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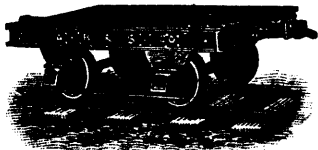
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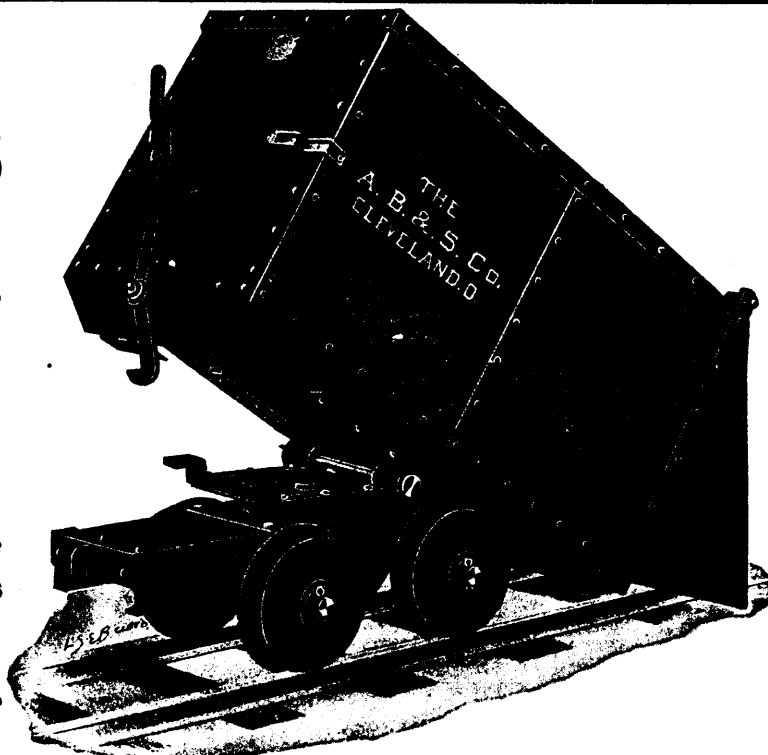
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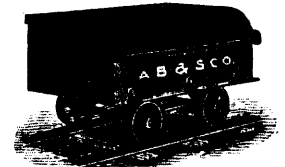
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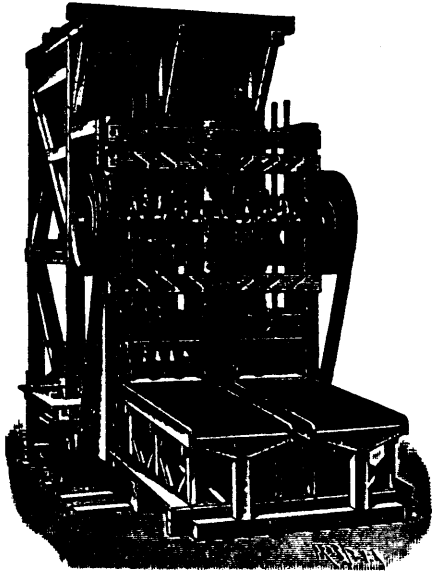
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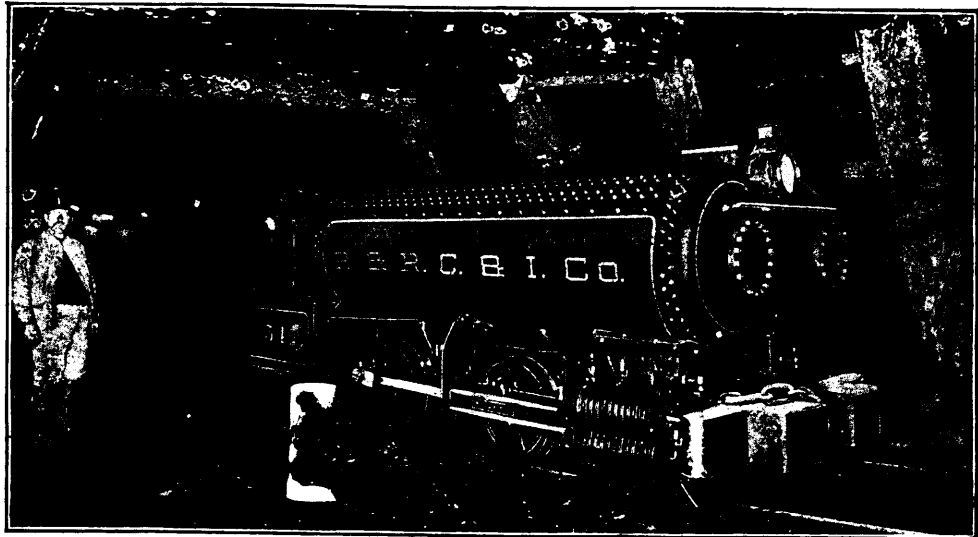
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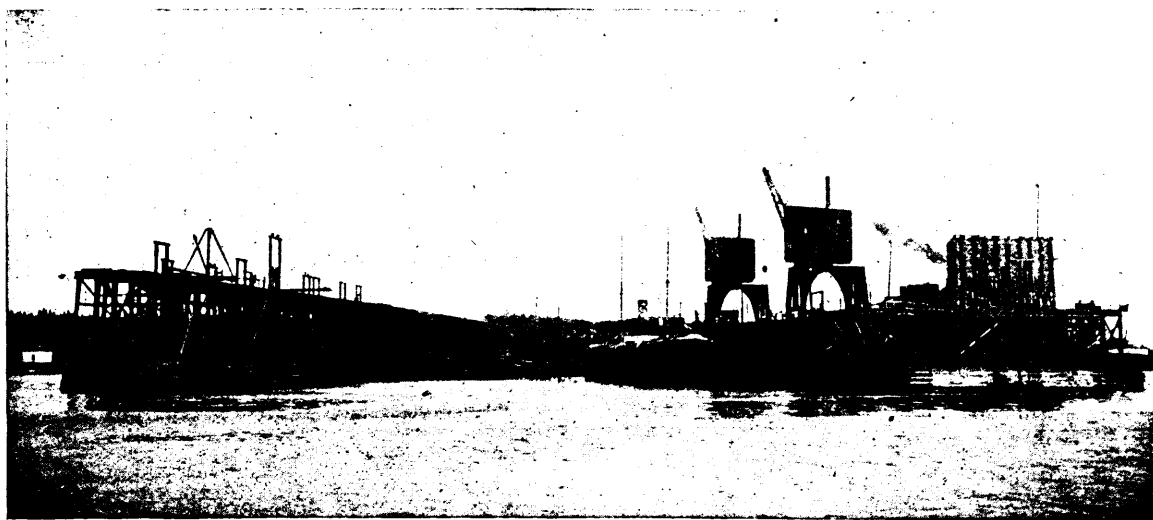
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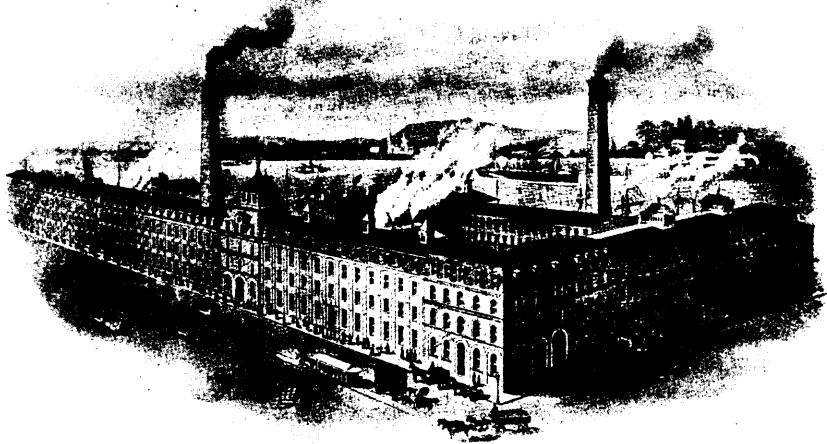
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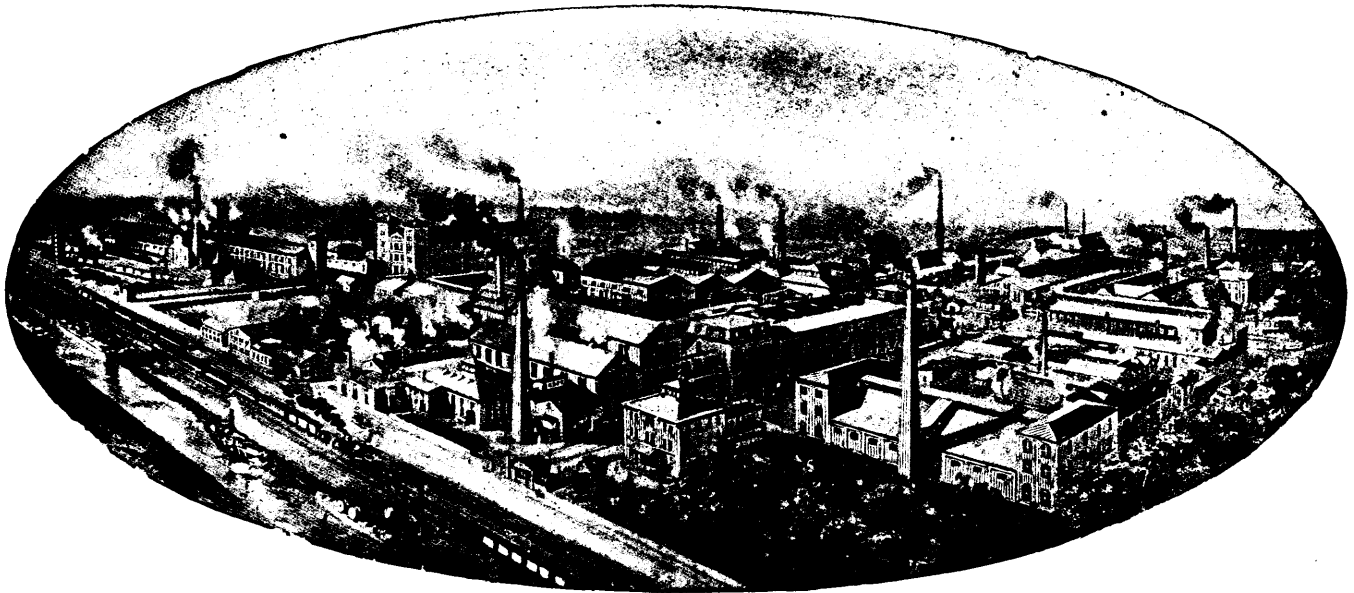
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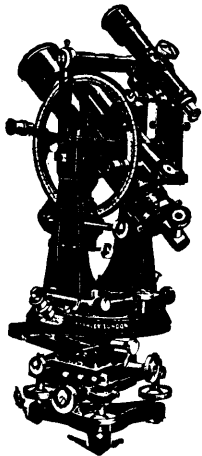
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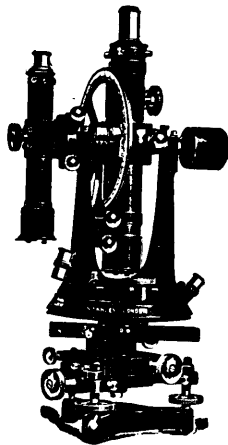
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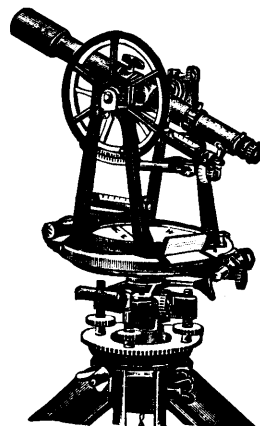
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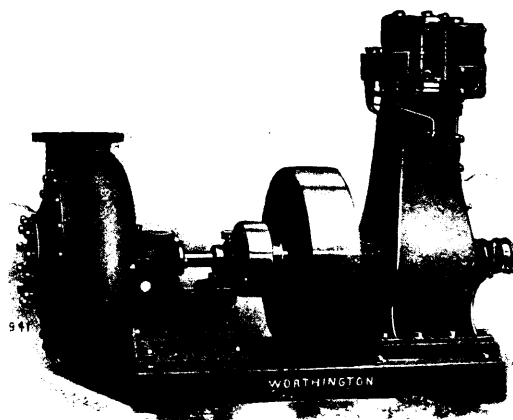
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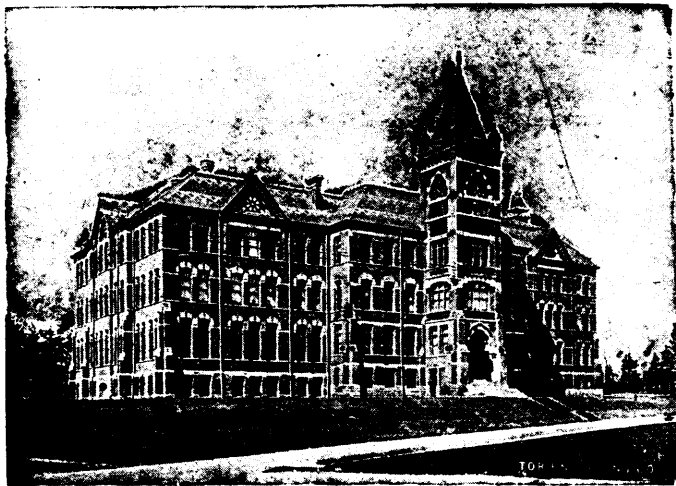


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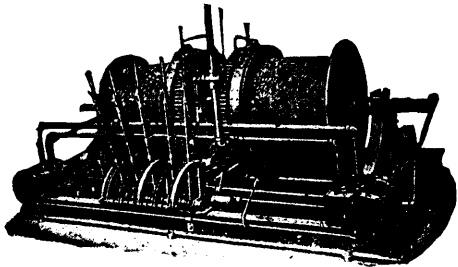
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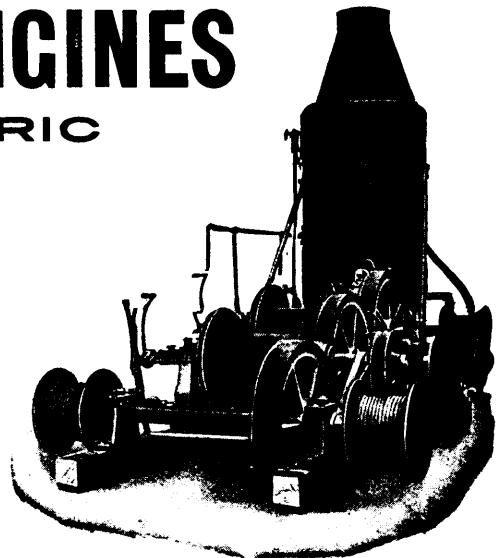


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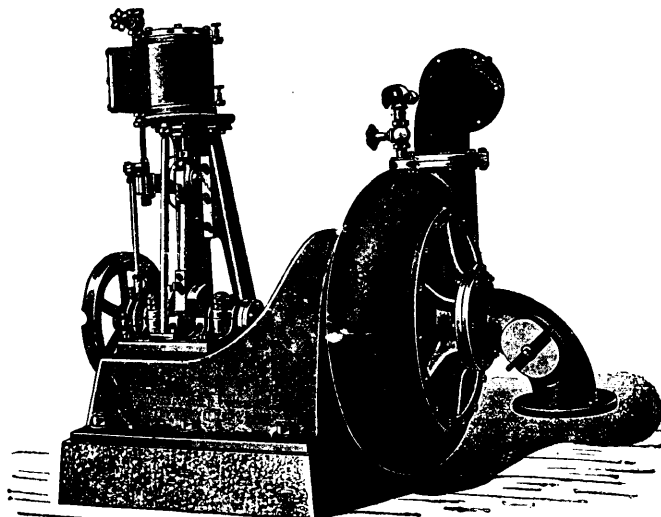
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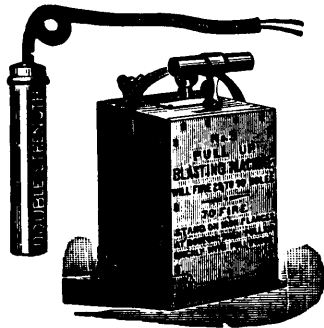
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JUDICIAL SALE

By Auction of Mining Property in the Rainy River District, Ontario, Canada, and in Cochise County, State of Arizona, and Eldorado County, in the State of California, in the United States of America.

PURSUANT to the Winding Up Order in the matter of the **Twentieth Century Mining Company, Limited**, there will be offered for sale with the approbation of J. A. McAndrew, Esquire, Official Referee, by Messrs. Suckling & Company, at their Auction Rooms, 66-68 Wellington Street, West, in the City of Toronto, at Twelve o'clock Noon, on Saturday, the 16th day of September, A.D. 1905, the following Mining Properties, and License:—

PARCEL 1. Mining locations in Manitou Lake region, District of Rainy River, Province of Ontario, Canada: being I.P. 398, fifty four acres: H. W. 44, forty-five acres; H. W. 47, forty-six acres; H. W. 204, one hundred and thirty five acres (total—two hundred and seventy acres): together with Shaft House, Blacksmith Shop, Assay Office, Stables, Boarding Camp, Ice House, Store House, Manager's Residence Oil House, Miners' Dwelling, Power House and Warehouse, together with a Diamond Drill.

PARCEL 2. United States Mining Claims known as "Copper Prince" and "Copper Plume," in Cochise County, in the State of Arizona, United States of America.

PARCEL 3. California property situate in Eldorado County in the State of California, United States of America, three miles from Onio Ranch: and being known as the Coleman-Barr property, one hundred and sixty acres, held under United States Patent; and Hopkins and Perry property, forty acres, held under United States Mining Claim.

PARCEL 4. License for the Province of Ontario for Canadian Patent known as Electro Godeitic Mineral Finder.

The above parcels will be offered for sale subject to reserve bids.

The Purchasers of Parcels 1, 2 and 3, shall pay a deposit of ten per cent. of the purchase money at the time of sale, twenty-three and one-third per cent. within ten days thereafter, and the balance in two and four months, satisfactorily secured, with interest at seven per cent.

The Purchaser of Parcel 4 shall pay a deposit of twenty per cent. of the purchase money at the time of sale, and the balance within ten days thereafter.

In all other respects the terms and conditions of sale will be the standing conditions of the Court.

Further particulars may be had from the Liquidator, E. R. C. Clarkson, 33 Scott St., Toronto, Ont., or from his Solicitors Messrs. Rowell, Reid, Wilkie, Wood & Gibson, 46 King St. West, Toronto, Ont.

The properties may be inspected on application to either of the above parties.

Dated at Toronto this 24th day of July, 1905.

E. R. C. CLARKSON,
Liquidator.
ROWELL, REID, WILKIE, WOOD & GIBSON,
Solicitors for Liquidator.

JUDICIAL SALE

BY AUCTION, OF THE MINING PROPERTIES, PLANT, MACHINERY AND ASSETS OF
LAURENTIAN MINING COMPANY, Limited.

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

Buildings consist of Power House, Oil House, Shaft House, Boiler House, Assay Office, Manager's Residence, Blacksmith Shop, Mill Building, Stamp Mill Complete, Stables, Cook Camp, Sleeping Camps..... 22,987.21

Also chattels, supplies, and loose machinery, including 2,444 cords of wood and a Boiler at Dinorwic Station.

Ore in the dump, value placed at..... 1,000.00

All the above assets will be sold in one lot and subject to a reserve bid.

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; 23 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%).

In other respects the conditions of sale will be the standing conditions of Court.

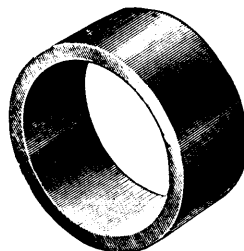
For further particulars apply to E. R. C. Clarkson, Esquire, or to his Solicitors, Messrs. Parker & Clark, 59 Yonge Street.

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BY AUCTION OF
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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 whole will be sold as one parcel subject to reserve bid.

The purchasers shall pay a deposit of ten per cent. of the purchase money at the time of sale, 23 1-3 per cent. within ten days thereafter and the balance in two and four months, satisfactorily secured, with interest at 7%.

In all other respects the terms and conditions of sale will be the standing conditions of the Court.

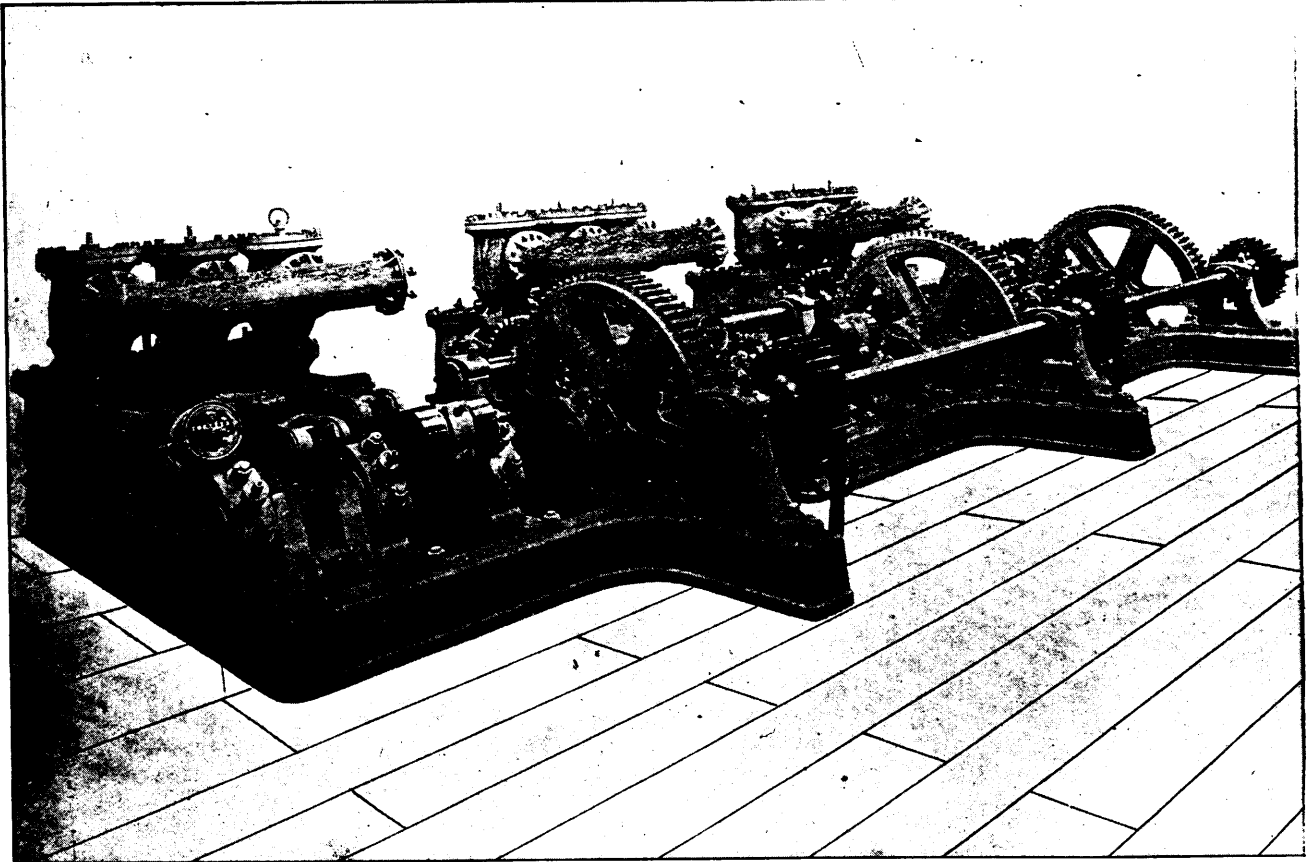
Further particulars may be had from the Liquidator, E. R. C. Clarkson, 33 Scott Street, Toronto, or his Solicitors, Messrs. Parker & Clark, 59 Yonge Street, Toronto.

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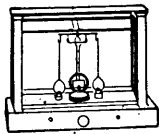
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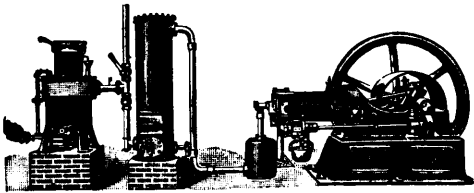
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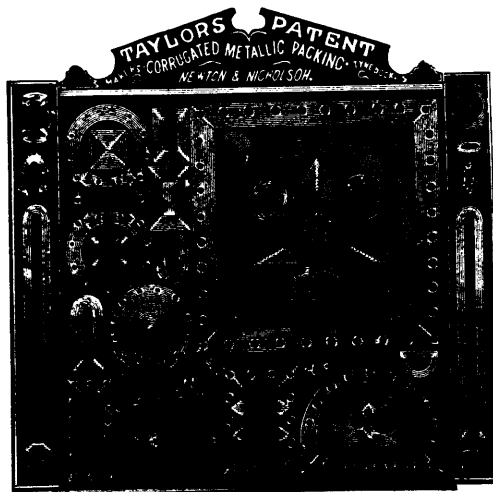
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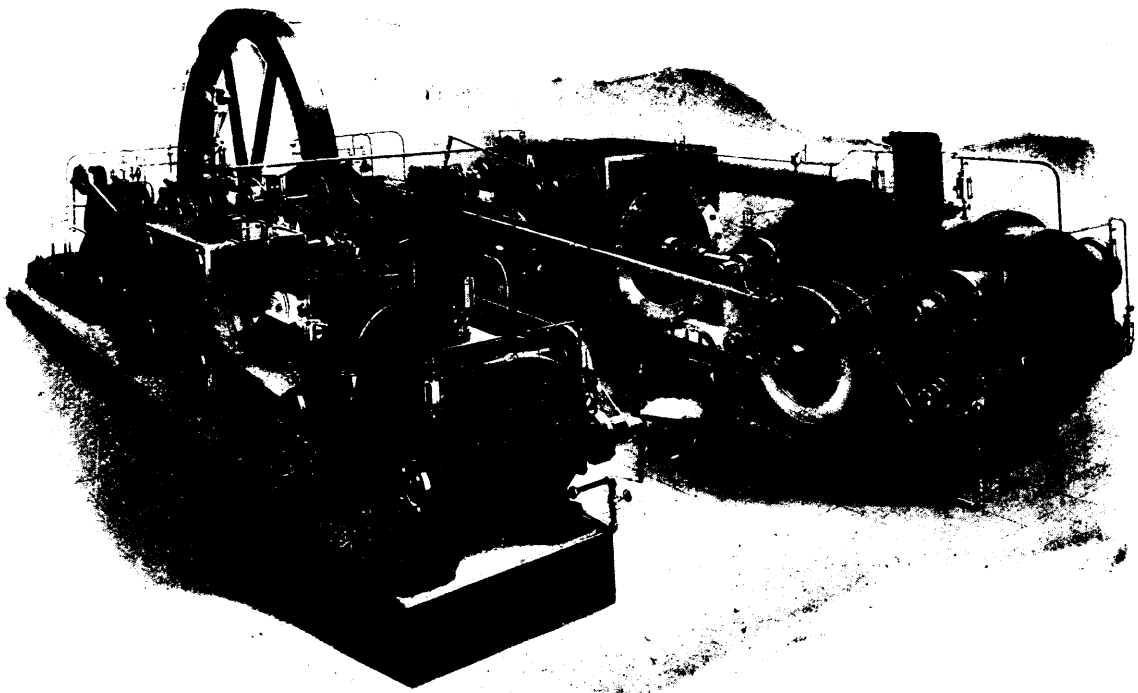
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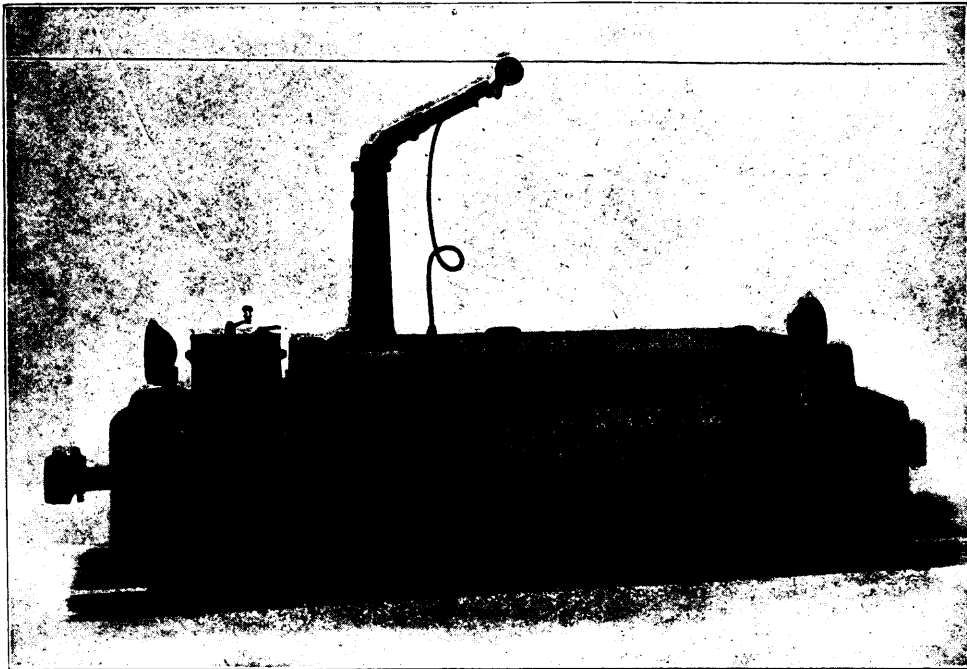
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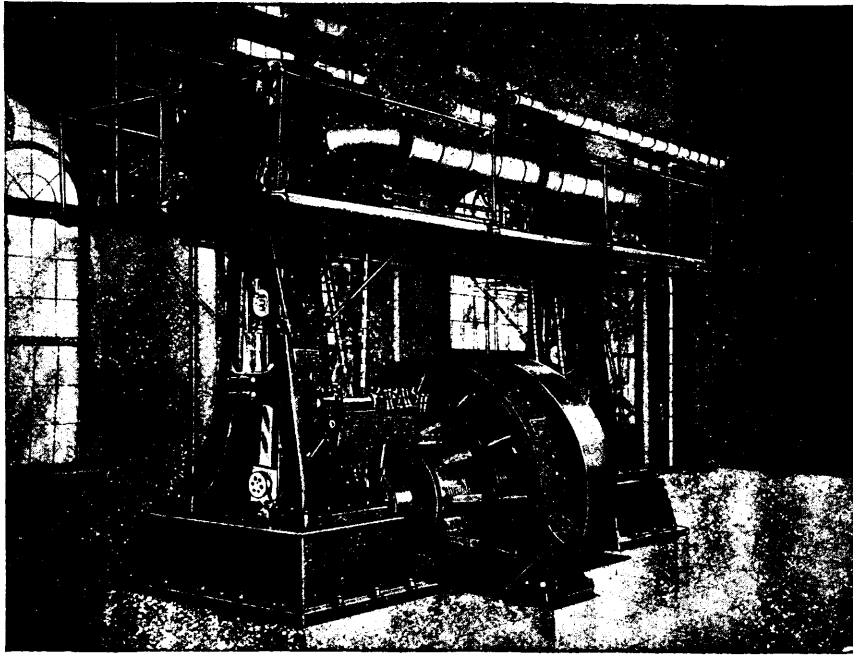
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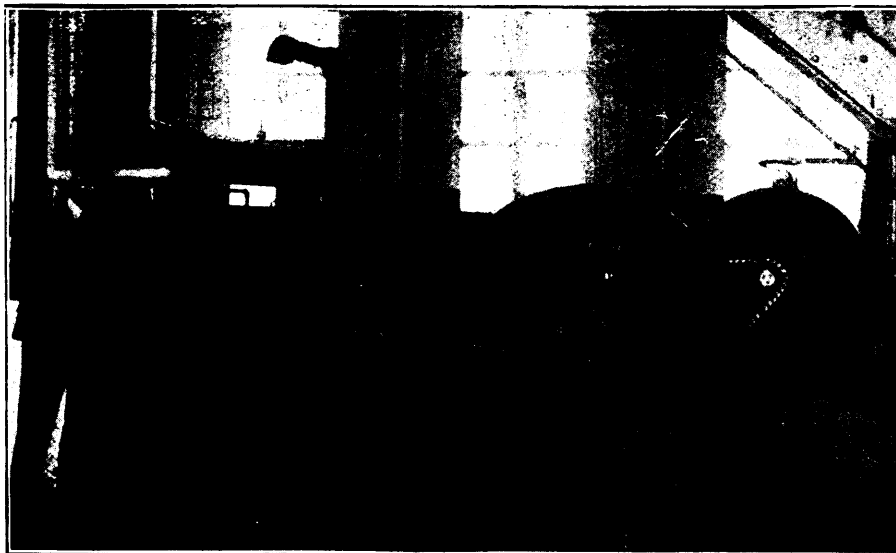
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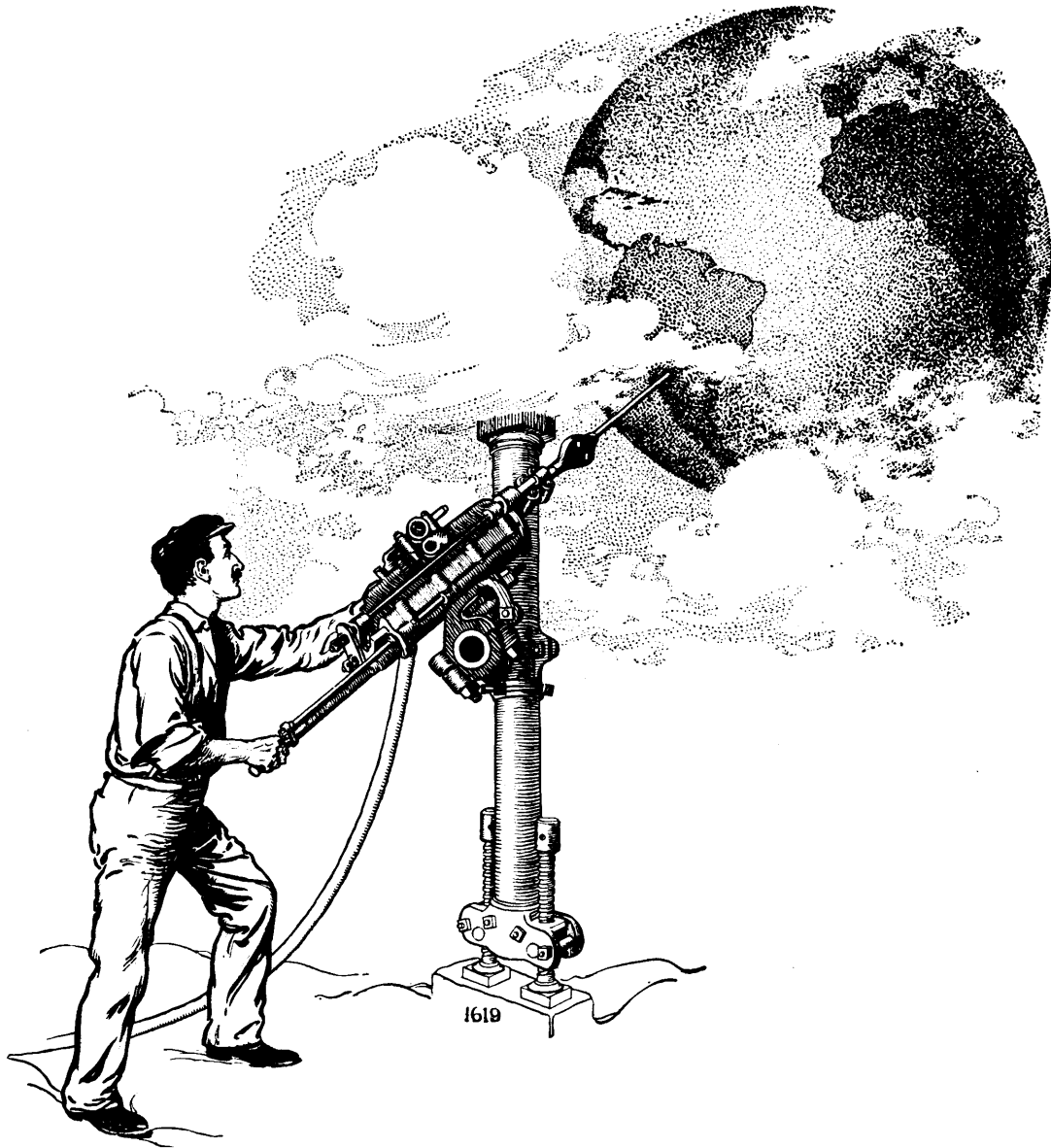
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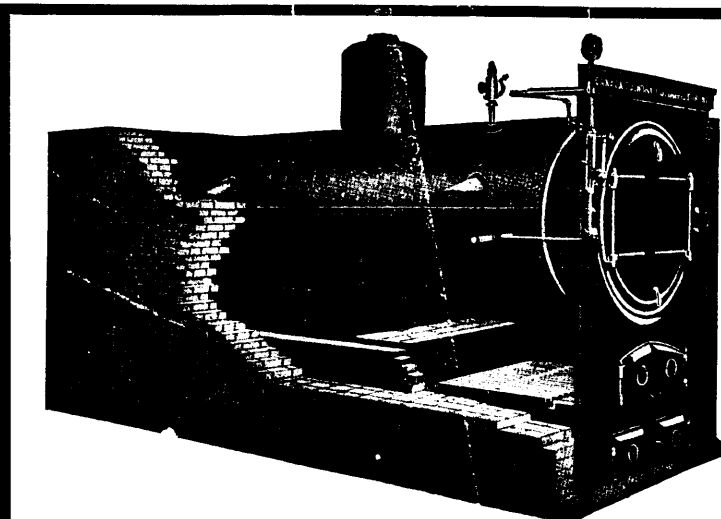
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The REVIEW appears this month in a somewhat changed, and, it is hoped, a more convenient form, the page having been reduced from what is known as a royal to a demy sheet, the latter having been generally adopted as a standard by the leading technical periodicals on this continent. It is believed the change in size will be approved by those who file or bind this journal, as the smaller dimensions will permit of the easier disposition of future volumes in the book-shelf or book-case, while the

monthly issue will doubtless be more readily handled and perused. The reduction in the dimension of the page is, of course, far from being an attempt on the part of the publishers to economise on cost, and so cheat the readers of the REVIEW out of so many hundred or thousand words per month; but, on the contrary, in making the change, which has necessitated increasing the number of pages over those usually printed, the monthly expenditures on account of printing will be considerably heavier than formerly, the departure having been made solely in the interests of our subscribers and advertisers.

The Assistant Secretary of the United States Treasury, who has direction of Customs' affairs, after hearing the argument in regard to the assessment of duty on "zinc lead ore imported into the United States," has decided that such ore should be taxed 20 per cent *ad valorem* on the zinc contents, basing his decision on the fact that the small percentage of lead which the British Columbian ores carry does not entitle them to be classified under the head of "lead-bearing." A decision as to what percentage of lead constitutes a commercial quantity has not yet been rendered, the matter being still under consideration. Now the question has been decided, Canadian miners may readily grant that from an ordinary business standpoint they have been treated in no wise unfairly, and it is merely surprising that their Joplin competitors allowed matters to drift under the old arrangement as long as they did. Meanwhile, we are glad to know that the Dominion Government has acceded to the request of the British Columbian zinc producers, and others interested in the industry, and that ere long an authority on zinc ore deposits and mining will be retained to make a thorough examination of and report on the zinc resources of that province, and at the same time offer recommendations as to method of treatment and the development of markets.

It is not likely that many people will take advantage of an invitation extended to the public by

Messrs. Fox & Ross, stockbrokers, of Toronto, to invest in the shares of a British Columbia company, on whose property, according to a report (so the advertisement states) of a Mr. A. F. Hogue, mining engineer ("formerly manager of the great Broken Hill mines of Australia, from which hundreds of millions of pounds sterling were taken by its fortunate English shareholders") "is a showing that is almost an exact counterpart of this famous mine;" even when they are told, too, that these claims, which are described as the King Edward mines in the Boundary district, are situated only about eight miles from the Granby ("the Mother Lode shipping about 20,000 tons weekly"). This seems to read as if the advertisers wish to intimate that the Mother Lode was one of the properties of the Granby Company, whereas the property is owned by the British Columbia Copper Company, of Greenwood, and its shipments do not exceed 4,000 tons of ore a week. We are not aware that any such mine as the King Edward exists in the Boundary district, although there is a group of claims of this name, at Keremeos, in the Similkameen district, some 40 or 50 miles, at least, distant from Greenwood. As we have stated, any one trying to sell British Columbia mining stock in the east at the moment is wasting his time, therefore there is no particular necessity to quarrel with promoters or others who resort to misstatements in the attempt to do so. The public just now can afford to laugh.

The *British Columbia Mining Record*, in championing Mr. A. J. McMillan, the Le Roi Company's managing director and general manager, against the criticism of which he has, of late, been made the target, states that: "The reply to the allegation that he is gutting the mine is that he is only shipping to the smelter ore that can be mined and treated at a profit. His carping critics complain further because profits that are being applied to development at depth—down to 1,550 ft.—are not available for distribution among the stockholders. They are indeed hard up for proof of Mr. McMillan's alleged unsuitability for the important position he so successfully fills when they misrepresent him in this connection. If there is one thing more than another required to ensure permanence of the mining industry in this province, it is to prove that ore, of profitable quality occurs at considerable depth. This, Mr. McMillan and his competent officials are doing, and doing it thoroughly, yet misrepresentation and abuse are indulged in. It is evident that the old fable of the man who was blamed whether he rode or carried the ass still finds application. Mr. McMillan, however, is not giving the fault-finders the satisfaction of answering their complaints. Like a wise man

he is reserving the rendering of his account of his stewardship for the next general meeting of Le Roi shareholders, who will judge him by the gratifying results achieved, and not by criticism that is manifestly unfair."

We reprint our contemporary's statement in defence of Mr. McMillan, in order to give it the fullest possible publicity. By all means, let's have fair play and defer judgment until after the Le Roi annual meeting. But if Mr. McMillan's attitude in connection with the proposed Le Roi-Centre Star consolidation was disinterested and unprejudiced, then what was the attitude of Mr. G. S. Waterlow? Despite Mr. McMillan's opposition, we have good authority for believing that the consolidation scheme will yet go through.

Quite an interesting story might be written, entitled, "The Travels of a News Item." Here, for example, is the basis of a plot—

Special information appeared in the June issue of the *Canadian Mining Review* (page 144) referring to the prospect of a sale of the Consolidated Cariboo Hydraulic Mine to a syndicate, represented by Mr. John Hays Hammond. This information was copied with and without credit by several of the newspapers in British Columbia, and finally is returned to Montreal in the form of a special despatch from a Vancouver correspondent, who notifies the *Montreal Star* that he learns "on the best authority that the directors of the Consolidated Cariboo Hydraulic Mining Co. have given an option on their property to Mr. John Hays Hammond, etc., etc.," these being the identical words used in the article which appeared in the *REVIEW*. It is reasonable to suppose that such a rambling excursion was not undertaken without some expense, and it is to be hoped that the Vancouver correspondent, at least, was adequately remunerated for his pains.

There is at the moment a formidable agitation in the Province of Ontario for the imposition of royalties on minerals, but more especially on cobalt and silver in connection with the new Temiskaming discoveries. Mining men, so far have regarded this agitation with comparative indifference, but, in view of past experience, are scarcely justified in so doing. With unthinking people plausible reasons can always be urged for killing the goose that lays the golden egg. Some will doubtless recollect that when the industry appeared to be entering on an era of prosperity in 1890-91 the Ontario Government and Legislature imposed a system of royalties which had the effect of paralyzing the industry. As soon as the effect was noted an agitation arose for the abolition of the royalties, and they were, in 1900, abolished with universal approval. Nor is this the only experience. Mining operators in Ontario should

watch the agitation much more closely than they are doing. The Canadian Mining Institute is on record as being utterly opposed to the system of royalties, and if need be, the attention of the Council will be directed to the present movement in order that an organized effort may be made to oppose it.

We have received a copy of the prospectus of the Hill Crest Coal & Coke Co., which has been formed with a capital of \$500,000.00, and a bond issue of \$250,000.00, to operate coal mines near the town of Frank, Alberta, one mile and a half from the Belleville Siding of the Crow's Nest Pass Railway. The prospectus is, in many respects, a model one. In the first place, the capitalization is exceedingly moderate; the shares are issued at their par value and the money so realized is to be utilized for strictly business purposes, the promoters receiving only \$50,000.00, to be paid them in stock. Of the total bond issue—bearing interest at 5 per cent. for thirty years—an issue of \$150,000.00 is to be placed on the market, it being proposed to establish a sinking fund to provide for repayment. The remaining bonds, to the value of \$100,000.00 can be issued only to reimburse the Company for 75 per cent. of future expenditures which may be made in developing the mine, or in the acquisition of additional property, but none of these bonds can be issued until the Company's net earnings are at least double the amount of the interest charges on the bonds then outstanding, plus a sinking fund of \$3,452.00 per annum, and double the amount of the interest charges which would accrue on the additional bonds then proposed to be issued, with a sinking fund sufficient to retire these bonds at maturity. The property itself appears to be a very valuable one, and comprises an area of two miles by half a mile of coal rights, including three large workable and developed seams of coal, and two smaller seams upon which no development work has been done. The company also owns clay rights for 120 acres of firebrick clay, two square miles of timber limits, water power and other assets. The mine is capable of producing 1,000 tons of coal a day, while it is stated there is an assured market for 600 tons. This, of course, at present, is the great difficulty in connection with coal mining in Alberta, but while there appears to be ample coal of excellent quality, there is a decided limitation in the matter of markets. The company's engineer states that the coal here is similar to the Frank coal, which is a favourite locomotive coal, and also possesses good coking qualities. The seams dip to the west 32°; the roof being very strong sandstone, and the floor being also hard, necessitates the use of very little timber. It is estimated that in one or two seams above the levels from the bottom of the 300 ft. incline there are ten million tons of coal available, less 25 per cent. for loss in working.

Shareholders of the Ogilvie Gold Dredging Co., Ltd., received in July a circular letter or report from the President and Manager, Mr. William Ogilvie, which, in respect of lack of information, is certainly unique. We have in previous issues commented on the autocratic way in which certain officials of this corporation withheld information from shareholders, and have expressed the fear that the future held little promise for them. The present document is confirmatory evidence. Mr. W. Ogilvie, the Manager-President, or the President-Manager, in this last letter or report or document (which by the way is not dated) states that he is "trying to secure the funds necessary" to put the business "on a practical working basis, but at present can say no more." Is it that he is without hope that prevents his giving the shareholders details? or is it that he is fearful that the apple-cart may be upset if full information be laid before his corporation?

Mr. Ogilvie also coolly informs long-suffering shareholders that while he believing (as he says) "in Stewart River as much as I (he) ever did," it has long appeared desirable to him "to secure ground more favorably situated to the work." He complains that the height of water "and other conditions" are not as constant "as those used to our Eastern streams would consider natural and proper." What have "those used to Eastern streams" to do with the question? Why should it matter what "those used to Eastern streams" think is "natural and proper." Was not one of the reasons why Mr. Ogilvie was engineered to the management of this concern because he was "used to" Arctic streams? We must confess to an incapacity to understand this reference to Eastern streams.

In brief Mr. Ogilvie's report is a disingenuous effort to turn his company, its funds and effects to new ground on the Klondike over near Dawson.

In the statements of expenditure submitted there are items well worth an explanation. For instance, we find that out of a total expenditure of \$76,302.56, the sum of \$20,222.65 is charged to "miscellaneous expense" account, so that 38 per cent. of the whole sum expended is denominated "miscellaneous." Again, the "salary account" for a total of \$3,500.78 worth of gold dust recovered, is \$23,000.00, so that it has taken \$6.40 in salaries to earn \$1.00 in gold dust. The two items of "miscellaneous expense" and "salaries" have absorbed 70 per cent. of the total amount expended, while labour, fuel, etc., all lumped together under the head of "maintenance and repairs," have only required 4½ per cent. of the expenditure.

Truly, one wonders what sort of directors this corporation has. Are they wooden men or have they been hypnotized? How long would any business corporation allow its "miscellaneous expenses" to be eight or nine times as great as its income? The expenditure of \$17,221.15 in the year 1904-05

brought forth the magnificent sum of \$2,731.49, that is, it cost \$7.26 to get \$1.00. Truly, this is the case of the mountain bringing a mouse into birth.

So long as shareholders are content with such management as this, just so long will gold mining remain a by-word and a reproach.

It is always gratifying to learn that one's advice is valued, and it is, therefore, flattering to note that the *Toronto Globe* evidently recognizing the force of the editorial remark in our last month's issue to the effect that the daily press of Ontario, judging from its inattention, had failed to realize the importance of the cobalt-silver discoveries in the Temiskaming district, came out a week or so ago with a long account (eight columns) of the Coleman Township, written by Mr. Wallace Maclean. The only unfortunate part of it is that the excellent *Globe* has "gone us one better," and the article is couched in the old familiar bombastic language which characterized the newspaper accounts of mining doings in Rossland during the period between 1896 and the end of 1898. A crowning touch of (unconscious) humour, however, is to be found in a sub-headline wherein it is solemnly affirmed that the writer "gives the truth" about the mines; very neatly suggesting perhaps that former articles had not observed this detail. As a matter of fact, the brief notices previously published in the *Globe* announcing the discovery of the field before Christmas, 1903, were reasonably accurate, whereas, the present account is—well, the exaggerations are somewhat noticeable. The same issue of the *Globe* contains a leading article, commenting on the statements as presented by Mr. Maclean, the substance of which inclines one to the opinion that the editorial staff of this important newspaper must include a writer far advanced in senility, or in complete ignorance of his subject. In view (for example) of the information contained in Prof. Miller's published account of this district (Thirteenth Report of the Bureau of Mines, Ontario, 1904, p. 96) where the character of the deposit is quite clearly defined, as being "distinctly veinlike in form" and of only a few inches in width, and as "dipping almost vertically," there was surely no excuse for such a statement as the following: "It is quite impossible to form any definite conception of the extent and value of this great bed of silver ore, but it is evidently quite safe to assume that the rock is argentiferously rich over a considerable area." The utter, idiotic nonsense of which the ordinary newspaper writer is capable and does produce, when discussing technical matters, is well exemplified in this article to which we allude. The harm of such writing was demonstrated ten years ago when the Eastern Canadian press was largely responsible for the British Columbia boom, the injurious effect of which is still felt by the mining industry of that

province, while hundreds, if not thousands of people resident in our Eastern Canadian cities suffered considerable financial losses in consequence. Ontario now may well cry: "Save me from my friends." Of the mineral wealth of the province there can be no doubt; progress henceforward will be rapid and success undoubted. The only danger to be now apprehended is the provincial boomster, from whose machinations, good Lord, deliver us.

We regret the necessity of challenging Mr. Maclean's figures of production, but as we had a representative in the field only a week previous to that gentleman's visit, and as our figures do not agree at all with his, we feel justified in questioning whether Mr. Maclean took the necessary trouble to secure reliable data, and more particularly so as he inadvertently acknowledges in his article the impeachable evidence on which his figures are calculated, e.g.: "The production of this mine (McKinley-Darragh) is placed at \$75,000. This figure is hardly correct but with the fact that only 13 carloads have been shipped. * * * * Mr. Darragh was not disposed to tell the income from the ore shipped to date, but a gentleman who knows Mr. Gorman told me," etc., etc. The more correct figures for the McKinley-Darragh are \$48,000. * * * Likewise in the case of Mr. Lawson's property:—"One carload (tonnage unknown) has been shipped. In the absence of Mr. Lawson I have estimated the value of the carload at \$60,000."

From figures which the REVIEW obtained at the expenditure of some time and trouble, the total production of the district up to the 15th day of July was \$1,560,000, of which the value of the tonnage actually shipped amounted to less than \$1,245,000, or about 50 per cent. of Mr. Maclean's figures. This production of a million and a quarter dollars is the result of one and a half year's work. The total production to the first of April, 1905, was \$640,000, for the three and one-half months following (to July 15th), the amount was \$605,000. Canada cannot afford another fake mining boom such as she experienced from 1896 to 1905. To overestimate or to exaggerate our resources is to court disaster, and produce revulsion. The London market does not recognize the fact that British Columbia is rising resplendent from the ashes of its boom, and is now established on a solid mining basis; nor will it, in all probability, for a few years yet. Our newspaper friends in Toronto will do well to remember the disastrous effects of their zeal in the Rossland boom. Let us have facts, by all means, but let us not listen to suppositions nor hearsay yarns.

The Halifax Morning *Chronicle*, with a lack of courtesy that is somewhat surprising in a daily newspaper of standing, insinuates that the remarks

published in the REVIEW last month on the subject of iron mining in Nova Scotia wilfully misrepresented the facts in order to depreciate the value of "securities which the market report shows are highly esteemed." This suggestion is unworthy of our contemporary. The *Chronicle* is, however, correct in its assertion that the paragraph in question laid insufficient stress on the commercial importance of the Torbrook and Londonderry deposits, and we hasten to make amends by printing in this issue a specially contributed descriptive article on the Londonderry Iron & Mining Company's works and properties. This is the first, of what we hope will be a series of articles on the iron ore fields of Nova Scotia. But the general truth of our contention, that no commercial iron ore (with the exceptions as noted) has yet been discovered in Nova Scotia, does not, we think, afford much opportunity for controversial discussion. A commercial iron ore is an ore that will readily sell in the ore market. Such an ore must contain from 50 per cent. to 60 per cent. of metallic iron, not over 10 per cent. of silica, with phosphorus, sulphur and titanium well within certain narrow limits. How much ore in Nova Scotia is equal to these requirements? The sole object of the REVIEW in denying the discovery of commercial iron ore in the province was to prove that a bounty on iron ore production would be of no practical assistance to the Nova Scotian iron and steel industries. The *Chronicle* now, not very logically, it seems to us, replies:—

"If this condition of things turns out to be unfortunately true then the Government will incur no expense in the payment of bounties."

But what about the iron and steel manufacturers? And adds:—

"We cannot understand why the very existence of iron ore in commercially productive quantities should be denied in order that an argument against the payment of a bounty should be manufactured. The truth is, it is no answer, and the further truth is we have many known deposits abundant in quantity and excellent in quality. Emphasis is laid on the alleged fact that the existing iron manufacturers have searched for ore and found it not. What value can be given to the argument even if it were based on a fact when we reflect that these searches were made on properties owned by others, which companies named probably could not buy at their own price. At the best the reports of the iron manufacturers could not be considered disinterested under such circumstances."

It is rather a waste of time and space to discuss the matter much further, but if it be true that Nova Scotia has "many known deposits abundant in quantity (sic) and excellent in quality" then as it is manifestly to the advantage of the local industrial concerns to utilize local ores, why are these rich deposits neglected? Our contemporary has presumably the interests of Nova Scotia at heart. It therefore surely does not realize that in proposing to substitute for the present bounty on manufactured iron and steel (which is a reality) a subsidy

on iron ore production (which is entirely problematical), it would aim a heavy blow at one of the chief industries of the province.

A NATIONAL DEPARTMENT OF MINES.

It is now very generally understood that the Dominion Government is about to act in accordance with the repeated representations and recommendations that have been made by mining and other organizations during recent years, urging the establishment of a Department of Mines at Ottawa, under the direction of a responsible minister. Matters have even gone so far for the rumour to be circulated that this portfolio will be offered to the Hon. Senator Templeman. At the moment, we need merely remark, as this report is entirely unconfirmed, that in the event of the creation of a Department of Mines there are few men who would be better qualified to undertake the direction of it than the hon. gentleman, who, as one of the representatives of the "mineral province of the Dominion," is naturally well informed concerning the necessities and requirements of the mining industry. The practical and scientific work in connection with the Department of Mines would, however, necessarily be under specialist direction, and it is essential that great care should be exercised in the selection of an officer to undertake these important duties. In the United States this work is in charge of the Director of the Geological Survey, the law having provided that "the Director shall have charge of the mineral resources and products of the national domain." Such an arrangement is manifestly a sensible one, as, of course, the function of the Geological Survey is, first and foremost, to assist the development of the mineral resources of the country. While the Geological Survey of Canada is doing, and has done, useful work on economic lines, there can be no question that the present system is imperfect in many material respects, and that the service might be reorganized or remodelled to very great advantage. During the past year or so we have had at Ottawa a Geological Survey and a Mines' Office, the latter working quite independently of the Survey. There is also a mining section of the Survey. It may be readily understood that, so long as these two institutions are maintained upon independent lines, the work of each is rendered less effectual, while expenditures are necessarily greater than they would be were the two departments under one direction. It is quite possible, for example, for work to be duplicated, and a recent case in point might be cited. We are now on the eve of a very considerable mining progress in the Dominion. The last half a dozen years have been regarded as a time of depression, but this is only true in a sense that there has

been no stock speculation. On the other hand, there has been a steady and continuous development of our resources, an improvement in market conditions and a general extension of the productive mineral area. The establishment of an adequately equipped Department of Mines at this juncture would, therefore, be most opportune and desirable. The publication of bulletins at regular intervals giving the statistics of production; the issuance of monographs dealing with special phases of industry or describing the conditions of production of some particular mineral, or reporting on new territory and discoveries, are needed to interest capital in the industry, and to assist those now engaged in the country in developing its resources. Without desiring in any way to reflect on the work of the Geological Survey of Canada during recent years, one must admit that a very large number of the reports issued have either been valueless (on account of the delay in publication) or the information they contained was not of the kind that is desired by mining communities. Comparing our system with that of the United States, where a very high standard of efficiency is maintained, one necessarily realizes how much Canada has to learn. It may, of course, be argued that the efficiency of the United States Survey is merely the result of a lavish expenditure of money, and that, in this respect, Canada is not in a position to follow, but while, doubtless, the large appropriation made for geological work in the neighboring republic is naturally conducive to the best results, these would not be obtainable were it not for the system that prevails. The great difference, in short, between the United States Survey and our own institution is that, the one is organized and the other is not; the one is non-political in character, whereas the other is hampered by political restrictions. Thus there can be no doubt that the successful work and efficiency of the United States Geological Survey is largely attributable to the fact that it, by the act by which it was established, is completely and absolutely divorced from any consideration of political influence. The members of the staff are not mere proteges of influential politicians, and are not, therefore, appointed regardless of special fitness or talent, but, instead, are required to pass qualifying examinations by which their abilities are very searchingly put to the test. Moreover, no man's services are required unless he displays a proper amount of zeal, energy and capacity in the performance of his duties. Another excellent feature conducive to the satisfactory conduct of the service is a provision vesting in the director full authority for the appointment or dismissal of members of his staff; while, too, it is possible to secure and retain really valuable assistance, as the salaries paid to members of the staff compare favorably with the remuneration professional men of equal standing are accustomed to expect from ordinary business under-

takings desiring to requisition their services. In both respects our system in Canada is dissimilar. The hands of the Director of the Canadian Geological Survey are tied by the Civil Service Act to such an extent that he practically has nothing to say in the appointment of his assistants, nor can he dispense with the services of useless individuals. Again, so inadequate are the salaries paid at present to members of the staff that it is practically impossible to retain—although there are one or two notable exceptions—really good men in the service for any length of time. To compare still further, the United States Geological Survey does not permit its members to engage in private practice. In Canada, last year, we had the unedifying spectacle of a member of the Geological Survey reporting, at the expense of the country on a coal area, in order, primarily, to assist a joint stock company owning this area to dispose of its shares to the same public. In this case the report was actually permitted to be handed to the company in question and printed by them in a prospectus before it was published by the Government in the ordinary way. Such practices as these should not be tolerated for a moment, and it is not too much to say that they not only bring the Survey into disrepute, but, to a large extent, neutralize the effect of any good work that may be done. It is fairly safe to assume, we think, that a Geological Survey in any country is not created merely as a department for the conduct of scientific investigation, but it is, first and foremost, a governmental bureau intended to benefit the general public, not necessarily the scientific public; but to be regarded as machinery provided by government to aid in the economic development of the country.

An instance, meanwhile, of the present lack of organization of our Geological Survey is afforded in the circumstances that a geologist now going into the field is required to spend at least two-thirds of his time in making topographical observations and in compiling maps from this data; thus he has had but little time left to devote to actual geological work. This is obviously a waste of time and also of money, for a geologist, as a rule, commands a higher salary than a topographer. In the United States, and other countries, the practice is to dispatch skilled topographers to a certain district or region to make a topographical map thereof, in order that the geologist may subsequently use it as the basis for his work. This plan should undoubtedly be adopted in Canada, and the regular field staff of the Survey should include two sections, namely topographers and geologists, and any district to be investigated should be visited first by the topographer, whose work could then be advantageously followed up by the geologist. In the United States the country is divided up into quadrangles, the survey of these quadrangles being undertaken in the order of their relative economic importance. When this is com-

pleted, four maps are made containing the information as follows:—

- (1) Topography, shown in a map of the area.
- (2) A map showing clearly the geological structure of the area in question.
- (3 and 4) Geological maps—one specially giving all information relative to occurrences or deposits of economic importance.

These maps are also accompanied by explanatory notes, and are regarded as of extreme practical utility by, not only scientific men, but by prospectors and others interested in the mining development of that country.

But, in addition (as has already been suggested), to make the Survey thoroughly efficient, its staff should include a number of mining geologists. The duties of these officers would be to examine and prepare detailed reports on known productive mineral areas, while their labours might well be supplemented by reports made by specialists (not necessarily members of the regular staff) on subjects, which in the estimation of the director, were deserving of special attention, or concerning which the public desired information. The prompt publication of these reports would undoubtedly be a valuable aid to the development of our mineral resources, and in many instances would serve to prevent mistakes or errors of judgment being made in the working of individual properties. Although the present Mining Section of the Survey serves some useful purpose, much more might be advantageously accomplished under proper direction, provided, of course, the funds were available for the purpose. Other countries publish—in some cases monthly, in other cases quarterly—bulletins of mineral production, and other statistics of economic value. Why not Canada? What earthly use (for example) is an annual statistical report for so long ago as the year 1903, a copy of which, issued by the Section of Mines, has just reached us?—though it is perhaps unfair to allude to the tardy appearance of this publication, since the mining engineer in charge of the work was absent from his office for four months last year in consequence of ill health, while he was subsequently engaged in the field on geological investigation until the first of November. But, nevertheless, this is no satisfactory reason, surely, to account for such extreme Departmental dilatoriness. In this connection, it may be noted that, while the report is supposed to deal with the 1903 returns, some of the information is only brought up to 1901. If one is interested in the study of ancient history this publication may possibly possess some value.

A well organized Department of Mines would, then, include a staff consisting of mining geologists, field geologists, topographers, chemists, and the ordinary editing and clerical staff. It should have

at its head a director, young, energetic, tactful, a good organizer, a capable administrator, and last, but not least, a man of high scientific standing and attainments. And we have every reason to believe that Government has already taken cognizance of these requirements.

THE LAW OF JOINT STOCK (ONTARIO) MINING COMPANIES.

"The buyer of mining stock is not entitled to any special protection," was a sentiment uttered by Queen's Counsel at a meeting of the Canadian Mining Institute in Montreal, some years ago. The subject under debate was the amendment of the law of joint stock companies. The sentiment quoted was apparently the sense of the meeting, no contrary opinion having been put on record. The consideration of amendments to the various provincial Companies' Acts was referred to a committee, of which Mr. Joseph Bawden, barrister, of Kingston, was appointed convener. No meeting of the committee has been held. It is stated that an insufficient response was given to the invitations sent out for the discussion of the subject. The limbo of good intentions has become the cemetery of the work given to the committee.

There is a world of meaning in the phrase, "the buyer of mining stock is not entitled to any special protection." In the first place he does not seek it, for the reason that in the great majority of cases he finds that he has been fooled, and the public confession of the fact he is unwilling to make, if even for the public benefit. He may be indignant that the Honourable Mr. So-and-so, or Mr. Justice What's-his-name allowed their names to go on the directorate, and he may figuratively kick himself for the stupidity under which he wrote his cheque when the names of these figureheads were pointed out to him. The salve he now applies to the sore spot is the discovery that these social luminaries who were used as deceiving decoys were themselves deceived. His cynicism, which now takes the phase of utter abhorrence of all mining stocks, he no longer pours into the ear of his neighbour Jones, who tells him that *he* made a good thing by investing in one of Heinz's copper companies, and that *he* turned away from a Canadian copper proposition for the sole reason that a political magnate's name was on the list of directors, and was rejoiced afterwards to find that his instinct had guided him safely.

In the second place, the device of any legal protection for the buyer of mining stock would defeat the object for which such stocks are put on the market. The impression, that the object of the company promoter is to raise capital for the operation of a mine in such a manner as to earn dividends, is a wholly mistaken one. The primary object of

the promoter is, as mine-owner, or as mine-owner's broker, to sell out at an enormous profit. If any dividend is earned or can be earned by working the mine, it is viewed simply as a by-product, subordinate to the main object in view. The Joint Stock Mining Companies' Act of Ontario is framed to afford the greatest possible facility for exploiting the public, with no requirement whatever for the exploitation of a mine. In fact, with the application for incorporation (a) proof is not required that the incorporators own a mine; (b) proof is not required that for the purchase or operation of a mine the incorporators have paid one cent into the company's treasury.

In fact, with the absence of these conditions, the Act should be entitled, "An Act for providing facilities for Exploiting the Public by the issue of Mining Companies' shares." That is the practical effect of the grant of incorporation to mining companies in Ontario. And what are the results upon the mining interests of the country? Some of them are here enumerated:—

1. The area of mining lands sold is far in excess of actual requirements. The business of speculating in mining property is stimulated at times very strangely, and by causes difficult to account for. The practice of buying parcels of land many hundreds of acres around a mineral prospect of a few acres loads enterprises at the outset with unreasonable cost. The fictitious advantage of ownership of extended surfaces is laid hold of to give the public an impression of territorial wealth for which no foundation exists.

2. The facilities given for the incorporation of mining companies without guarantees for the initial honesty of the adventure is of benefit to brokers alone in selling shares, and of no benefit whatever to persons honestly desiring to find capital for the honest development of mines, or those seeking legitimate investments in mines. Every fake company is effective for choking off ten honest adventures.

The Legislature of Ontario cannot aid legitimate mining enterprises by throwing down all barriers against the granting of mining company charters except that of a stiff incorporation fee. But it can do much to sift from the speculative efforts of professional wind-bags and get-rich-quick promoters, an immense amount of chaff wherein may be found an occasional parcel of sound grain. It can do this by inspection. It can clothe some functionary with the business of learning whether "The-Last-Chance-of-Your-Life Gold-Mine" is held under a good title by the men who are endeavouring to get a large price for the same, partly in stock, partly in cash. It can make it the duty of its inspectors to enquire into the transactions by which the gold mine with this euphonious title has become the property of

Brown & Jones, and their duty to obtain some honest opinion on the value and prospects of the mine. It should demand from promoters all the information they have as to the value of the minerals on a company's property. From these data it would be possible to pronounce on the good faith of the promoters. Without these data called for, the public may as well be warned that there is no protection given by the Joint Stock Mining Companies' Act against the perpetuation of the foul crime of obtaining money upon false pretences by the issue of mining shares.

The legitimate organization of mining companies for the operation of mining works and the development of mines on a dividend-paying basis are hindered in this province by the lack of system for supporting the initial stage of the development of mines. A period of exploration of deposits and testing of ores should be conducted to a considerable extent before placing mining property on the market. Strangely enough the experience of other mining companies has not been laid hold of to instruct our legislators in what is evidently required in this province. In Cornwall, England, the operation of initial or experimental mining enterprises is safely conducted on the cost-book system until the mines and miners are in need of larger capital, and are in a position to seek for the investment of money in shares of a joint-stock company. In British Columbia mining partnerships may be organized and conducted on a limited-liability principle, having some analogy to the Cornish cost-book system. The Ontario Act respecting co-operative associations, with very little modification, would suit admirably the business of carrying a mining enterprise through its earlier stages, but the Act is inapplicable, for the reason that it especially "excepts working of mines, minerals or quarries." Under it, any seven or more persons who desire to assemble themselves for the purpose of carrying on any labour, trade or business, may become incorporated, with power to make such by-laws as are required for the convenient management of the business. Incorporation is accomplished by signing and acknowledging before a notary or magistrate a certificate of intention to form an association, and by filing therewith a copy of the rules agreed upon by the parties in the office of the Registrar of the Registry Division in which the business is to be carried on. Beyond all question, if the provisions of this Act were extended to three or more persons desiring to work a mine during the stages of prospecting and initial development, much mining work could be accomplished without burdening the enterprise with the cost of joint-stock company incorporation and the flotation of stock upon the dishonest basis presented by so many owners of partially-developed and insufficiently-tested mines.

QUEBEC'S NEW MINERAL REGION.

By JOHN E. HARDMAN.

The REVIEW has already made known to its readers, through the letter of Mr. J. Obalski which it published in the November issue of last year, the fact that a new area of mineral-bearing rocks has been discovered in Northern Quebec, and that exploitation of the same has been commenced by an incorporated company known as "The Chibogamoo Mining Co., Limited." The purpose of the present article is to more fully describe a portion of the new district, its position and present mode of access, and also one or two of the more important discoveries which have already been made.

The region lying south of James' Bay and west of Mistassini Lake has been partially described in

mouchouan* (about 80 miles northwest of Roberval), and having in mind the report of Mr. Richardson (1871) concerning the probable existence of deposits of copper on the western shore of



Mr. Peter McKenzie, the Discoverer of Valuable Ores in the Chibogamoo Country.

former reports of the Geological Survey of Canada—one account by Mr. James Richardson was published in 1871, and the accounts by Mr. A. P. Low of his explorations in the same region are found in the reports for 1885 and 1895. In these printed reports mention is made of the indications of probable mineral and metallic wealth which were seen, but no particular deposits are dwelt upon, nor are decided opinions expressed. The honor, therefore, of discovering minerals of undoubted commercial value must be given to Mr. Peter McKenzie, of the McKenzie Trading Company, Montreal.

As related by himself, the circumstances of Mr. McKenzie's discovery were briefly these: In August of 1903, being at the trading post on Lake Ashuap-



Mr. Peter McKenzie. Mr. J. Obalski.
Mr. Herbert McKenzie. Mr. Robert Simmons. Mr G. McKenzie.

The McKenzie-Obalski Party, Aug.-Sept., 1904.

Chibogamoo Lake, Mr. McKenzie determined to make a trip to that lake, hoping to find the mineral region described by Mr. Richardson, and with a secondary thought of obtaining possible pelts for his trading company.

It was not, however, an easy matter to find a guide to the lake, few Indians being available who knew the route, but two half-breeds were finally

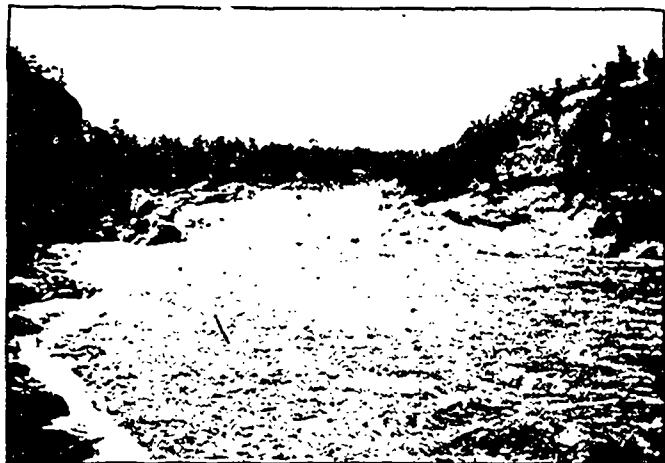


The Ashuapmouchouan River, below Pemonka Rapids.

secured who *claimed* a knowledge of the route, and a start was made. It is perhaps sufficient to say

*In the spelling of the Indian names of this region there is considerable diversity:—Chibogamoo is spelled Shebougamou, Chebougamoo and Chibugamoo. Ashuapmouchouan is now shortened to Chamouchouan, and so on, but in this article the writer has endeavoured to preserve the original spelling, based on the phonetic language of the Montagnais tribe of Indians, who are indigenous to the country.

that the guides failed in their knowledge, and that Mr. McKenzie had to be his own pilot. Lake Chibogamoo, however, was finally reached, and the "copper mountain" of Mr. Richardson was visited.



Vermilion Falls, Chigobiche River

During the same trip samples of asbestos, lodestone carrying magnetite, pyrites, ochre, quartz, etc., were obtained, and were taken back to Montreal the following winter, where they were examined and assayed.

Early in the spring of 1904 Mr. McKenzie returned to Chibogamoo Lake, accompanied by one of his sons, made a more thorough investigation, and in July returned to Quebec, where, upon description of the location, he obtained a mining license for the asbestos discovery, and prospecting licenses for other portions of the territory; both granted according to the provisions of the Quebec Mining Law.

The then premier of the province, the Hon. S. N. Parent, showed a great interest in the discovery which had been made, and early in August commissioned the Inspector of Mines for Quebec, Mr. J. Obalski, to visit the new mineral region and re-

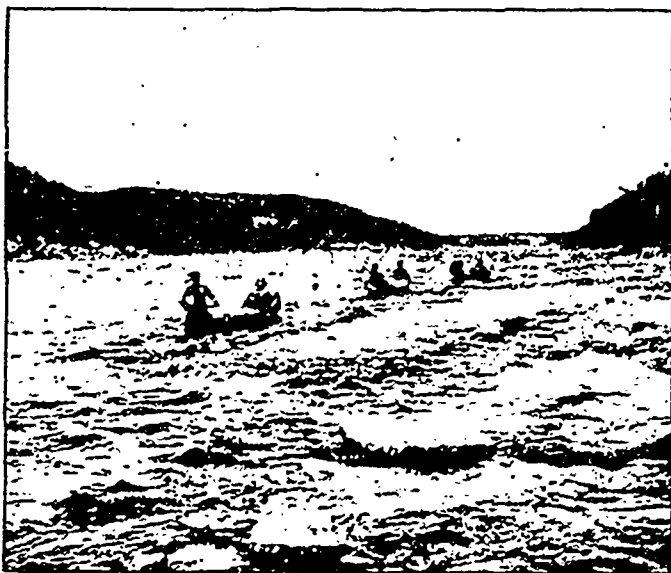


Remnant of Glacier or Ice Bank Existing on May 29, 1905. This Shows the Lateness of the Spring in this Region.

port upon the same. Mr. Obalski's report to his government was made under date of February, 1905, and has since been printed, and distributed freely

to all enquirers by the Department of Mines, Lands and Fisheries. This, briefly, is a statement of the existing knowledge and facts at the time the writer was retained for an examination in March, 1905.

The portion of Northern Quebec in which these discoveries have been made lies, approximately, along the fiftieth parallel of north latitude, and is in territory which (by Dominion Act) only became a portion of the Province of Quebec as recently as 1897.* To reach this new region involves a journey of 200 miles from Roberval, 175 of which can, at present, only be accomplished by canoe and on foot. The charter which has been given to the Trans-Canada Railway provides for a line from Roberval to the mouth of the Nottaway River, at James' Bay, a distance of between 400 and 500 miles. If this railway were built, as it has been projected, the new mineral region would still be 25 or 30 miles (at the least) distant from the main line, but the discoveries made at and about Chibogamoo Lake are of such



Party Descending White Spruce Rapids, Ashuapmouchouan River.

importance that it is probable that the line may be diverted somewhat to the eastward, in order that it may serve the needs of the mining population which is sure to come to that country.

Persons intending to make this journey will take canoes from the point marked "Portage a l'Ours" (Bear Portage) on Ashuapmouchouan River. Leaving Portage a l'Ours the route runs upstream for about 35 miles (including 8 portages) to the mouth of the Chigobiche River. After the first three portages, the river is clear for a stretch of seven miles to Pemonka Rapids. Following Pemonka come a series of rapids, some of which are important, and which are named "Pas de Fond," "Hat" and "White Spruce," passing which one reaches the Chaudiere Falls, which are the largest on the river, and whose

* Prior to 1897 the northern boundary of the Province of Quebec was the height of land dividing the waters flowing into the St. Lawrence from those reaching Hudson's Bay.

height, inclusive of the rapids above and below, as shown by barometer, was 116 feet.

These falls really are a series of three, the first (or main) fall having a clear height of 60 feet, but



The Lower Rapid, Chaudiere Falls, Ashuapmouchouan River.

within a length of one mile the total fall amounted to 116 feet on the 31st of May, 1905. As the water was at a very high stage, it is probable that the mean fall will be found to be about 120 feet. The power available has been roughly calculated at about 75,000 h.p.

Three miles above the Chaudiere Falls the route turns to the west and follows the Chigobiche River through its entire length westerly to Chigobiche Lake, a distance of 26 miles. From the most westerly bay of Chigobiche Lake, 14 miles from its mouth, a long portage leads to waters which flow into Ashuapmouchouan Lake, and the distance between the two lakes by the crooked course of the stream is about eight miles. The Chigobiche River is shallow and rocky, and is an annoying one to traverse in canoes, as, even with the best of care,



Chaudiere Falls in Ashuapmouchouan River, Middle Fall.

these rocks (which are rounded ones) seem to rise up on purpose to scrape the bottom of your canoe and make leaks. Ashuapmouchouan Lake is then traversed for its length of eight miles to the mouth

of the Nikaubau River. In this distance of 108 miles, from Lake St. John to Ashuapmouchouan Lake, there has been a rise of 800 feet, and the character of the country has changed.

The valley of the Ashuapmouchouan, as far as the Pemonka Rapids, is low above the river, and consists of a clay substratum, with layers of sand overlying them. The soil is fertile, and good wheat crops can be grown. Above Pemonka, the banks of the river rise abruptly to heights of 100 to 300 feet above the stream, and, for the most part, are rocky and denuded of soil, which latter is chiefly a boulder clay of no value for crops. These high banks and hills continue all the way to above the Chaudiere Falls, where the banks again become low, flanked by rounded hills, and the soil changes to a sandy loam. The Ashuapmouchouan River varies in width from about a mile at the mouth to 2,000 feet above the Chaudiere Falls. The Chigobiche River has a width averaging about 250 feet. All the timber along the route thus far is a growth which has



The Upper Rapid, Chaudiere Falls, Ashuapmouchouan River.

arisen since 1870, when the whole region from Lake St. John to the forks of the Ashuapmouchouan was burned.

Around Ashuapmouchouan Lake the land is good, and will grow grain. Mr. Robertson, the late factor at the former Hudson's Bay post on this lake, succeeded in raising grain of a very good quality.

Beyond this lake the Nikaubau River and a series of small lakes is traversed for a distance of 38 miles to the height of land, which, along the route, rises from 1,275 to 1,356 feet above sea level. Crossing the height of land an uncharted lake (Obatogoman) is first met with, and at the northwest end, above the narrows, some six miles from the northern end of the lake, is noticed the first change in the country rock of the region.

Hitherto the only formation visible has been the Laurentian, a series of gneisses, with occasional black mica schists, and a few bands of quartzite. The occasional bands of limestone are siliceous. The gneisses usually show quartz, feldspar (of a pink,

yellow, or white shade) and hornblende, which occasionally is varied to biotite. Shortly after passing Lemoine's stake or post (put up in 1898) the change to greenish slates and shales, and to sandstones, is noticed, and for the rest of the way to Chibogamoo Lake the shores are in the Huronian formation.

This change is evidenced also by the different outline of the hills, which has changed from the



Gras Chute, Chigobiche River.

rounded character of the gneisses to the sharp and jagged profiles characteristic of the Huronian sediments and volcanics. The remaining 50 miles is an easier journey than before, as one is going downhill slightly, there being a drop of almost 200 feet from the height of land to Lake Chibogamoo. The altitude of Lake Chibogamoo is given as 1,150 feet above sea level; it has a general northeasterly trend, and its northern portion is split into two parts, the one to the east is called "Bay of Islands,"



Chigobiche River—A Chance Meeting with Indian Family.

and on the west has been named "McKenzie Bay." The Bay of Islands has not yet been explored for minerals, nor is it likely to be for some time, as the gneisses of the Laurentian cover the eastern shore so far as is known. Many of the islands in the lake are also gneissic or granitic in character, and devoid of commercial minerals. The western bay, named McKenzie Bay, after Mr. Peter McKenzie, has a shore line showing Huronian rocks,

which, so far as the writer has seen, are diabase, conglomerates, talcose schists and some pyroxenous rocks of species not determined. The alteration of both sediments and plutonics has been very considerable, and there are many sericitic and chloritic species as yet unnoticed. The lower end of the lake and all the west shore is Huronian, but they have not yet been prospected. The ochres which give its name to "Paint Mountain" drew the attention of both the Indians and early white visitors, and it is on Paint Mountain, or at its foot, that occur the chalcopyrite and the iron pyrites which both Richardson and Low have mentioned in their reports to the Government.

(To be continued.)

MINING STATISTICS.*

By FREDERICK HOBART, New York,

The question of the collection and use of mining statistics is like all others, in that it has two sides—the theoretical and the practical. The theoretical side has been so well treated by Mr. Eugene Coste, upon former occasions, that I shall have little to say about it. Some experience in the collection and presentation of such statistics have, however, given me definite ideas, the brief presentation of which may be of service.

The first question is, what is the use of such figures? That, I think, is readily answered. A knowledge of the work done is essential for the benefit of producers and traders. To the miner and smelter it is of great importance to know the course of production which may seriously affect the value of his own output. The figures of production in all metals, for instance, have an important bearing on trade. Under or over-production are very important factors. To know what has been done in a given period, and to know it as early as possible, is the chief object of the practical worker. Thus, the approximate return of output for a given year, or other fixed period attainable, say two or three months after the close of that period, is far more valuable than the exact returns published ten months or a year later. Accessible at the earlier date they serve as a guide; later their value is only historical.

The Mines Section of the Geological Survey of Canada has set an excellent example in this respect. Its figures are now before us, and for several years past it has been the practice to present them about this time. The labor involved in this can only be appreciated by those who have done similar work. The United States Geological Survey also collects statistics, but its figures are not usually complete until about a year after their date; that is, the returns for 1903 were not published in full until almost

* Trans. Can. Min. Inst., Montreal Meeting, March, 1905

the close of 1904. For this reason, the work of the Survey has, for a number of years past, been forestalled by private enterprise. Though I have had a part in that work, I think I am justified in saying that it has been acceptable to the mining public. I know that it has proved successful and profitable, showing a definite appreciation.

No one, of course, can claim perfection for his work. I will say, however, that I have found the great majority of producers willing to co-operate and assist by furnishing definite figures at the earliest possible date; only requiring a promise that the information shall be used only in making up totals, and that individual returns shall not be published. Without any official backing, I have found that producers realize the advantages referred to above, and are willing to aid, even at the cost of some trouble to themselves. A few exceptions are found, and one important company, which is, unfortunately, run on the "blind-pool" basis, persists in withholding all information. It does not take even its own stockholders into the confidence of its managers. Outside of this one conspicuous offender, there are very few who do not willingly furnish returns.

Perhaps I have discussed too much on this point, but I want to present the practical points as fully as time will permit, because I realize how strongly the other side has been heretofore presented to you. We have a clear, printed, brief, easily understood statement of production, which is undoubtedly of use to mining men; which can, as a rule, be prepared and presented in a reasonable time and at a possible cost of money and labor; and which commands the support and assistance of the great majority of producers. How successful this is, in a practical way, may be shown by the fact that the estimate of output of one important metal, made and published only five days after the close of the year 1903, varied from the full and corrected figures, secured later, by only four-tenths of one per cent. I trust you will not take this as a boast, but only as an example of what can be done in practice.

So far, I have only considered the relation of statistics to the mining world. To the general public their principal value is to convey a definite impression of the importance and standing of the mining industry, and its claims upon their regard and consideration.

This brings us to the question of valuing production. My own experience has not led me to attach much importance to values. The main point to be known usefully is the quantities. The value is simply a counter which enables to state a total. One cannot add together ounces of gold and tons of iron ore; it is necessary to find a common unit. And here a question of some difficulty presents itself, in the determination of prices. In valuing metals, for instance, what price shall we take? The one standard easily accessible is the current or average price

at important market centres. It is true that the value at mines or smelters is somewhat below that. There are freight charges, perhaps refining charges and other deductions to be made. But if we once attempt to make these, we are lost in a sea of uncertainty. We have cast loose from our definite standard and cannot find another with certainty. My own belief is that it is better and fairer to accept standard prices at the commercial centres as a rule. It involves a slight over-valuation, but the proportions to the total of the mineral product are so small that they cannot be considered misleading.

In all statements of mineral values there must enter of necessity some arbitrary element. Thus I had recently to go over the accounts of a certain coal mining company. The books were well kept, the statements clear, and the case was a plainer and simpler one than is often found. I give below a summary statement, using round figures which can be more quickly grasped.

The total product for the year was 2,020,000 tons, of which in the disposition made, 600,000 tons were classed as run-of-mine; 600,000 tons lump, which means, under the Western schedule, coal passing over an 1¼ in. screen; 350,000 tons nut, or coal passing through an 1¼ in. and over a ¾ in. screen; 450,000 tons slack, which means all passing through the ¾ in. screens. The railroad company serving the mine took 300,000 tons at a fixed price, under a contract which gave it the right to do so and, on its side, granted the company a fixed freight rate on coal shipped. The commercial sales, on coal, amounted to 1,350,000 tons. The company operated during the year—for the first time—a coke plant, just completed, in which washed slack was converted into a fair foundry coke; about 150,000 tons being made. Now the account stands as follows, the prices being averaged for the year:

Railroad sales:			
Run of mine	... 300,000 tons at \$1.20..	\$	360,000
Commercial sales:			
Run of mine	... 200,000 " " 1.30..		260,000
Lump	..... 600,000 " " 1.60..		960,000
Nut	..... 350,000 " " 1.40..		490,000
Slack	..... 200,000 " " 0.75..		150,000
<hr/>			
Total sales	. 1,650,000 " (av.) 1.33..	\$	2,220,000
Made into coke,			
slack.	..... 200,000		
Used on operating			
mine, run-of-			
mine	... .. 100,000		
<hr/>			
Total	.... 2,000,000		

It may be added that the 150,000 tons of coke sold at an average of \$2.30 per ton at mine; rather a low price being accepted for a branch new to the market. No by-products were saved; but one bat-

tery of ovens was fitted with an arrangement for saving the gas, which was used to make steam, thus reducing to some extent the quantity of coal used in operating the mine. This gas-saving plant is to be extended, and it is proposed to use the gas, through gas engines to generate electric power.

Now here is about as plain a case as is often found, and, yet, as to 350,000 tons, or 17½ per cent., of the mine product it was necessary to assume an arbitrary price, in order to give a value for the whole. Of course, it was not difficult to do this, but it was still an arbitrary price. Where there is more complicating of accounts and more assumed values, how can we trust them? And four-fifths of our values are founded on assumptions.

It is for such reasons that I have been led to attach little importance to values; considering them, as I have said, only a medium through which totals can be figured out. The only rule that can be made for them is to fix a standard, and then adhere to it as closely as we can.

Turning now briefly to the theoretical, or scientific side of the statistical question, we should have all the information in detail: First, the quantity of crude or first product as taken from the earth—the crude ore mined and the cost of mining it. Then the secondary products—those which have passed through a preliminary process, but are not yet in marketable form. Such are ores milled and concentrated; mattes and the like. Then comes another stage in which the product is in an advanced stage, but still not ready. Examples of this stage are lead bullion; converter bars, blister copper, or copper bullion carrying precious metals. To be precise, pig iron ought to come under this head; it is marketable as pig, but it must be cast, puddled, or converted into steel to reach its final commercial stage.

The variety of products is great, and to give the information fully would require discrimination in many products. For instance, some iron ores can be shipped directly to the furnace, while others must be crushed, washed, concentrated before shipment. If we must make the division, and if we are to ascertain values and costs—upon which values must depend—each step, the work is not only difficult but expensive. We require the services of experts to collect the information, to determine values and to apportion costs. Moreover, the time needed to classify, arrange and present the information would be so great as to postpone the publication of all statistics so long after the period they cover, that they would be valuable only as historical records.

There is another point to be considered here, and that is the difficulty of securing such information at all. In many mining and milling operations—especially the smaller ones—the costs of different stages of the operations are not carefully separated, perhaps not separated at all. Moreover, a great

many operators, while quite willing to give general results, would resent inquiries as to details as too much inquisition into their business. They would probably decline to give the necessary information altogether and would add largely to troubles of the statistician, already grievous enough.

Finally, there is the question of cost. The Mining Bureau is limited by its appropriation, which legislators are always inclined to cut down to the lowest point. The collection of detailed statistics, such as I have outlined, involves the employment of many men, some of whom must be experts who can command good pay; it requires much clerical help, and the whole expense would be decidedly beyond the means of most statistical bureaus.

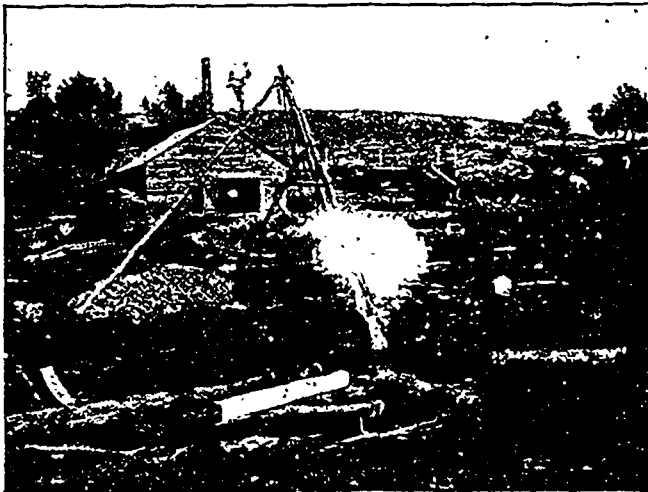
I do not mean to depreciate the value of such information. For engineers, mine managers, and millmen, it would have the greatest interest. Practically, however, we must be limited by the means at our command. The Chief of the Mining Bureau and the private collector of statistics must each do, not what he wants to, but what he can do, with the means at his command. The possible result, unfortunately, comes too often—perhaps always—far short of what is theoretically desirable. Nevertheless, by such intelligent work, as is in our power, results of great use and benefit to the mining industry and the public can be attained—and, I believe, we are all trying to keep up to that standard.

IRON PYRITES IN EASTERN ONTARIO.

(Specially Contributed.)

The production of iron pyrites first commenced in the early eighties, when a series of narrow lenses near Brockville were exploited, and the product obtained therefrom utilized locally in the manufacture of sulphuric acid. Phosphate found in the same locality was also utilized at this time, manufactured into superphosphate and marketed both locally and abroad. These deposits appear to have been narrow shoots of pyrite and calcite in gneiss, and in the year 1884, or thereabout, the deposits having become to all appearance exhausted, the acid works were obliged to import raw material from the vicinity of De Kalb Junction, in the State of New York. The Geological Survey, meanwhile, reported other occurrences of pyrite in Eastern Ontario, but no use was made of this information until seven years ago when a New York company commenced operations at a property near Tatlock, in the Township of Darling, Lanark County, upon which an option had been secured. Prospecting was continued on this property for some time before operations were discontinued, and work was then commenced on another prospect near the village of Bannockburn, in North Hastings, with satisfactory results, and a company known as the Madoc Mining Company was organized to operate the mine.

The property has been continuously operated for the past five or six years, weekly shipments being made to Buffalo and Cleveland, a production last year at the rate of 15 cars per week having been maintained. About three years ago the Madoc Mining Company commenced development operations at a property near Bogart, in North Hastings. The mine was steadily worked until the autumn of 1903, when some dispute arose between the owners of this and the adjoining property, as to the location of the boundried lines between the two. This matter having been at length settled, operations were resumed. In 1904 another property, near Queensboro, North Hastings, was worked by the British American Development Company. The property has since been acquired by a subsidiary concern known as the British American Pyrites Company, and for the past year development work has been in progress. The deposit, although not developed to the same extent as the Bannockburn and Bogart mines, promises exceedingly well. Development,



Pyrites Mine of B. A. Pyrite Co., Queensboro, Ont.
General View.

up to the present time, comprises an 8 x 12 ft. shaft, which has been sunk to a depth of 75 feet through solid pyrite, for this distance, only one break having occurred when a wedge of talcose schist was encountered. This schist carries a proportion of ore, and if a roaster were installed at the property could be utilized to advantage. Surface crosscuts on the ground meanwhile indicate a large occurrence of ore, and this presumption is supported by favourable geological conditions in the vicinity. No ore has yet, however, been marketed, although there is now in the dump some 750 tons taken from the shaft, less than 20 tons of which are unmarketable product. The ore is granular and free from arsenic, a circumstance which is considered an advantageous one. It contains, moreover, about 50 per cent. of sulphur. The plant comprises steam drills and pump. The installation of an air compressor, and possibly a roaster, is however under contemplation.

The ore is worth \$5.00 f.o.b. at Queensboro Station, half a mile distant from the property, and as this ore can be mined at a cost of about \$2.00 per ton, a considerable margin of profit remains. Recently arrangements have been made to build a spare line from the Bay of Quinte Railway to the property, which will save the cost of hauling the ore on wagons. Later advices inform us that the British American Pyrites Company has sold the dump of ore at the mine—equivalent to 600 tons—to the Contract Process Co., of Buffalo, at the rate of \$12.50 per ton, the sulphur contents being estimated at 45 per cent.

AN ELECTROLYTIC METHOD FOR PRODUCING BICALCIC PHOSPHATE.

Mr. Wm. Palmaer, Director of the Electro-chemical Laboratory at the Technical College, Stockholm, Sweden, gives a brief account of an electrolytic method of producing bicalcic phosphate for use as a fertilizer out of unserviceable raw phosphate, this being published as an appendix to the Report of the Dominion Government Superintendent of Mines. In the hope that this new and cheap method may help to revive the now defunct phosphate industry in Canada, we reproduce in the REVIEW some of Mr. Palmaer's observations. After pointing out the fact—which is well known—that large quantities of raw phosphate occur which are not available for the production of superphosphates, either by reason of their low percentage of phosphoric acid, or on account of other drawbacks attaching to them, Mr. Palmaer proceeds to describe the method, which is protected by patent rights, as follows:—

I.—General Features of the Method.

In an apparatus expressly adapted for the method, a solution of chlorate or perchlorate of sodium is electrolyzed. In the anode chamber an acid is thereby generated—chloric or perchloric acid—and in the cathode chamber a solution of caustic soda. The electrolysis is continued until a certain quantity of the dissolved salt has been separated into acid and alkali. The anode and the cathode solutions are led off into separate receivers. The acid anode solution is then allowed to work in a dissolving battery upon raw phosphate, in which process the phosphate is dissolved. Into the solution thus obtained the alkaline cathode solution is introduced, the while being meanwhile kept vigorously stirred, until the liquid bears evidence of a slightly acid reaction; to obtain that result, about half the cathode solution is required. In the process, bicalcic phosphate falls as a finely crystalline precipitate, which is drained off by filtration and washed. The filtrate, which contains one-third of

the lime originally dissolved, but hardly any phosphoric acid, now has added to it the remainder of the cathode solution, whereupon the greatest part of the lime in the solution is precipitated as hydrate; by the introduction of some carbonic acid the rest is precipitated as carbonate; the lime precipitation is allowed to settle. The solution remaining above it is then drawn off. The original electrolyte is regenerated by its means and enters again the electrolyzing apparatus.

II.—The Raw Material and Its Utilization.

In applying the method, both phosphorites and apatites of very varying origin (e.g. those obtainable from Sweden, Norway and France, and also insular phosphate) have been employed. The percentage of phosphoric acid has varied between 9 and 40, corresponding to a variation of from 20 per cent. to 88 per cent. of tricalcic phosphate, without that, however, having any effect upon the course of the process. The raw material may be in a finely pulverized state, but not necessarily so, for raw phosphate has been used in lumps of a diameter of as much as 5 cm. The phosphate of lime present in the raw material is completely dissolved, provided, that is to say, that no grains of phosphate are embedded in silicates or other insoluble minerals, which may occur if the crushing has not reduced the raw material to fairly small-sized lumps.

Out of the amount of acid generated per ampere-hour, 1.33 grammes of tricalcic phosphate is dissolved. The voltage required is about 5 volts per cell. The phosphoric acid remaining in the solution, on the precipitation of bicalcic phosphate, is about 1 per cent. of that present originally in the raw material.

Of the silicates or iron ore (oxides of iron) mingled in the raw phosphate no appreciable quantity is dissolved.

If the raw phosphate contains carbonate of lime, it is dissolved by the acid simultaneously with the phosphate, chlorate (perchlorate) of lime, and carbonic acid being formed and the latter disappearing; consequently, the consumption of acid is rendered greater by the presence of the carbonate of lime, which is, from an economical point of view, a disadvantage. In this process, 1 per cent. of carbonic acid in the raw material involves practically the same amount of consumption of acid, or of energy, as 1 per cent. of phosphoric acid. On the subsequent addition, however, of the alkaline cathode solution, the same high-percentage bicalcic phosphate is precipitated. Consequently, an equally excellent fertilizer is obtainable out of raw phosphate containing carbonate as out of that free from it, though at an expenditure of more acid or of more electric current. In any case, by the electrolytic

method it will be possible to make use of raw phosphates containing more carbonate than is the case in the manufacture of superphosphate; on the other hand, they are not the most suited to be first resorted to.

III.—The Nature of the Electrolyte.

With reference to the electrolyte, the salt used should be of such a nature that its acid may yield in conjunction with lime an easily soluble salt and of a kind which is not subject to change during electrolysis. As electrolytes solution of perchlorate of sodium or chlorate of sodium are suitable, or else mixtures of those salts, the presence of other salts, for instance chloride, in small quantities is of no account.

Both these salts are thoroughly suited to the purpose, perchlorate of sodium being the best that could be desired. Both chlorate and perchlorate of sodium are exceedingly easily soluble salts—1 part of chlorate of sodium being soluble in 1.05 parts of water at an ordinary temperature, while perchlorate of sodium is still more easily soluble: that is of importance, inasmuch as the washing of the precipitated bicalcic phosphate is thereby rendered considerably easier.

A slight loss of the electrolyte by spilling in the process of washing, etc., always occurs. The amount of that loss will not exceed a value of \$1.50 per ton of the finished article, if perchlorate is employed.

IV.—The Composition of the Phosphate and Its Value as a Fertilizer.

The normal percentage of phosphoric acid ($P_2 O_6$) soluble by citrate, contained in the bicalcic phosphate produced by the electrolytic method, is about 34, irrespective of the character of the raw material. The quantity of the phosphoric acid soluble by citrate has been determined in accordance with the method officially recognized for that purpose in Germany. As the quantity of phosphoric acid soluble by citrate in the bicalcic phosphate obtained constitutes about 95 per cent. of all the phosphoric acid in the product the total percentage of phosphoric acid in the bicalcic phosphate works out at 35.8 on an average.

Extensive experiments in cultivation with the aid of bicalcic phosphate, prepared by the electrolytic method, have been carried out by Professor H. G. Soderbaum, Chemist to the Swedish Royal Academy of Agriculture. Exhaustive reports of the results of these experiments are to be found in "Meddelanden fran K. Landtbruksakademiens Experimentalfalt," Nos. 75 and 78 (1902 and 1903), and a report of experiments in the cultivation of oats is given in "The Experiment Station Record," edited by the United States Department of Agri-

culture, Washington, D.C., Vol. XIV., No. 10, pages 951-2 (1903). In these comparative experiments in cultivation the amounts used of superphosphate and bicalcic phosphate have been so determined, that equal weights were used, per superficial unit of soil, of phosphoric acid soluble by citrate from bicalcic phosphate and of phosphoric acid soluble by water from superphosphate.

The result of the experiments in cultivation is that the phosphoric acid soluble by citrate in the bicalcic phosphate proves to possess the same fertilizing value as the phosphoric acid soluble by water in the superphosphate, and consequently the same value as a trade product. The result might, indeed, have been foreseen, inasmuch as it is probable that the superphosphate in the soil is rapidly transformed into bicalcic phosphate through the agency of the compounds of lime present there. Retrogradation of soluble phosphoric acid in the bicalcic phosphate does not occur.

V.—Cost of Production.

In calculation of the cost of production per ton the following items are of importance:—

One electric horse-power produces in a year:

1.73 ton bicalcic phosphate of 36 per cent. soluble phosphoric acid;

Or. 1.95 ton bicalcic phosphate of 32 per cent. soluble phosphoric acid.

The percentage of soluble phosphoric acid will vary between 32 and 36 per cent., depending on the degree of dessication, etc. But under given circumstances a product of uniform composition will be obtained with a percentage of phosphoric acid from 32 to 36 per cent.; 95 per cent. of the total phosphoric acid will always be soluble by citrate.

The cost for chemicals is small, as they are regenerated.

As a by-product will be obtained about 1-3 ton of very good lime for every ton of bicalcic phosphate.

The capital needed amounts to something about \$65 per electric horse-power used in the fabrication when a plant of at least 2,000 electric horse-powers is supposed. In manufacture on a larger scale the capital needed will be comparatively smaller. In this calculation it is supposed that the electric power is hired, and consequently the cost for the electric power plant is not included.

VI.—The Superior Advantages of the Electrolytic Method.

The merits of the electrolytic method are as follows:—

(a.) It admits of the use of cheap low-percentage raw phosphate, not suitable for the superphosphate industry.

(b.) By it a phosphate containing about 34 per cent. of soluble phosphoric acid is obtained, even from low percentage raw material.

(c.) Freightage for a given quantity of phosphoric acid in the finished article is only about half that in the case of ordinary superphosphate.

(d.) Retrogradation of soluble phosphoric acid when stored does not occur.

(e.) The raw phosphate need not be reduced to a finely powdered state.

(f.) Bicalcic phosphate can be employed as a fertilizer on all kinds of soil, even on sandy and boggy land, where superphosphate is out of the question

ON THE EXAMINATION AND VALUATION OF MINES.*

By JOHN E. HARDMAN, S.B., M.A.F., etc.

(Continued from June issue, 1905.)

But of all the precautions against salting and tampering with samples, none are known to be absolutely effective, and perhaps it is of equal value to the engineer to know whether tampering has been attempted at all. For this purpose a safeguard which I used over twenty years ago in Leadville, and recently mentioned by Mr. Rickard, is of value. This is to have a certain number of sample bags filled with waste, or with ore which has previously been accurately assayed out of reach of "salters," these bags are then mixed up with the regular sample bags. An assay from these dummy bags, made daily, or whenever suspicions arise, may reveal any attempt at extensive salting of samples. It is necessary to insist on the absolute exclusion from the assay office of every one but the assayer and his assistants.

The second system of sampling is to take out a large channel across the ore section by blasting it out with powder, subsequently trimming the edges of the channel with pick, or hammer and gad. It is used sometimes for ores that are so hard as to render the first method exceeding slow and laborious, or where the ore bodies present great and sudden variations in values, or where the deposit is very thick and contains thin streaks or layers of very high grade ore. The samples taken are necessarily large, varying from 100 lbs. to five tons, and the system cannot very well be applied to properties which are not fairly well equipped with crushing machinery for the reduction of bulk samples. It is unnecessary to say that the number of samples taken is very much smaller than by the first method, and that the approximation to the real value is not so close. The liability to salting is, perhaps, less.

A third system, applicable principally to milling ore, and to districts where an available mill is not

* Trans. Can. Soc. of C. E.

too remote, is to blast out mill run tests, taking (necessarily) only a few samples, but each sample being of a large quantity or tonnage. Before taking such samples, the engineer should determine the approximate boundaries of the pay shoots, if there be any such, and their area should be roughly computed, and the ratio of their area to the whole

this class of ore, but it is not practicable in remote districts.

A tool which saves much time and labor in sampling under the first system, at mines which are equipped with an air-drill plant, is the Haessler-Ingersoll hammer, which weighs about twelve pounds, is fourteen inches long, has a stroke of

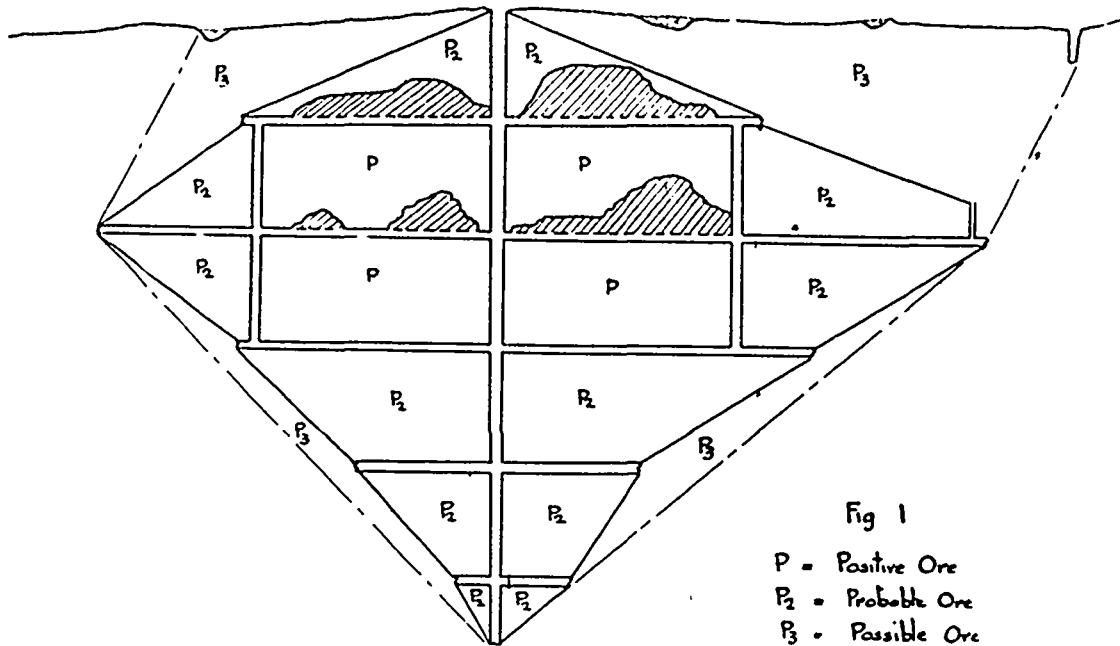


Fig 1

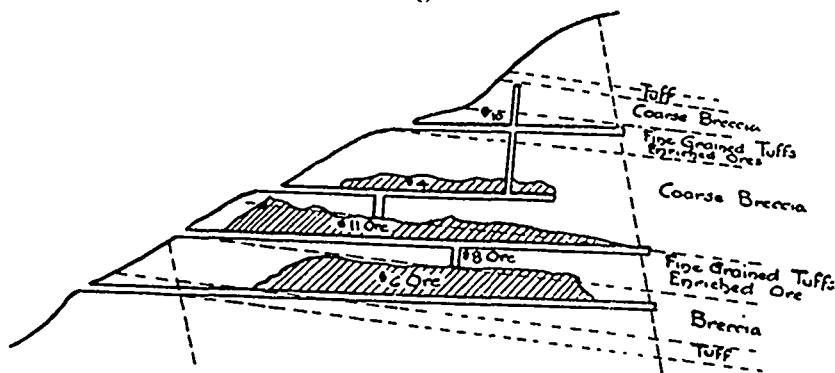
P = Positive Ore
 P₂ = Probable Ore
 P₃ = Possible Ore

(See page 133, June number, 1905.)

area blocked out, determined. A few mill run samples should be taken outside of the vein which is known to be pay grade. The samples taken under this system will each be of at least five tons in amount, or perhaps much larger; they may be worked by the engineer himsc'f or shipped to some mill or sampling works of whose honesty and independence the engineer is thoroughly convinced.

about three inches, and delivers up to about 300 strokes per minute. With an air pressure of sixty pounds, a channel one inch in depth and three inches wide can be cut in one-fourth to one-sixth of the time required by hand, and with little or no labor. The cuttings are finer than those obtained with hammer and moil, and there is less tendency for the rock chips to fly away to long distances; it is also

Fig. 2.*



(See page 134, June number, 1905.)

The last system is not in frequent use owing to the difficulty in most cases of finding a reliable mill within a reasonable shipping distance of the mine. When time and cost are both permitted, it is, in some cases, much the more satisfactory method for

easier to trim the channel to exact dimensions. Wherever the rock is hard, the number of samples to be cut is large, and the property is equipped with a compressed air plant, the use of the air hammer will greatly expedite the work of sampling, and diminish the hard labor item.

* From T. A. Rickard, Mineral Industry, 1902.

Some of the points connected with the work of sampling, upon which comments seem necessary, may now be noted.

It has already been stated that the object of sampling is to obtain a correct general average of the value of a block of ore reserves; since such ore reserves can only be sampled on exposed faces, it follows that the smaller the block from which samples are taken the greater the approach to accuracy. Large blocks of reserves, therefore, must be examined with great thoroughness. If such blocks are penetrated by winzes, upraises or drifts, these openings will give a chance to note any variations in value as the centre of the block is approached. If there are no such openings, the list of assays must be searched to detect, if possible, the existence of streaks, either high or low in grade, running through the block.

It is unwise to attempt to set arbitrary limits to the extent of blocks of reserves, the conditions attending being so diverse. One must be guided

by assay, and a distance of three feet in width, or laterally, between two samples, may show values ranging from \$2.50 per ton in the one assay to \$25 per ton in the second assay. In one case it is possible that samples may be taken from a longer stretch than the values would justify stopping, or, in another case, if the sample be cut across the full width of the pyrrhotite showing, its full value may be greatly reduced.

The writer has met with the same possible error in sampling some auriferous saprolites in the Southern States. In the figure shown (No. 3) the width between walls is 60 feet, all of which was extracted and worked by previous owners as "ore."* Preliminary sampling showed values were not uniformly distributed, but were segregated along two lines; the face, therefore, was sampled in the manner shown in Figure 3.

As to the distribution of sample lines and the intervals between them, something has already been said showing that distribution of values and widths

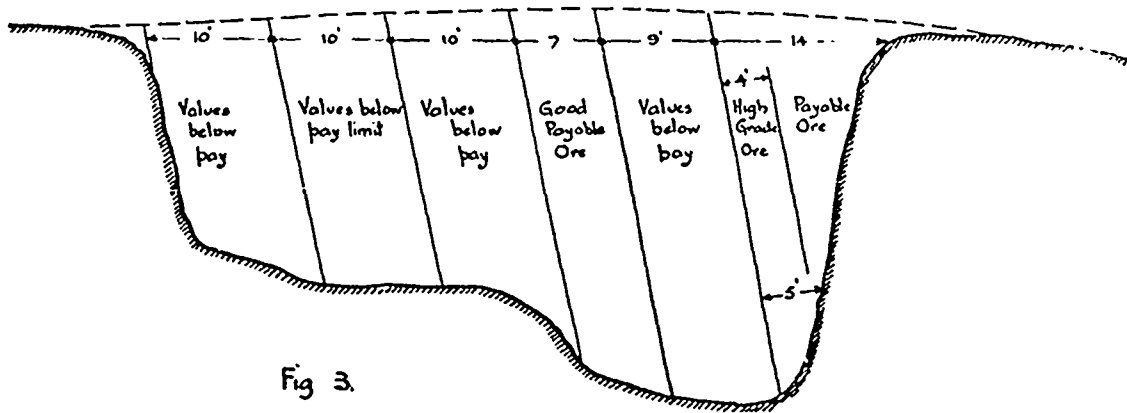


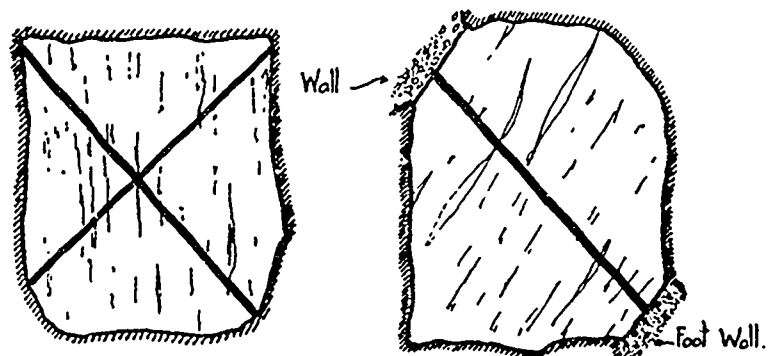
Fig. 3.

by the record of the stopes which have been worked out, and which may show whether payable portions of the deposit have been erratic in form and extent or regular and uniform. Among the figures the writer finds given by other engineers, the greatest allowable dimension for height appears to be 100 feet, but (it may be stated) with a strong preponderance of opinion for 60 feet as the permissible limit; the greatest length allowable is 200 feet; this would make the maximum unpenetrated block permissible one of 100 feet by 200 feet. The writer does not care to set limits personally, believing that such must be governed by the character, past history, and previously noted peculiarities of the deposit.

A possible source of error arises occasionally out of the practice of taking assay samples at irregular distances, without having first determined by trial samples the extent of the ground to be regarded as "pay ore." The possible error is chiefly confined to deposits in which the pay ore is indistinguishable to the eye from ore that is barren or very low grade. For example, the pyrrhotite ores of the Rosslund, B. C., Camp present no reliable way of distinguishing poor ore from rich except

of ore bodies are governing factors. To this should be added the statement that in the case of very rich ores the sample lines must be much closer than with low grade ore ores. Care must be taken that the samples cut shall impartially represent the full section taken, and to facilitate such impartiality it is often advisable to have the section trimmed to a good face before cutting the channel for the sample.

In sampling the ends of drifts or levels, where a good cross section cannot be obtained, the sample, as an alternative, may be cut crosswise, or as an X, thus:—



* Bonner Mine, Carrollton, Georgia.

In sampling shafts, care must be observed that the section is complete, just as in a stope or level, and this point is specially mentioned because the sampling of a shaft is almost always slow and tedious on account of the delays caused by the rigging up of temporary scaffolds or platforms from which to cut the samples.

In the sampling of very wide deposits, having a nearly horizontal position, it is advisable to cut the samples in sections, as was indicated in the case of the wide, nearly vertical, saprolite deposit occurring in the South, only in this latter case the sectional or dividing lines should be practically horizontal. As an instance, one may mention the galena deposits at Bonnetterre, Mo., and some of the silver-lead and copper deposits in the region of the Grand Canyon in Arizona.

Mention should be made of some cases in which it is necessary to sample ore that has already been broken, or is coming daily from the mine. When the ore is coming out daily, one or more shovelfuls should be taken from each car or bucket hoisted, these shovelfuls being thrown into a separate car or pile to be broken or reduced to the proper size and then cut to a smaller sample; if the ore already broken lies in piles or in bins, it is best sampled by removing to another pile or bin, taking out each tenth shovelful for a sample: this process is slow, expensive, and not often necessary.

In sampling ore already sacked for shipment, a sample of a few pounds may be taken from the top of each sack; or better, each fifth or tenth sack may be dumped on a sampling floor to make the sampling pile, which is subsequently quartered down, and the portion not wanted filled into sacks. If a big dump of ore or waste requires to be sampled, it may be roughly done by taking one or more shovelfuls from each point marked in the scheme, a usual scheme being to draw equidistant lines at right angles to each other over the dump or pile, and to take a sample at each point where the lines intersect.* A better method is to cut a trench right through the pile or dump, casting each tenth shovelful aside for the sample.

If a dump of mill tailings or sand requires sampling, it is usually done by crossing it with equidistant lines at right angles, as in the case of dumps above mentioned, the sample being taken with an auger, or with a piece of inch and a half or two-inch pipe, driven through the sand to the bottom, or to any determined depth.

The relation of the maximum size of the particles of ore to the bulk of the whole sample is a matter which was ably treated by Mr. E. B. Kirby† some nine years ago.

While the samples are cutting, the engineer, or an assistant with some knowledge of compass surveying, should make sketches of the workings as the sampling proceeds. He should locate the position of each sample taken, giving it a number in his sketch; should note increases or decreases in width of vein, changes in character of vein filling, occurrence and position of feeders or "angulars" coming in, and their effect; note the timbering, and any places "walled up" without any obvious reason; in short, he should prepare full notes of the underground geology *as he sees it*, with a record of all unusual, inexplicable or suspicious appearances.

As to precautions against tampering with samples, or salting, allusion has already been made to such, and to attempt a catalogue of the possible devices against which one must guard, would encumber this paper and probably be profitless. Nevertheless, the engineer (or assistant) who is noting the underground geology should keep his eyes open for detection of faces of work which have been stopped while yet in good ore, though other facts give a presumption that a few feet will break into poorer rock; old workings, possibly honey-combing what are called "reserves," carefully walled up or concealed by a few stulls and lagging, the reason for whose being is given perhaps as "a bad place in the roof"; sumps (in levels) which are suspiciously full of water, and which likewise may conceal openings in the block of ground below, which, if inspected, would show that it had been "guttled"; long, but low, stopes showing no ore in the roof may be intended to convey the idea that the ore occurs in a long shoot, therefore falsely giving to a small and isolated ore body the semblance of a larger and extended ore shoot. To quote a phrase from Mr. Rickard—"Experience, silvered with age" is the best insurance one's client can have against the many and ingenious devices made by our fellow men to deceive and entrap the examining engineer.

Preparation of Samples.

The size of the samples taken is dependent on the method employed, many small ones in the case of the first system, and individually larger ones in the third and second systems: the importance of the examination (financially) and the complexity of the ore also govern.

With ores of a simple character, such as free gold ores, working tests of large samples are always to be preferred to small samples, if possible. Every engineer of experience in free gold ores has known the doubt he has felt as to whether a small sample actually represented the true value of the vein where it was taken: a free gold ore carrying \$10 to the ton is good pay ore anywhere, yet this value represents only 240 grains of gold distributed through one ton or 14,000,000 grains of vein matter.

* In the case of the seven large dumps at the American Sisters Mine, Colorado, these lines were spaced 20 feet apart, and the sample was taken from the centre of each 20 feet square space.

† Proceedings of Colorado Scientific Society, December, 1894.

As, in many cases with free milling ore, particles of gold *may* weigh more than one grain rather than less, what are the probable chances of obtaining an aliquot portion of such gold in a five-pound sample, as compared with a 500-pound sample? Or, what is more nearly the case, in an assay ton weight? Mathematically, the chances are very slight with the majority of gold ores, and hence arises a well-founded objection to the fire assay as a means of determining the value of free milling gold ore where the gold is "spotty," or inclined to coarseness rather than to well disseminated, very minute "dust."

With sulphuretted ores, which are more common, as for example with the Rosslund pyrrhotites, and the pyrites and chalcopyrites of Colorado and Montana, a five-pound sample taken at regular and frequent intervals is a much better guide than 1,000-pound samples taken infrequently.

Each sample taken with the moil and hammer should first be broken to pieces of an approximately even size, such as to pass any screen with three-quarters of an inch meshes. It should then be thoroughly and completely mixed on a sheet of rubber or oilcloth and quartered. There has been a just criticism of the practice of mixing a sample by rolling it on a square of canvas, the point being taken that the fines accumulate immediately on the canvas and do not roll over and get mixed with the coarser particles, but simply slide back and forth beneath the coarse stuff. When the sample, by quartering, reaches the size of three or four pounds, it is best to use a "split" shovel, or a riffle shovel. In this way the five-oz. sample required is correctly obtained. This sample can then be put into a wide-mouthed glass bottle or tin case and sealed; it is then ready to be shipped away to an assay office, or can be kept for assay on the spot.

The preparation for samples taken by the second system demands the use of machinery on the spot for their reduction to a convenient size, and in such a case extreme care must be exercised to have the crushing machinery, screens and receiving bins absolutely clean and free from dust of other ores. As to precautions against salting, and against the outside labor sometimes necessary, each circumstance will present its own conditions to which the engineer must apply his remedy.

When the ore, broken in the stopes, requires its richer or poorer portions to be sorted, or cobbled out, in order to make a marketable product, or to facilitate good work in a subsequent mill treatment, the sampler has to determine the respective percentages of weight and of value in the different portions. This he may do by making careful sorting tests himself upon the samples he has cut, or, better perhaps, by having an experienced ore sorter of the mine sort the samples under his immediate supervision. The products of this sorting of each

sample are then put into separate packages and labelled; afterwards they are carefully weighed to determine percentages, and assayed for values; circumstances will determine whether each product requires to be assayed separately, or whether a number of such products may be combined and quartered down for the assay sample.

In sampling, the engineer has under *immediate* consideration only the taking of an accurate cross-section of that part of the ore body which is exposed at each point where a sample is cut, whether the width of that cross-section is one foot or ten feet, and for many purposes of his investigation, the width is immaterial. But in many ore bodies of a minor character, this cross-section is far too narrow to be removed or mined by itself, and more or less waste rock will become mixed with the ore. In the gold quartz veins of Nova Scotia, which are locally known as "whin-bound," or "frozen," the quartzite ("whin") adheres firmly to the vein quartz, and in many cases which have come under the writer's personal notice the ore going to the mill has contained more than fifty per cent. by weight of barren quartzite. In other of the gold veins of that same province, the casing is a soft chlorite or talcose slate, very brittle and friable, and a very considerable percentage of barren rock finds its way into the mill, and reduces the returns per ton below the assay figures gotten from clean samples. Hence the use and value of sorting tests before calculating values.

In all cases where the ore is too narrow to be removed without breaking barren rock, or where ore is frozen to barren rock, or where the ore is accompanied by a brittle, friable, barren casing or "gouge," which is not economical or feasible to separate, the values obtained from clean samples must be modified by the results of the sorting tests before they are used in calculating final results.

It will be seen that the process of obtaining the average assay value of ore reserves is very tedious, and liable to many errors: its value, as a factor, is dependent on the skill and personal equation of the sampler. So clearly is this recognized by engineers that the higher authorities have a practice of retaining in their employ men who possess this skill at its greatest, being disinterested and impartial, and, one might almost say, automatic.

(To be continued.)

The Buckingham *Post* makes the following rather neat and amusing reference to the recent Anglo-Canadian Graphite Syndicate fiasco:—

"It is understood that the Anglo-Masson Dumfussat Co. are about to acquire all the rights and privileges of a graphite company recently defunct, with gorgeous array of closely related mourners. The prospectus will, we understand, read something like this,—we're not referring to the preamble, which

we understand on good authority is of roseate hue enough to put the danger signal on the rear of a fast express to shame.

"Capital Stock, \$1,000,000, in 10,000 shares of \$10 each. (This ought to appeal to wood choppers and workmen generally.)

"Plant \$25,000.00

"Stock, mostly unpaid for 3,000.00

"Working Capital, partly subscribed. *.22

"The people of Buckingham are not straining their backs in the frenzied desire to secure stock.

"Cannot vouch for the amount, it may be less.

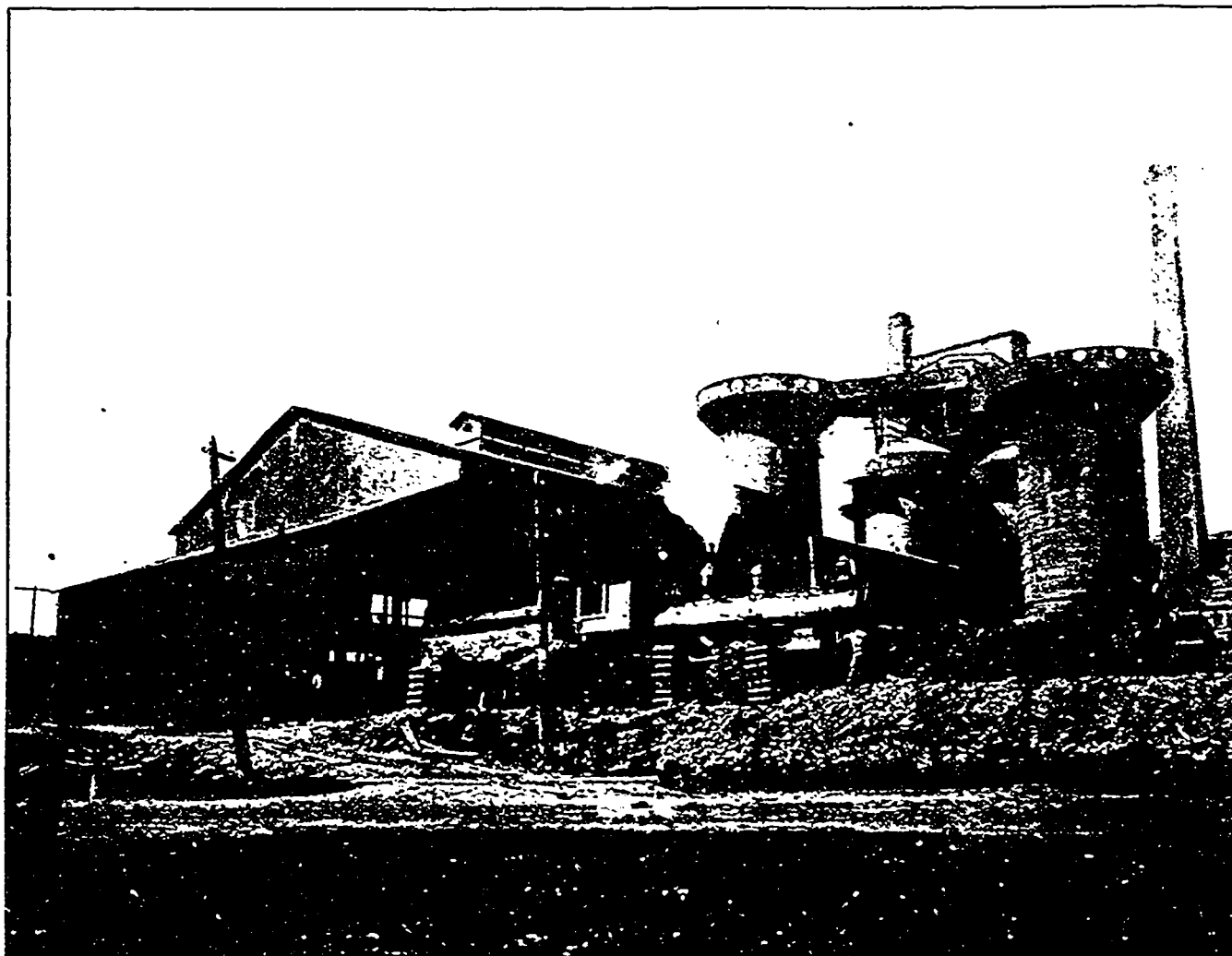
"Parties who have entered suits against the late unlamented Graphite Syndicate are meanwhile

among those who get the judgment is eagerly awaited. It is said that the English capital subscribed for experimental operations is not quite expended, and there remains a tidy sum of some thousands. Could this sum be "collared" on a Canadian Supreme Court judgment?"

THE IRON ORE RESOURCES OF NOVA SCOTIA.

(From Our Special Commissioner.)

"Londonderry" pig iron, or as it was formerly known, "Siemens," has always had the highest possible reputation throughout Canada and has been used for many years in all classes of work. For



The Londonderry Iron & Mining Company's Cast House

authoritatively informed that the Syndicate will not defend the actions, and it is therefore asked whether the transfer of the property to another Company in which the directors of the defunct Syndicate are associated as members has anything to do with this decision, if it has been arrived at. We do not imagine that a suit for over \$2,500 has been entered merely for the fun of the thing, and we are very curious to learn what motive underlies the action. The distinction the law will necessarily have to make when apportioning the Syndicate's assets

example, castings made from this metal have been specially noted for great strength and soundness, combined with softness, and these facts are generally known to everyone conversant with the iron trade throughout Canada.

So far as the Londonderry deposits are concerned, the ore bodies, owned by the Londonderry Iron & Mining Company alone, extend from the Debert River on the east to the Portapique River on the west, a distance of about twelve miles or more, assuming the form of a series of true fissure veins.

Following the south slope of the Cobequid Mountains and extending to an undetermined depth, the total quantity of this great deposit is scarcely possible to calculate, but explorations and operations carried out by the present company have proved to their satisfaction that the deposit extends into many millions of tons. The ores obtainable are specular ores of great purity, carrying from 64 to 60 per cent. of metallic iron, which run in irregular pockets throughout the formation, the main body being, however, limonite or brown and black hematite ores lying usually between well defined walls. These ores carry from 45 to 56 per cent. metallic iron and are especially valuable on account of their low sul-

phur and phosphorus contents and easy fusibility in furnace practice. The brown and black ores from these veins run largely between 50 and 56 per cent. in iron with silica between four and six per cent., phosphorus about .015 and sulphur from .008 to .027 and manganese varying from .30 to .90.

Further, in regard to the quantity of ore, the highest independent authorities have estimated these deposits as being capable of yielding a supply for many years to come, even if drawn upon to a much greater extent than heretofore. At present the Londonderry Iron & Mining Company is drawing from these mines between six and eight thousand tons per month to meet their regular requirements and could increase this output at any time if it was necessary, it being simply a matter of increased mining facilities. The Cobequid hills, through which these veins run are broken by ravines and gorges, so that adit mining is always practicable and the ores are thus easily attained and most of the mines are self draining.

Apart from the iron ore deposits the vein matter consists chiefly of ankerite and siderite, which are used for fluxing, doing away with the necessity of the use of limestone and having the added advan-



Coke Ovens at the Londonderry Works.

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of Torbrook ores, while the old company handled an amount far exceeding that, so that the question as to the suitability of these ores can easily be determined and proven.

First, as to the cost of mining, Torbrook ore can be mined at as low or lower cost than any other suitable quality of iron ore obtainable in Canada, and, further, it is probably the cheapest ore to break underground on this continent. As to the quality, the average of the ore taken from that district for some years past yielded between 52 and 55 per cent. in metallic iron with the silica running from about eight to eleven per cent. In the case of the high silica it was mainly a matter of mining and could have been easily overcome by more careful clobbering at the mine. As to the extent of the ore deposit, the



The Londonderry Iron & Mining Co.'s Pine Brook Quarry.

possible quantity has been placed as high as one hundred million tons and this by very good authorities, but it is certainly easy to prove that there would be at least one-tenth of this quantity or ten million tons in the district mentioned, of ore of the quality referred to.

At present, working in a small area the Londonderry Iron & Mining Company has been taking out for its own requirements two thousand tons per month. This will shortly be increased to about four thousand tons per month, and if there is the demand for the ore it can be increased to an output of one thousand tons per day or more, it being simply, as in the case of Londonderry, a question of a mining operation, or, in other words, increasing the mining facilities by additional development, plant and

workmen. Taking an average run of ore mined and delivered from Torbrook, I find that the iron contents averaged between 52 and 54 per cent., the silica from 7.94 to 11 per cent., mainly below ten per cent., the phosphorus from 1 to 1¼ per cent., manganese .150, lime about 2.50 to 3.50 and sulphur from .010 to .035. The ore is a red hematite and free smelting, and any one conversant with iron ores will readily admit that the quality is more than equal to the average class of ores that are being imported.

THE U S. TARIFF ON ZINC ORES.

The following letter, addressed by Mr. L. M. Shaw, Secretary of the United States Treasury, to Senator Stone, on the above subject, has been made public. Mr. Shaw writes: "With reference to the tariff on zinc ore, I beg to say that I have no doubt of the correctness of the following propositions:

"First—Lead-bearing ores, within the spirit of the law, must bear sufficient lead to justify its reduction for the retention of this lead. From the best information available it appears that 4 per cent. of lead is sufficient to justify its reduction and retention. Instructions will therefore follow not to consider as lead-bearing ores, such ores as bear less than 4 per cent. of lead.

"Second—I have no doubt that calamine zinc is entitled to free entry, for the statute so provides.

"Whether sulphides of zinc are free or dutiable is by no means easily determined. Section 614 of the Dingley tariff act, included in the free list, reads as follows:—

"Minerals, crude or not advanced in value or condition by refining or grinding or by other process of manufacture not specially provided for in this act."

"This section relates to minerals of all kinds, and includes sulphates of zinc. It would therefore appear that sulphide of zinc in its crude form should be admitted free. Unfortunately, however, Section 183 of the same act appears to be in direct conflict, for it reads:—

"Metallic mineral substances in crude state and metals unwrought, not specially provided for in this act, 20 per cent. ad valorem."

"Sulphide of zinc is a metallic mineral substance, and in its crude state would seem to be dutiable at 20 per cent. Section 614, the free section, refers to minerals generally, and includes metallic substances, as well as every other character and kind, while Section 163 relates solely to metallic mineral substances. The unfortunate feature of the ambiguity arises from the fact that the free section includes the dutiable substances when not specially provided for. If it were reversed, and the dutiable section referred to all minerals and the free section to metallic substances, it could be easily solved. I reach the conclusion that the proper tribunal to interpret these two apparently conflicting sections is the court, and the only way to present the case to the court is to exact duty on sulphides of zinc. The importer can protect his rights, and the government's rights will be protected. Instructions will therefore follow accordingly."

In commenting on the above letter Mr. J. R. Holmes, chairman of the committee appointed to defend the interests of the producers of the Joplin District, in the event of an appeal in the case against the importations of foreign zinc ore, remarks:—

"The above is the first definite and authoritative statement issued by the treasury department and emphasizes the importance of the steps taken by the district committee to raise funds for the prosecution of these matters in the courts, and secure the enforcement of their interpretation of the tariff laws. The necessity of immediate action is so apparent that it does not admit of argument.

"All the preliminaries of engaging counsel, securing witnesses and securing funds should have been taken even before this time, and it is not too late even now, but no more time should be wasted in idle talk. The decision of the treasury department that lead-bearing ore must contain 4 per cent. is far from satisfactory. This ruling would only impose a duty of \$1.20 a ton as against \$5 under the ad valorem clause. It is difficult to see the reasons on which such a ruling is based and the committee is unanimously of the opinion that it can be reversed either before the general board of appraisers or the United States Circuit Court. If the proper effort is made at once.

"That portion of the ruling which refers to crude ore is not considered important as no crude ore will be imported, though attempts may be made to ship concentrates as crude ore, and if so, they will be inevitably defeated. In his reference to calamine, Secretary Shaw has overlooked or failed to see the point made by the committee, which visited Washington. The committee admitted that calamine was an

the 'free list,' but protested against the admission of carbonate of zinc under the name 'calamine.'

"The committee is positive that the decision of the general board of appraisers rendered May 8, that carbonate of zinc is properly termed calamine, and hence not dutiable can be successfully attacked, but do not mean the retention of high-class legal talent, the employment of expert chemists and assayers, payment of their expenses, etc."

"It may be that the importers of ore will be satisfied with these rulings, and if so, it will be for the producers to seek their remedy in the courts. No time should be lost, for delay might be construed as sleeping on our rights and so forfeit our standing in court."

"Let the soliciting committee now go actively to work, and all interests give them liberal support. On the speedy completion of this work will depend in a large measure the continued prosperity of this district."

THE BOUNTY ON STEEL RAILS.

Just as we go to press it is announced that an order-in-council has been passed providing that the bounty on steel manufactured in Canada shall not apply to steel rails. This, if true,—but as yet there has been no official confirmation of the intelligence—will naturally seriously affect the interests of both the Lake Superior Corporation, at Sault Ste. Marie, and the Dominion Iron & Steel Company at Sydney.

The bounty on steel rails which has been in effect up to this time, amounts to \$3 per ton, and as the works at the "Soo" are manufacturing rails at the rate of 500 tons per day, and the works at Sydney at the rate of 350 tons per day, the loss in revenue to the two companies in question by the change will approximate \$2,550 daily.

The act under which a bounty of \$3 per ton on steel rails was claimed and successfully maintained was brought down on August 4, 1903. At the same time a bounty was also provided on other manufactured articles such as wire rods, beams, joist channels, etc., as well as upon pig iron and steel ingots. The act reads as follows:—

"The Governor-in-Council may authorize the payment of the following bounties on the undermentioned articles manufactured in Canada from steel produced in Canada from ingredients of which not less than fifty per cent. of the weight thereof consists of pig iron made in Canada, viz., On rolled round wire rods, not over three-eighths of an inch in diameter, when sold to wire manufacturers for use in making wire in their own factories in Canada, a bounty of six dollars per ton.

"On rolled angles, tees, channels, beams, joist girders, or bridge building, or structural rolled sections, and on other rolled shapes not round, oval, square or flat, weighing not less than 35 pounds per lineal yard, and also on flat eye bar blanks, when sold for consumption in Canada, a bounty of three dollars per ton."

The contention was raised by the Lake Superior Corporation and subsequently upheld that the words "and other rolled shapes not round, oval, flat or square, weighing not less than 35 pounds per lineal yard," clearly meant that the bounty of \$3 per ton applied to steel rails.

A GOVERNMENT REPORT ON B.C. ZINC RESOURCES.

It is reported that Mr. W. R. Ingalls, the well known American authority on zinc, has been retained by the Canadian Government to report on the zinc resources of the Kootenays in conjunction with a Canadian engineer, whose name will shortly be announced. British Columbian producers have asked that the examination be made on the following lines:—

1. To obtain a report on the districts from which zinc ores are now being produced; the character and tonnage of such ores; the methods employed in their production and local reduction; cost of mining and local reduction; where marketed and at what cost, with freight charges.

2. To obtain an estimate and report on the tonnage and character of zinc ores which have been made available for production by mining development; and a report on local economic conditions, such as transportation facilities, which will govern their production.

3. To obtain a report on the location and, from an economic geological standpoint, the probable future of the undeveloped deposits; the local economic conditions, such as transportation, which will affect production therefrom; the character and metallic values of the ores so exposed; and analyses of ores, either taken by the expert making the examination, or under his direction, and of ores submitted for analysis by prospectors and claim owners.

COAL TESTS.

The Welsh coal producers, with a view to a possible market in Canada, some six months ago procured, through the Toronto Branch of the Canadian Manufacturers' Association, samples of six varieties of coal used in Toronto for

analysis. The report of Mr. Llewellyn J. Davies, F.C.S., of Cardiff, who made the tests, has just been received at Toronto. The figures he gives are as follows:—

Chemical constituents.	Description Furnished with Sample.					
	Stove coal.	Pea coal.	Hard ser'gs.	Soft ser'gs.	Mash'n coal.	Steam coal.
	%	%	%	%	%	%
Fixed carbon.	84.43	81.63	75.17	55.47	55.40	60.63
Volatile matter.	3.77	5.22	5.13	31.88	33.55	31.87
Ash.	7.80	9.10	15.50	10.50	4.20	6.10
Water.	4.00	4.05	4.20	2.15	6.85	1.40
Total.	100	100	100	100	100	100
Sulphur separately estimated. . . . .	.067	.085	.095	4.06	1.21	2.40

MINING MEN AND AFFAIRS

Mr. R. S. Broadbent, who is in charge of Canada's mineral exhibit at the Liege Exposition, has been informed of his appointment as a member of the International Jury on Mines and Metallurgy.

Mr. Alex. Dick was recently appointed general sales agent of the Dominion Coal Company. Mr. Dick will, it is announced, have sole control of the disposal of the entire output of the collieries.

Dr. H. M. Aml, of the staff of the Geological Survey, is preparing a special report for the Government describing the territory along the proposed route of the Grand Trunk Pacific, between Winnipeg and the Pacific coast.

Mr. T. A. Rickard is now in Nova Scotia to examine the gold mining districts in the province with a view to undertaking the preparation of a comprehensive report on the gold measures for the Provincial Government.

We have received from the secretary a notice that the autumn meeting of the Iron and Steel Institute will be held at Sheffield, Eng., on the 26th, 27th, 28th and 29th of September. An interesting programme has been prepared.

Mr. A. B. W. Hodges, general superintendent of the Granby Consolidated, anticipates that by the middle of August, eight furnaces will be in operation at the Granby works, allowing of the treatment of 2,700 tons of ore daily.

At a meeting of the Board of Governors of Dalhousie College, Mr. E. Brydone Jack, C.E., was elected professor of civil engineering in the place of Prof. Dixon, who has accepted the chair of civil engineering at the University of Birmingham.

Major R. G. Edwards Leckie, who is well known to a number of our readers, recently paid a visit to British Columbia. Major Leckie is now associated with a London syndicate which has secured extensive concessions in Eastern Somaliland.

An order-in-council has been passed at Ottawa, providing that dry white lead, orange mineral, and dry red lead produced from Canadian ores and pig lead made from Canadian bullion, on entering Canada shall now pay duty on the full value of the article.

Mr. Jas. Floyd, of the Intercolonial Coal Company, Westville, has been promoted to the management of the company, in succession to Mr. Chas. Fergie. Mr. Floyd has had a long experience and is regarded as a highly competent and well qualified colliery manager.

Mr. T. Hayes Sheen, of London, Eng., representing the Lancaster syndicate, is visiting Ontario in connection with the operation of the Bruce mines. Meanwhile, a new company, known as the Copper Mine and Smelter Co., of Ontario, Ltd., has been organized, with a capital of £200,000.

Messrs. H. H. Claudet and L. C. Wynne have purchased Mr. R. Marsh's assaying business in Rossland, and are opening offices on Columbia Ave. The firm intend making a specialty of control and umpire assaying, this work being in charge of Mr. Wynne, who was formerly assayer for the Le Roi Mining Company.

The death occurred at Brockville, Ont., on July 25th, of Major J. M. Walsh. In 1883 Major Walsh established the Dominion Coal, Coke & Transportation Company, doing much towards developing the coal resources of the Souris district in Southern Manitoba. In 1897 he was appointed Commissioner of the Yukon, which position he filled with great success.

The annual outing of the Engineers' Club of Toronto took place on July 28th. The excursionists travelled by steamer to Burlington Beach, thence by special electric car to Hamilton, where the works of the Hamilton Steel & Iron Co., the International Harvester Co. and the Cataract Power Co. were visited. The party was in charge of Mr. W. Chipman, the secretary.

Mr. Carl R. Davis, formerly superintendent of the Centre Star and War Eagle mines, is now superintendent of a gold mining company in South Africa. In writing to a friend in Rossland, recently, he states that his company is employing no less than 2,400 men of which the greater number are Chinese and natives. Mr. Davis speaks most enthusiastically of South African mining possibilities.

eral output of this territory, the government is prepared to do everything in reason to bring such a system about. Two years ago the Dominion government granted two and a half million dollars to develop the lead industry in British Columbia. It revived the lead industry greatly there, and it would revive the mining industry here if the government was to take steps to furnish water to the miners."

The American Institute of Mining Engineers was most hospitably entertained during its recent visit to Dawson, and members of the party were given every facility to visit the mines. Before leaving a banquet was held in honour of the Institute, each visitor being presented with a souvenir gold pin, of which the design represented a miniature gold pan, pick and shovel, inscribed with the date, "1905."

The Customs officers in the mining districts have received notice that part of item 455, schedule B. of the Customs Tariff, 1897, and subsequent Acts, relating to mining machinery, has been amended as follows: "The exemption from duty of machinery and appliances of a kind not made in Canada for use exclusively in alluvial gold mining, authorized by section 12 of the said chapter, is extended from July 1, 1905, to June 30, 1906."

The annual session of the Nova Scotia Summer School of Science was held last month at Yarmouth. Among the visitors were the president, Mr. J. D. Seaman, of Charlottetown; Mr. W. R. Campbell, of Truro, Secretary; Dr. G. U. Hay, of St. John, botany; Dr. Andrews, of Mt. Allison, chemistry; Dr. L. W. Bailey, of Eaton, geology and zoology; Miss Eleanor Robinson, of St. John, English literature; Principal Solon, of the Normal School, Truro.

The Rossland Miner states that excellent progress is being made with the structural geological survey of the camp by Professor Brock and his able staff of assistants. Mr. Brock is devoting his energies just now to the underground workings of Columbia and Kootenay Mountain, having finished his examination of White Bear flat and vicinity. Mr. Young is busy with the geology of Red Mountain while Mr. Boyd is preparing a map of the country embracing the big working mines.

The Vancouver World quotes that "the Granby Co., recently, sent the Laborers' Cooperative Gold, Silver and Copper Mining Company of Golden, a check for \$770.44, being the returns from the small shipment of matte received from the company's smelter at Golden. The officers of the company with the lengthy name were so tickled to get so much money all at once from their own mines and smelter that they had a photo-engraving made of the check and printed on the first page of the Golden Star."

The report is general that the National Lead Company, of New York, is about to take steps to establish a lead corroding plant in Montreal. The National Lead Co. is the largest amalgamation of lead-corroding interests in the United States and is generally known as the white lead trust. On June 26 last it increased its capital stock from thirty millions to fifty millions of dollars, one-half preferred and one-half common. The company owns a dozen large corroding works at different centres of the paint trade.

Mr. Howard DuBois, of the firm of DuBois & Mixer, mining engineers of Philadelphia and Salt Lake City, is again visiting British Columbia with a view to investigating the platinum resources of the province. Prior to 1896 some \$20,000 worth of platinum was produced in the Similkameen district, but since that time the annual output has decreased to an inconsiderable amount. It is said that in connection with hydraulic mining in Cariboo and Cassiar platinum may be saved by the installation of special appliances.

M. De Romeau, an eminent French geologist, is, as we mentioned last month, visiting Canada with a view to investigate our corundum deposits. He recently spent two days in Toronto in conference with Mr. Craig, of the Canada Corundum Company, and Mr. T. M. Gibson, Director of the Bureau of Mines, afterwards proceeding to Newfoundland. On his return he will visit the mine and mill of the Canada Corundum Company at Craigmont. As a considerable amount of Canadian corundum is exported to France, this investigation is of more than ordinary significance.

Mr. Thos. Kiddie, manager of the Tyee Copper Co.'s smelter at Ladysmith, V.I., has established a most successful record in the operation of that plant, and it may be confidently stated that, notwithstanding the refractory character of the Mount Sicker ore, which contains a considerable percentage of zinc and barite, he has reduced his costs to below those of (for example) Rossland. Mr. Kiddie has also, in the face of strenuous competition from the Tacoma smelter and other American smelting works, succeeded recently in securing contracts for the treatment of copper ores from Alaska, in American territory.

After leaving British Columbia, the members of the American Institute of Mining Engineers who attended the Victoria meeting took the steamer for the north. A stop was made at Port Simpson, and, later, at the famous Treadwell mine, on Douglas Island, where a visit was paid to the deep-workings some six hundred feet below sea level. From Skagway the party travelled to White Horse, on the Yukon & White Pass Railway, whence they transferred to a steamer on the Yukon River, ultimately arriving in Dawson. Here they were received by the Commissioner and other officials, and most hospitably entertained. The party was driven to

the Dome, which commands a magnificent view of the Yukon watershed, while a number of the principal creeks were also visited.

When negotiations are in progress for the sale of mining properties strange things sometimes happen, the Toronto Telegram remarks. A rather remarkable series of incidents is revealed in the judgment given by Mr. Justice Meredith in the McConnell vs. Lye case. Rinaldo McConnell is an Ottawa miner. He made a purchase of mining lands from Henry Lye, of Vancouver, for \$3,600. McConnell subsequently wished to drop the matter. Lye took steps to compel McConnell to complete the purchase. When McConnell agreed to do this Lye decided not to sell. McConnell thereupon entered suit, and Judge Meredith decides that Lye must deliver the lands.

Mr. Goodale, the well-known metallurgist of Butte, Montana, recently visited the Boundary district of British Columbia, of which he expressed the following opinion as reported by the Phoenix Pioneer: "I am deeply impressed with the possibilities of the mining industry in British Columbia. There is every reason to believe that the output of the mines of the Boundary District will, before many years, rival that of Butte in regard to tonnage. Nature has not been so considerate at Butte. The values of our mines are higher, of course, running from \$9.36 to \$12.85 per ton, but we have to bring our lime for fifty miles at a cost of \$1 per ton. Taken altogether, and remembering that we have to roast our ores, we have more complicated problems to deal with than exist in the Boundary District."

Referring to the imposition of a 20 per cent. ad valorem on zinc imported into the United States, Mr. Byron N. White, in an interview, stated that the effect of this imposition would be to close down the Slocan Star, which has been recently shipping six hundred tons of zinc concentrates to the smelter at Pueblo. Zinc miners in British Columbia have apprehended this danger for some time past, and all contracts have been made conditional on a freedom from duty. Mr. White thought that the action of the American authorities would furnish good ground for the imposition of a retaliatory Canadian duty on manufactured zinc. Such a course would hasten the building of a zinc smelter in British Columbia, which is bound to be established, in any event in the near future, but the immediate effect of excluding Canadian zinc from the United States is likely to be the closing-down of every zinc mine in the country.

Mr. W. W. B. McInnis, the new commissioner of the Yukon, in an address made before a Dawson audience shortly after his arrival, said, that coming from a mining province he could well understand the difficulties under which the people of that territory laboured in respect to the mining regulations, but that he wished it to be understood that the policy he would follow would be, first, the protection of the prospector; that the people who had received concessions from the Government would be expected to carry out their part of the bargain with the Government, and that he proposed to discourage the practice of the acquisition of mineral lands for speculative purposes. Referring to the policy of the Government in respect to encouraging mining development, the speaker said:—"I heard long before I came into this territory that the one great necessity here is to bring water on to the hill claims. I know, and the government at Ottawa realizes, that that is a problem that deserves their immediate consideration. You are well aware that at the present time they are collecting data in regard to this matter. Such an enterprise will involve an outlay of millions of dollars, and the Dominion government is fully alive to the mineral wealth of the Yukon, and so far as a water system will materially increase the min-

The Iron Age, referring to complaints with which the die trade is familiar anent—ill-fitting threaded joints and the careless manner in which these are made up—speaks of the paper recently contributed by Mr. F. N. Speller, of the National Tube Co., to the Proceedings of the Canadian Mining Institute, as being most opportune. Mr. Speller criticizes the general character of most of the tools for pipe fitting at present on the market, and the main essential principles which should be embodied in an easy cutting die are discussed. A die which tears or scrapes the metal out, owing to lack of clearance or insufficient rake on the cutting edge, cannot cut a true V-thread. The result is a short-lived die, a useless waste of labor, often permanent damage to the pipe, due to the twisting strain, and in the end a poor joint difficult to make tight even with recourse to the well known dopes and cements. A clean cut and accurate thread is naturally the easiest one to make, hence a properly made and well kept die is evidently by far the cheapest in the end. A consideration and appreciation of the principles which should govern die making would seem to be of great practical benefit to the pipe fitting trades. The tools in use should be easy to repair, and with a little practice it would not be much trouble for each shop, with the aid of an emery wheel, to keep its own tools up to the mark. The neglect of tools used on pipe fitting jobs is responsible for daily losses that would not be tolerated for a moment in a moderately well managed machine shop. There seems to be little excuse for this state of affairs, except that few pipe fitters have had the benefit of a machinist's training, and, therefore, have paid little attention to the mechanical principles involved in the tools they use.

ONTARIO MINING INTELLIGENCE.

(From a Special Correspondent.)

The Ontario Government proposes to take strong measures to compel holders of mining concessions to live up to the terms of their leases. All leaseholders in arrears for a period of over one year, who have failed to perform the development work required by law on their properties, have been notified that it is the intention of the Government to cancel forthwith all leases where the terms have not been followed out. The Government also propose cancelling certain patents to mining lands, title in these cases, it is alleged, having been procured by fraud or misrepresentation. Writs have been issued by the Attorney-General against M. J. O'Brien, of Renfrew, W. C. Chambers, A. Ferland, Thos. Herbert, Nipissing; Ellis P. Carle, of New York and the Nipissing Mining Co., whose patents to territories in the township of Coleman, near the town site of Cobalt, in the silver district of that name, is likely to be forfeited. It is understood that this is the first of similar actions on the part of the Government.

Much interest has been created by a recent discovery of iron ore on the English River, north of Kenora, from the fact that though the find has been made in the district of Keewatin, it is in that part of the territory which will ere long be joined to the Province of Ontario. Report has it that there are deposits of lignite in this neighborhood, which may possibly be utilized.

Among the companies incorporated in Ontario during the past month are the Toronto Sand Lime Brick Co., of Sun-bridge; Concretes, Limited, of Toronto, to engage in all process of concrete manufacture; Ogden Oil Co., of Windsor, to bore for oil, gas and other mineral products; the Spider Lake Mining Co., of Windsor; the Loughborough Mining Co., of Sydenham. Extra-provincial companies authorized to do business in Ontario are the Ontario Gold Concessions, Limited; Anglo-Canadian Gold Estates, Limited; Drummond Mines, Limited—this company is operating a mine in the Cobalt area. The Dominion Natural Gas Co. has been authorized to increase its capital from \$500,000 to \$1,000,000.

A petition has been filed in the Court at Toronto, asking for the winding up of the North Shore Copper and Smelting Co., organized in 1903 to operate in the Sudbury district, where all its assets are situated. They consist of mining property, said to be worth very little and mortgaged to nearly their full value. The application is made on behalf of Pennsylvania shareholders.

The following mining leases have been cancelled by the Minister of Lands and Mines for Ontario:—Lease to Mr. James D. Taylor and transferred by him to the Great Lakes Copper Co., W. ½ and N. ½ of N. E. ¼ of lot 11, 4th concession, township of Trill; lease to Ralph Gillespie and transferred by him to the Grand Lakes Copper Co., N. E. ¼ of N. ½ of lot 10, 3rd concession of Trill; lease to Thos. Foster and Jas. D. Taylor, S. E. ¼ of N. ½ of lot 10, 3rd concession of Trill.

The account of the silver mines at Cobalt, which recently appeared in the Toronto *Globe*, has created a great deal of interest, and an agitation has sprung up in favour of a system of royalties by which the public may share in the mineral wealth which is now believed may be recovered from the public lands in Northern Ontario. The *Globe* lays down three principles with which the mining regulations should comply (1) the title to mineral lands, like that of timber lands, should remain vested in the Crown for the advantage of the people; (2) no private party, whether individual or corporation, should be allowed to hold mineral lands on speculation, even on payment of a rental; (3) the revenue obtained by the province from ore deposits should be proportioned to the amount of ore extracted and disposed of.

A great deal can be said on both sides of this question of royalty. In two instances has it been imposed in Ontario and subsequently abandoned—in the case of the Madoc gold discoveries, and the nickel developments at Sudbury. It is understood that the Ontario Government will, at an early date, take the matter into consideration. The adoption of a royalty system would be popular, but whether it would tend to bring about the development of more mineral wealth in the best way is another matter. The question is of importance at present, not only on account of the Cobalt developments but because of the discovery of an important deposit of bessemer iron ore some distance east of Port Aetlin.

An important case came before the Hon. F. Cochrane, Minister of Lands and Mines for Ontario, recently, involving the ownership of 300 acres of nickel lands in the township of Morgan in the Sudbury district. The parties concerned are Mr. A. H. Smith and the Edison Mining Exploration Co. The latter had failed to pay the dues and Mr. Smith was informed that the lands were open and filed a claim and obtained a lease. Now, the Edison Company dispute his right. A point involved is the "discovery" of minerals on Crown lots. The Edison Co. also claim that if they made default they were entitled to notice before forfeiture. The whole question of blanket leases is involved. After hearing both sides Mr. Cochrane reserved his decision.

Mr. Wallace Maclean, who has just returned from an investigation of the Cobalt silver deposits, in an interview with your correspondent stated that there is much dissatisfaction among prospectors with some of the present mining regulations. A prospector who claims to have discovered mineral can plant a discovery post, make the necessary affidavit as to his discovery—and let the claim lie for a year without doing anything further. As a remedy, it is suggested that local inspectors should be appointed whose duty it would be to examine into the alleged discovery and ascertain if there is any mineral in situ. This need not cost the country anything, as the inspectors would be paid by those who requisitioned their services. Another complaint is that prospectors are not allowed on timber limits held under lease. Some of the valuable veins at Cobalt have been traced into the Lumsden and Booth and Gillies Bros.' limits. The lessees will not allow prospectors on their limits, but have prospectors of their own, so that if any mineral is found it will be claimed at once by the limit-holders when thrown open. This virtually gives a monopoly of these valuable mineral lands to the lumbermen. Asked his views on the question of royalty, Mr. Maclean said he thought there should be no royalty on mineral products up to a certain figure, say half a million or a million dollars. On all ore produced after that amount there could be no hardship in imposing a royalty, which should be on a sliding scale as with the succession duties. The prospectors are opposed to a royalty.

There are indications of renewed activity in the Parry Sound district. The Mountain Mining Company are working copper deposits, and there are rumors that a company with a capital of \$2,000,000 will erect a 50-ton smelter to treat the ores of the district. The Parry Sound Copper Company is to hold a meeting in a few days when it is expected a decision will be arrived at as to operating their claims. A miner who is familiar with the South African ores and who has been working in one of the mines, expresses his conviction that the Parry Sound ores are equal to the best in the world.

A new peat industry is about to commence operations in Ontario. It is known as the Manitoba Peat Company, and the scene of its operations will be at Fort Frances, where there are extensive bogs suitable for the manufacture of an excellent quality of fuel. The company installing three excavators and other machinery, which are to be run by electric power. The plant is expected to be ready to start this month. The shareholders are chiefly residents of Winnipeg, and it is expected a market will be found in that city, where the output can be sold for about \$6.50 a ton.

So many disputes with reference to mining claims have arisen in Northern Ontario, and the expense of bringing witnesses to Toronto is found to be so great, that the government has appointed Mr. S. Price, a barrister of St. Thomas, to investigate and adjudicate on these claims on the spot.

Toronto has been afforded the opportunity of securing an abundant supply of natural gas at a cheap rate. Mr. R. A. Broomfield, of Pittsburg, Penn., secretary of the Dominion Natural Gas Co., which controls most of the gas territory along the shore of Lake Erie, between Dunnville and Port Dover, covering an area of 40 miles by 16, has been in that city looking over the ground. His company is now supplying a number of western towns, and their pipes have been laid in Hamilton for the past four months, only awaiting a settlement of a disputed point with the city authorities to turn on the gas. The wells aggregate a large yield a day, and experts express the opinion that these, and other wells to be sunk, will yield an unending supply for many years to come. Mr. Broomfield thinks gas can be supplied in Toronto for 45 cents a thousand feet, perhaps less. The present price of gas is 80 cents. No overtures have yet been made to the City Council, but no difficulty is anticipated if the company shows that it means business.

Two mining locations on Lake Koo-ka-gaming, township of Scadding, district of Nipissing, W. D. 40, containing 76 acres, known as Eagle Nest Mining location, and W. D. 25, containing 177 acres, with Shaw Island 5 acres, adjoining the Eagle Nest location, were offered for sale by auction under a mortgage, at Toronto, recently, but as there was no bidding they were bought in for the mortgagees. These locations were originally purchased from the Crown Lands Department as gold prospects, but practically no development work has been attempted.

Great satisfaction is expressed at the announcement just made public that the famous Bruce Mines, on the North shore of the Georgian Bay, are to be re-opened. They have had a somewhat checkered career, having been worked at intervals ever since 1846, principally with English capital, and at one time, notwithstanding the somewhat crude methods employed, paid a dividend of 25 per cent. Latterly, a small force of men have kept the workings pumped out, and sufficient shipments from the old tailings have been made to pay running expenses. Now the mines have passed into the hands of the Lancaster Syndicate of London, England, which has organized the Copper Mine and Smelter Co., with a capital of \$100,000. A smelter is to be erected, and the output, which will commence with 100 tons a day,

will be increased before long to 400 tons. The re-opening of these mines is expected to give a great impetus to operations on the North shore.

Prof. W. G. Miller, provincial geologist, has just returned from a trip through a part of the mining territory of Eastern Ontario. He visited the following working properties, all of which lie near Madoc:—Eldorado Copper Mine, Queensboro Pyrites mine, Madoc talc mine, Madoc fluorspar mine. A carload of the material from the last mentioned deposit has recently been shipped. The mining of fluorspar is a new industry among the varied mining enterprises of Eastern Ontario. The Olden zinc deposit, near Parnham Station, was also visited. A concentrating plant has recently been erected and contains some new features, the sizing being done by a wet automatic stream and the concentrating on the New Bartlett simplex tables. It seems to be questionable whether success will be achieved in handling the ore on this property with these tables. The ores are much like those of Broken Hill, New South Wales. The Richardson feldspar mine, near Bedford Station, was visited. This deposit is worked on a large scale and is, in all probability, the largest deposit of its kind in the known world.

Mr. E. L. Fraleck, the engineer in charge of the Queensboro Pyrites mine, has recently submitted the following report of recent operations, together with a summary of the work accomplished at the property to date:—

"A working shaft 7x12 has been sunk to a depth of 75 ft.; at fifty feet in depth a drift has been driven to the north-east for a distance of thirty feet. The last twenty feet of the drift is now being blasted up to a depth of five feet to form a reservoir for the surface water which has been coming into the shaft. This makes a total of over a hundred feet of workings. The shaft has been securely timbered with a crib work round the top, a skidway secured by wall plates and a ladder and pipe way securely planked off from the shaft. A creek has been diverted and a stone earth filled retaining wall built. The crib-work round the shaft has been clayed and earth filled to prevent surface seepage. A substantial boiler house has been erected and a complete equipment for the development work installed. Nearly seven hundred tons of ore have been won from the dump out to the main road. Another building has been erected which comprises a room for an office and a living room for the Superintendent. The property is well stocked with lumber, timber, etc., for some time to come. The first shipments of the ore were made from the property this week, about forty-five tons being sent to Buffalo. Toward the close of the harvest season when teams are available six hundred tons will be shipped to Buffalo as quickly as possible; arrangements have been made with an acid works there for a profitable disposal. At the end of that time the work on the property will be in such a shape that shipments will be continuous. In about four months from date the property will be in a position to pay its own way and after that no further requisitions will be made on the head office for finances. The equipment of the mine is complete with the exception of a hoisting engine, heavier cable, larger sheave, etc., which should be installed before the winter season sets in. The permanent plant which will eventually be placed on the property will be paid for out of the profits of the mine and the winter season will be utilized getting out timber for same. Eventually a method of transportation will be developed from the mine direct to the railroad, thus saving about twenty-five cents per ton in putting our ore upon the cars. The expense of this, however, will also be met out of the mine. The high grade nature of the ore still continues at the bottom of the shaft, and no reason has yet been disclosed why the grade of our ore should not continue, or why our ore body should not be as large underground as the surface indications would lead us to expect. Including the contract work, we now have twelve men at the mine and this number will be increased from time to time as we extend our drifting and cross cutting work, which will enable us to proportionately increase the output of the mine."

MINING IN THE KOOTENAYS.

(From a Special Correspondent.)

Looking back over the month just past, although no one particular incident or occurrence stands out with unusual prominence, yet indications and evidences of progress have been general and the mining industry is certainly "picking up" marvellously. There is no doubt that the government bounty on lead is doing good, Mr. G. O. Buchanan, the government dispenser of this bounty, recently stating that he was now paying for the fiscal year just closed 156 bounty claims, made by as many different properties, this being an increase of 100 per cent. over the amount of lead yielding properties two years ago, that is, at the time of the inauguration of the bounty policy. Indeed, one of the best features in the matter is the number of small properties that are working all over the country, especially in the Lardeau and Ainsworth districts. And, as a consequence of this activity, induced by the better price of lead, the recent change

in the lead duties, the bounty, together with the increasing market in the Orient, naturally the exploration work has brought to light many discoveries which have been overlooked in this difficult country in the past. The country really has never been thoroughly prospected and will not be thoroughly prospected for many a year to come even were the present activity to keep up indefinitely. Notable among these new discoveries from the huge value of the assays, are the finds upon Poplar and Rapid creeks, the latter being about ten miles beyond Poplar up the Lardo River. Your correspondent has seen assays which run over \$200,000 in free gold, that is to say, over forty per cent. of the weight being gold. But this district as yet, despite the richness of the finds, has not come to the front. Its enemies say that it is merely a case of surface enrichment and that whatever values there are in the claims are in the first foot of depth. That is to say in the grass roots. Now, this is not absolutely true; still richness at depth has yet to be demonstrated. When this is shown Poplar will have a far different standing than it enjoys just now.

From what has been said, however, notwithstanding, there is no immediate prospect of any great increase in the output of lead outside of the Sullivan mine. But production from this property alone will effect a considerable increase. With its leadstacks both under operation, as should be the case within a month, the Sullivan smelter at Marysville, should make a contribution of at least 8,000 tons yearly to the lead output of the province. Directly opposite to the Sullivan is the North Star. This is situated on the same vein as is the Sullivan, which has a surface showing of about a quarter of a mile in width and traceable for several miles. The North Star was reported unfavourably upon a year ago, and although fair shipments were made during the past twelve months, principally, it is said, from the dumps and from a vein that was located on the property, yet shipments have again ceased. From the St. Eugene no great increase can be expected this year. Last year the mine drove hard up to its fullest capacity to live up to its contracts, but this performance can hardly be expected to be maintained until such times as arrangements are made for shipping on a regularly larger scale. In the same section of the country is the Paradise and the Delphine, on Toby creek. From the Paradise something may be expected, but not until such time as the Kootenay Central Railroad is completed. Further up on Toby creek another strike of some importance has been made recently which is interesting mining men.

Coming west to Kootenay Lake there is great activity at the north end of the lake in the Ainsworth and Lardo-Duncan districts. Recently some American capitalists have gone in on the Duncan River, and it is expected that some good things may yet be got out of the Duncan country. Kaslo bestirred itself some time ago to build a waggon road into the district, but shortly after its completion came the slump in lead mining, now only just being recovered from, and nothing was done. The Highlander has not shipped for some time as it entered upon an extensive system of development work, which is now nearing completion, and from this an added supply of ore can be looked for.

In the Slocan camp there is a great deal of activity among the smaller properties, and, recently, a good strike has been reported from the Ottawa. Beyond this there is little increase to be expected. The Slocan Star has been tied up with litigation and the trial is still being proceeded with, a vexatious example of the lateral rights of the old system of mining claims. The Payne is shut down until such time as money is found to drive a new tunnel, which will cost a great deal of money, and the shareholders do not seem willing to produce the required amount at the present moment. The Monitor Ajax has been erecting a separator on Carpenter Creek, which is distant some ten miles or so from the property. Work is to be started upon this in the near future and demonstration will alone show whether the ore will bear the cost of transport so as to yield a profit. This is an English company.

In the Lardeau proper the Silver Cup is doing very well and the mill is being thoroughly overhauled and its rather ponderous machinery equipped so as to deal with the ore in more profitable shape. Experiment in these things is, after all, the only guide. But the Silver Cup, the Nettle L and the Triune are probably all three to be reckoned with in the estimate of the lead output for many a year to come. Sufficient work has been done to demonstrate the worth of the mine, and recent discoveries have put a yet stronger faith in the minds of the directorate.

Mr. Constant Fernau is trying a new scheme in zinc properties at the head of Kootenay Lake, where, by the way, the Krao, an old time standby, has again started up actively. He has acquired the Kootenay Chief, the United and the Blue Belle and proposes separating the zinc and then sending it over the Rocky Mountains to Frank to his zinc smelter there, which is now in course of erection and to which, it is stated, it is the intention eventually to add a lead stack. But whether this is likely to prove a success is yet to be demonstrated. The zinc smelter is the first in the country and as such should be welcomed inasmuch as it relieves the zinc mine owners from any fear of adverse action

on the part of the people of the United States, such as before destroyed temporarily the lead industry. Just now the proposition is to take the zinc ore from the mines mentioned at the head of Kootenay Lake and bring them to the foot of the lake, shipping them upon the C. P. R. at Kootenay landing, and then over the summit of the Rocky Mountains to trains to Frank. The attraction is the proximity of the Frank coal, which is said to possess good coking qualities. Whether it will prove cheaper to take the ore to Frank rather than a lesser amount of coke to Kootenay Lake, which would apparently seem to be the more reasonable course, remains yet to be seen. The great point is that a zinc smelter is really being added to the industries of the Kootenay, and it probably will not remain the only one of its kind.

In the Rossland copper gold camp there is nothing new. A proposed amalgamation between the White Bear and the California mine is talked of, the latter having been closed for several years and on the former a discovery of good smelting ore has been discovered on the 700 level. This is very much in nubibus at present. Development work is steady on the Le Roi and War Eagle mines, and an increasing output is the result of the better conditions recently prevailing in the camp.

The Boundary is steadily going ahead and its shipments are even beating the record of the previous year. The output for 1905 is likely to be very near if it does not exceed 1,000,000 'ons. There has been some trouble over the Providence mine, chiefly because of an attempt of the Greenwood directors to wrest the control from the directors living in Chicago, which has resulted in the Chicago men winning and the local management being heavily censured by Mr. Justice Irving of the British Columbia Supreme Court.

Active construction seems likely to be started on the coast to Kootenay route, which will bring the many Similkameen properties into prominence. From all that is said of the Nickel Plate it is likely to prove one of the leading mines of the upper districts.

At the coast steady progress has been made, but with the exception of the unfortunate dispute over the Nanaimo coal mines, which now seems probable of adjustment, there is nothing particular to record.

THE MONTH IN NOVA SCOTIA.

(From Our Special Correspondent.)

Gold.—It is understood that Mr. T. A. Rickard, of New York, the well-known mining engineer, and, until recently, editor of the Engineering and Mining Journal, is to be employed by the Provincial Government, and, in company with Mr. E. R. Faribault, of the Geological Survey Department, Ottawa, and Mr. D'Arcy Weatherbe, Engineer of the Provincial Mines Department, Halifax, will make a tour of inspection among the gold mines of the province. It is also understood that, in order to facilitate the matter, the Government is making arrangements for the unwatering of several of the representative mines.

During the month of July lease holders have been paying their annual rentals, which, according to the amendment to the Act, passed in 1902, must be paid by July 2nd of each year. This is, however, allowing thirty days' grace.

The gold mining areas applied for during July were mostly for areas previously held and which had been allowed to expire and were again retaken.

The areas applied for were as follows:—

Halifax Co.—		
Sraggy Lake District.....	21	areas.
Sheet Harbour "	84	"
Salmon River "	60	"
Montague "	144	"
Gay's River "	3	"
Tangler "	223	"
Lawrencetown "	26	"
Shier's Point "	21	"
Oldham "	55	"
Cow Bay "	27	"
Lochaber "	12	"
Guysboro' Co.—		
Miller's Lake District.....	41	areas.
Wine Harbour "	6	"
Ecum-Secum "	10	"
Stormont "	290	"
Lunenburg Co.—		
Centre District.....	71	areas.
Gold River "	25	"
Leipsigat "	31	"
Queens Co.—		
Whiteburn District.....	12	areas.
Brookfield "	6	"
Malaga "	131	"
Pleasant River Barrens District.....	12	"
Hants Co.—		
East Rawdon District.....	30	areas.
West Gore "	33	"
Renfrew "	57	"
Victoria Co.—		
Wagamatcook District	30	areas.

The crushings are somewhat small owing to more attention having been lately given to development work.

Latest returns give the following crushings and yield:—

- W. L. Libbey Mill, Brookfield District.—
3,290 tons crushed. Yield, 1,098 oz., 7 dwt., 14 grs.
- Moose River Gold Mining Co. Caribou District.—
65 tons crushed. Yield, 20 oz., 13 dwt.
- F. Taylor Mill. Oldham District.—
171 tons crushed. Yield, 193 oz., 11 dwt.
- Walton Mill. Kemptville District.—
40 tons crushed. Yield, 17 oz., 13 dwt.
- Old Provincial Mill. Wine Harbour District.—
1,316 tons crushed. Yield, 24 oz., 10 dwt.

Work at the iron mines at Torbrook is reported to be active. It is expected that five hundred additional men will shortly begin operations at Messrs. F. Wheelock's and M. P. Hoffman's works.

OMITTED FOR THIS MONTH.

Owing to the pressure on our space this month, a number of articles, and some regular features have been left over. These include an interesting letter from Mr. T. H. Mason, of Halifax, criticising our remarks on the iron resources of Nova Scotia, our patent report, etc.

GENERAL MINING NEWS—A MONTHLY SUMMARY.

NOVA SCOTIA.

The Nova Scotia Steel & Coal Co., New Glasgow, N.S., have their blast furnace and open hearth plant in full operation. The 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 are the electric power house and different shops.

The Dominion Iron & Steel Co., Sydney, N.S., have their rail mill put on double shift. The rod and blooming mills are also on double shift.

It having been announced that a new discovery of wolfram had been made at North-east Margaree, a correspondent of Greetings, a Cape Breton newspaper, writes: "This is no new find, as wolfram was discovered in this section in 1898. The mineral was found in a vein of quartz 2 1/2 feet wide, and development operations were commenced, but were not continued for any length of time."

The Dominion Iron & Steel Company's rail mill, which has been employing only a single shift since operations were commenced some weeks ago, has during the month changed to two shifts, employing double the number of men, or 150 hands in all. In the company's open-hearth furnace building a new crane of large capacity has been installed. The company has at present in operation two blast furnaces both producing basic pig iron.

QUEBEC.

The Buckingham Post, in a recent issue, contains the following paragraph:—"As we understand it, the Anglo-Canadian Graphite Syndicate, Limited, has gone "bust" with the usual number of "suckers." Now, what is agitating the minds of those financially interested is: If the agreement of the company with the owners terminated on the 28th July midnight, does property, say cordwood, for instance, on which money is due, revert to the owners, and can it be legally transferred to the new lessors whom, we are told, are comprehended in the euphonious, high sounding and far-reaching title of Anglo-Canadian Merchants. It is understood that the new company intends paying its men weekly. This is good news."

ONTARIO.

It is reported that the Canadian Copper Co. have decided to establish a smelter for the treatment of the cobalt and other rich ores from the new Ontario district. The works will be at Copper Cliff and the plant will be installed in the course of the next few months. The company has a water power at High Falls, and is there establishing a plant for the transmission of power to Copper Cliff, a distance of twenty-five miles.

The optionees of the G. I. property in the Manitou district propose to commence active development work on the claim about the first of September. In this district it is also expected that the ten-stamp mill at the Big Master mine will resume crushing operations by the first of September next.

The Imperial Steel & Wire Co., Ltd., of Collingwood, Ont., proposes to increase the capacity of its plant this summer to fifty tons of wire per day.

Work on the buildings for the additional plant has been commenced. The building will consist of a fence mill, 60 x 200 feet, two storeys; galvanizing building, 40 x 250 feet, and warehouse, 100 x 200 feet. The additional machines to be installed will consist of a 250 horse-power water tube boiler and a compound condensing engine of 150 horse-power, to drive a 100 k.w. generator.

It is announced that the Imperial Oil Co., of Sarnia, is about to erect a coal-handling plant, to cost about \$40,000, and also has arranged to build a short line which will be equipped with two locomotives and sixteen cars, for handling the coal.

The Gladstone Development Co., of Ontario, was recently organized with a capital of \$75,000, to acquire and operate property in Gladstone Township, owned by a Mr. N. J. Morrissey. According to assay returns, the ore here contains good copper values. The claims cover an area of 400 acres, about seven miles from the C. P. R. tracks and north of Dean Lake.

The United Gas and Oil Company, of Windsor, who suspended operations in the Wheatley oil fields some time ago, but have lately commenced work again, have struck a large well about two and a half miles from here on the farm of Fred. Wright. It has flowed 150 barrels and is still flowing. This well has not been shot, and is thought by the company to be one of the best in this section.

In the Manitou district there appears to be some slight revival of interest, steps having been taken in the resumption of development operations at the Golden Rod Company's property, while good progress is being made in the development of the Minnehaha Gold M. & S. Co.'s property. Work is also under way at the Big Master Mines Company's property. The district has recently been visited by many mining men and prospective investors.

Important discoveries of iron ore have recently been made by prospectors in the vicinity of Iron Lake, east of Port Arthur. Messrs. Wiley Bros. report that the quality of this iron is good, being sufficiently low in sulphur and phosphorus to be suitable for the manufacture of Bessemer steel. At the instance of Prof. Miller, the Provincial Geologist, a party has been inspecting the ground for the past month, and now reports that the field is much more extensive than was originally believed. Little can be said, however, of the quality or actual value of the new discovery until development operations are commenced.

The Ontario Government. It is understood, has engaged the services of an eminent mineralogist from Saxony, reputed to be the highest authority in the world upon Cobalt ores, to investigate and report upon the rich Cobalt areas of Nipissing near New Liskeard.

A dispatch from Port Arthur, Ont., states that Messrs. Mackenzie & Mann and Marks & Wiley have concluded arrangements by which all their iron mining properties on Atikokan Steep and Rockinge will be transferred to the Port Arthur Iron Mines Co., Ltd., which is being incorporated with a capital of \$500,000. Active mining operations are to commence immediately, arrangements having been made by which 50,000 tons of sulphur ore are to be shipped annually to the States. The deal will embrace between 20,000 and 25,000 acres of land, taking in the whole Atikokan range outside of claims held by McKellar, Pumpelly, Smith and Coleray. The arrangement assures active development work upon the property, but it is improbable any ore can be shipped before the end of the year.

ALBERTA.

The oil from the wells, which have not yet been productively developed owing to litigation between the Canadian Pacific Railway and the Canadian Government, which only ended last month, is alleged, as it comes from the wells, to be sixty-five per cent. pure and of the non-sulphurous kind, which gives off no smoke.

The Big Seepage springs, where the work is most developed, lie fifty-five miles north of Belton, Mont., ten miles across the boundary line. The country is rough and uncultivated, and is only reached from Belton by stage or horse back.

The extraordinary purity of the oil found in the Big Seepage Springs, in Alberta, has been much commented on, although the circumstance itself is unfavourable, having regard to the permanence of the occurrence.

BRITISH COLUMBIA.

The Coast.—The Western Construction Company of San Francisco has undertaken to supply the United States Government with several million yards of cut and dressed stone from the Newcastle Island quarries, near Nanaimo. It is estimated that it will require three years before the contract is filled.

Crushing operations have commenced at the Britannia mine, Howe's Sound, and shipments are shortly to be commenced to the Crofton smelter.

Mr. H. Wild, M. E., of New York, has secured an option on the Van Anda Mines, Texada Island. These properties were owned formerly by an American company, who, as a result of bad and extravagant management, came to grief. The mines have been bonded twice in the last few years.

Boundary District.—The owners of the Sally Mine on the West Fork of Kettle River last month received a cheque for \$4,143.50 from the Trail Smelter, in payment for twenty tons of ore shipped recently from this property. The group is situated at Wallace Mountain, near the junction of Beaver Creek with the West Fork of Kettle River. There are a number of promising prospects in this vicinity, and it is expected that many of these mines will be able to begin production when the Midway & Vernon Ry. (which is about to be constructed) affords the necessary transportation facilities. The ore in this camp gives very high silver values, shipments from the Sally having averaged over 225 oz. to the ton.

Slocan.—The installation of a compressor plant and mill is to be made shortly at the Argenta mine. It is also proposed to build a tramway $2\frac{1}{2}$ miles in length from the mine to the waggon-road.

Milling operations are in steady progress at the Jackson mine, where four hundred tons of zinc concentrates were produced last month and are ready to be shipped to the Kaslo sampler. At the Ruth mine, mill operations are to be resumed directly the contemplated additions shall have been made to the Kaslo works, as at present the sampler is not in condition to receive ore. The company has ordered three new zinc machines from the United States, which are expected to arrive in the course of the next two weeks.

Nelson.—The Nelson press makes rather much of the fact that a sample of ore brought from the Molly Gibson mine was found to assay 2931.8 oz. in silver. Of course, the assay returns from a mere specimen may have no special significance. It is not unlikely, however, that the Molly Gibson will prove to be a very rich property, from which handsome profits will be realized under good and careful management. Ore is now being taken out, ready for shipment, there being employed at the mine a force of twenty-five men.

The British Columbia M. & D. Co., of Rossland and Chicago, have instructed their manager to proceed at once with development work upon the Bon Ton group of claims on White Grouse Mountain, east of Kootenay Lake. There is said to be an excellent showing on the property, which has been opened by surface cuts.

Rossland.—The Privy Council has allowed the Centre Star Mining Company the right to a cross appeal in its suit against the Rossland Kootenay Mining Company. The action was brought against the Rossland Kootenay Mining Company by the Centre Star Mining Company, which claimed (1) Damages for the original trespass committed by the Rossland Great Western Mines, Ltd., the predecessors in title to the defendants; (2) Damages for a large quantity of ore taken by the Rossland Great Western Mines, Ltd., from the Centre Star property; (3) Damages sustained by the Centre Star Mining Company owing to water which was allowed to escape from the Nickel Plate mine along the trespass workings into the Centre Star mine; (4) An injunction against the Rossland Kootenay Mining Company to prevent a repetition of the aforesaid damages.

The Canadian Gold Fields Syndicate of Rossland, has distributed a quarterly dividend of 2 per cent. The syndicate has paid in dividends in all \$72,000, of which \$36,000 has been paid since the 15th of December last.

At the Centre Star mine preparations are being made to extend the shaft down from the 9th level, and work was to have been commenced at the beginning of August. An electric locomotive is to be installed at the mine to transport the ore from the shaft to the bunkers. Stopping meanwhile continues on the 3rd, 4th, 5th, 7th, and 8th levels, where development work is also in progress.

The Rossland Miner states that the new shaft on the 6th level of the War Eagle is opening up in a very satisfactory manner, and the ore that is being stoped from it is of excellent grade.

Both the concentrators at the Le Roi and the Le Roi No. 2 are now running steadily on second class ore. The Le Roi concentrator is said to be giving good results, although this method is still regarded as experimentally treatment only.

At the Trail smelter the lead stack was blown in during July, while the work of enlarging the refinery is making good headway.

There is still some prospect of an amalgamation between the White Bear and California Companies, though the Rossland Miner points out that the owners of the California appear to have an exaggerated idea of the value of their property, which is practically undeveloped. The White Bear, on the other hand, has a good showing of ore, and some of it is of an exceptionally high grade. Besides this it has a valuable concentrating mill, a good plant for hoisting and a compressor plant. It would seem as though the advantages, so far, as having the more valuable property and plant are concerned, are on the side of the White Bear.

East Kootenay.—Mr. S. S. Fowler, who recently visited the Paradise mine in the Windermere section, reports that a discovery of high grade silver has been made on the north fork of Toby Creek. This strike is said to be one of the largest and most important yet made in Northeast Kootenay.

A new 30-drill air compressor has been installed at the St. Eugene. This plant has a capacity of 3,000 feet of air per minute and will enable the mine to operate in all fifty drills.

Atlin—Recent work on the Columbia Hydraulic Company's property on Spruce Creek is said to have demonstrated the existence of a large quantity of pay gravel, and it is anticipated that the clean-up for the season will be a satisfactory one. Good reports continue to be received concerning dredging operations on Gold Run. A steam drill is being employed loosening the ground ahead of the dredge, and a large area of good ground has been opened up.

Ainsworth—Mr. Fernau has commenced active operations at the United mine, and has arranged to secure air for power purposes from the Taylor compressor plant, for this property and also for the Glengarry.

Mr. D. F. Strobeck has taken over the direction of the Pacific-Bullion Co's claims, upon which work is also about to recommence. This company many years ago, made some heavy shipments of ore, but the work was afterwards suspended in consequence of adverse conditions. Other important intelligence from this district is to the effect that rich strikes have been made on the Highland property recently, a large vein of concentrating ore having been opened up on the surface.

Similkameen—Operations at the Nickle Plate mine are now being carried on upon an extensive scale, about 3,000 tons of ore being mined and crushed per month. A force of one hundred men is employed at the mine and mill.

Lardeau—A new company called the Camborne Mining Company, was formed at Calumet, Mich., on July 21 to take over the assets and property of the Northwestern Development Syndicate, Ltd., and the Gold Finch Mining Company, Ltd. The property includes a 10-stamp mill and other machinery, a gravity tram about a mile in length; electric power house generating sufficient power to operate the mill and drills, and also the illumination of the mine and buildings. The Goldfinch claim has produced \$12,000 in bullion to date.

The Swede and Lucky Jack properties at Poplar Creek have been acquired by a new concern called The International Mining Company, which proposes to continue the development of the mines and install a mill and tramway on the Swede.

Atlin—Atlin reports state that the water is falling rapidly in McKee Creek, and will, it is feared, considerably restrict operations for the rest of the season; meanwhile, the McKee Creek Hydraulic Co.'s clean-up last month realized approximately, \$10,000.

The Northern Mines, Ltd., has been engaged in installing a steam shovel and auxiliary plant on Spruce Creek, and it is expected that digging will be in operation early in August.

Cassiar—News of the discovery of rich gold quartz was recently reported by Mr. C. W. D. Clifford, M.P.P., to have been made on the Copper River, some 50 miles above Hazelton, on the Skeena.

Ainsworth—Mr. C. Fernau, of the Canadian Metals Co., has secured control of the United Mine in this district. Negotiations are also in progress for the purchase of the Kootenay Chief, which contains a large body of low-grade zinc-lead ore.

The Coast—The iron deposits on the West coast of Vancouver Island continue to attract attention. On Quatsino Sound several properties have recently been bonded and it is stated that a dozen or more ovens will be built at once for the making of charcoal iron.

Boundary District—The production of the Boundary District for the seven months ending July 31st, approximated 540,000 tons. Of this total the Granby has contributed about 345,000 tons, the next largest producer being the British Columbia Copper Company with 95,000 tons.

A struggle for control of the Providence mine between factions representing Chicago and local interests culminated last month in a victory for the former, when in four actions heard in Nelson a Supreme Court judge gave his decision favouring the contentions of the Chicago directors. The evidence showed that some of the tactics of the contending parties had been most discreditable.

The Phoenix Pioneer states that there is some talk of reviving the project of driving a 4,000 foot tunnel into Hardy Mountain, near Grand Forks, thereby tapping a number of leads at a depth of some 1,300 feet. It is claimed that the undertaking can be carried into effect at a cost of \$75,000.

A consolidation has been arranged between the Freemont, Strathmore and Barbara high grade properties near Greenwood. The Strathmore and Barbara, it is stated, are in a position to commence shipments of ore running about \$100 to the ton. The Freemont is situated between the Providence and Strathmore, and has an excellent showing of ore. The syndicate owning these properties include a number of well known residents of Chicago, including the mayor, Mr. Dunne; Hon. George E. Foss, chairman of the naval committee in Congress; Mr. W. F. Porter, of Marshall Field & Co.; Judge Prendeville, ex-Senator Hall, Mr. John C. McPherson, Mr. Charles Winslow, a member of the Board of Trade and Mr. A. B. Shaw, director of the Drovers' Bank. The syndicate have agreed to set aside \$25,000 for the development of the Strathmore and Freemont.

Cariboo—Mr. John Hopp, of the Slough Creek, Ltd., is authority for the statement that the Cariboo output for 1905 will nearly equal last year's production. This was contrary to expectations, as the spring was very early, the snowfall light, and consequently the prospects of an adequate water supply were unfavourable. The outlook at the Slough Creek property is extremely encouraging.

The Ashcroft Journal states that satisfactory clean-ups are being made by the hydraulic and drifting mines on Kootenay Creek. The Onward drifting claim has paid another dividend, the third during the present year, while Messrs. Veith and Borland are reaping the reward of their persistence in the operation of their claim. Ever since the lead was struck it has been a steady producing and profit-earning property.

Slocan—A vein of very hard quartz was recently encountered in the Last Chance mine. This quartz is of unusual character in this district, and contains much gray copper and ruby silver, assays having been obtained giving 600 to 1,100 ozs. of silver to the ton. The occurrence of dry ore here is most unusual. A fine body of rich ore is being worked at the Mountain Con, this having been encountered recently in a new upraise. It is expected that a pack train will be busily employed for the rest of the year hauling out ore from this property.

It is reported that the Hewitt mine, near Silverton, has been sold to Chicago investors.

The case of the Slocan Star Mining Co. vs. B. N. White Co., involving the question of extralateral rights, was tried in Nelson during the last week of July. After hearing argument of counsel, the Chief Justice declared that the plaintiffs' contention was mythical. Notice of appeal to full court was given.

The Molly Hughes group near New Denver, one of the earliest locations in the Slocan district, has been bonded to German investors. Operations are to be resumed at the property immediately.

Nelson—The Kootenay Bell, a free-milling property, near Salmo, has been leased by Mr. G. D. Bell, and operations have been resumed with a force of 20 men.

In the No. 5, the lowest tunnel at the Molly Gibson, 1,000 feet in and at a depth of about 500 feet, a ledge of high grade silver ore has been encountered. Values chiefly occur in the form of ruby and native silver, while there is also present gray copper.

YUKON.

There seems to be no doubt that the discovery of new gold diggings at Willow Creek, in the Nisultin District, is genuine, and that another important placer mining district will be added to the productive area of the Yukon. The depth of bed-rock is eight feet, or less in many places. The pay averages from three cents to seven cents per pan, and is uniform on all the creeks so far prospected. It is, however, reported that boulders are both plentiful and large, which will, of course, render the ground difficult to work by pick and shovel. Willow Creek lies about one hundred miles due east of White Horse.

On Hiatt Creek some eighty miners are now working. The pay is said to average from six cents to nine and one-half cents to the pan.

An important new strike of rich placer ground is reported to have been made on Indian River.

There are said to be many excellent promising indications of mineral oil throughout the Yukon, the Indians having for years past used seepage oil as a coating for canoes. Meanwhile, a number of claims have been located, and applications made for record to the Dominion Government. It is said that these properties are quite accessible, and not far from White Horse.

A large dredge is being erected at the mouth of Bear Creek, the last of the machinery having been received during the month. This consisted of a large cylinder screen, the Grizzly being some twenty-five feet long and weighing 27,250 lbs. A team of fourteen horses was required to haul this piece of machinery to its destination.

As there are several Willow Creeks in the Yukon territory, the name of the creek in the Teslin district, on which the recent gold discoveries were made, has been changed at the suggestion of the recording officer to Iron Creek. Gold has been found on other creeks in the same locality, one of the most promising streams being Sydney Creek, where prospects amounting to 25 cents to the pound have been obtained.

COAL MINING NOTES.

NOVA SCOTIA.

Tests of a new hydraulic mining machine are being made in one of the collieries of the Dominion Coal Co. The machine contains a row of telescopic pistons at one end and a small pump at the other. After the coal is undercut the machine is operated parallel with and near the roof. The action of the pump forces water along a tube where it comes in contact with the pistons. There it penetrates the coal seam in a downward direction, and as pressure increases the coal begins to fall to the floor. The use of the

machine does away with explosives, and in addition to being economical in operation, is said to produce the coal with the least possible breakage.

The Dominion Coal Co.'s production for the month of July aggregated 329,164 tons, an increase of 69,809 tons over the corresponding period last year. The shipments were 343,198 tons.

Output was divided among the respective collieries as follows:—

Dominion No. 1	49,563
" No. 2	45,545
" No. 3	37,357
" No. 4	50,668
" No. 5	69,601
" No. 6	6,193
" No. 7	16,193
" No. 8	20,985
" No. 9	32,730

The output (in tons) by months since the beginning of the year compares with previous years as follows:—

	1905.	1904.	1903.	1902.
January	160,618	101,721	270,120	205,000
February	128,778	183,500	258,798	197,943
March	228,765	236,290	289,660	236,290
April	221,541	242,625	263,878	242,252
May	294,647	310,555	251,313	259,994
June	332,926	331,090	283,000	276,000
July	329,164	259,355	275,850	307,298
Totals	1,696,439	1,765,136	1,893,119	1,751,849

A dispatch from Glace Bay states that one of the biggest strikes in the history of the coal mining industry in Cape Breton was made in July, near Gardiner Mines, when the famous Mullins Seam, which for over fifty years has defied all efforts to trace out its course for any distance, or for any degree of accuracy. The existence of the seam, has, of course, been known for scores of years back. At Low Point the seam crops out on the sea shore, and coal has for a long time been taken from it for domestic use. It has always been held in high repute for household purposes. Some progress was made previous to this season in tracing out the seam. Mr. P. Neville, Deputy Inspector of Mines, in 1904, traced the seam from Low Point to the head of Lingan Bay, and about a mile and a quarter west of the Sydney and Louisburg Railway and back of Gardiner mines. Early in July men were employed boring at the upper southwest side of Lynks Lake, at a depth of only about seventy feet. The seam at that point is as follows:—Drift, five feet, nineteen feet of strata and shale, one foot six inches of clear coal, forty-eight feet of sand, stone and shale, five feet six inches of good, clear coal. It is now established that the Tracey and the Mullins are two distinct seams as the Mullins turns eastward into the Glace Bay basin. The latter seam is seven feet thick at Low Point. The seam underlies the Phalen, Hub and all seams operated by the Dominion Coal Company. Its course and the area of the country under which it lies are now indicated at least in a general manner by the discovery. Its extent is said to be greater than any seam yet discovered and it is impossible to compute the quantity of coal in the seam. It underlies some of the Dominion Coal Company's areas, the areas owned by the Weatherbe Atlantic Coal Co., at Bridgeport. Boring operations will be continued at other points by the Dominion Coal Company, and development work will, it is expected, commence this autumn. The length in a straight line of country covered by the Mullins seam is about 16 miles. Its outcrop line is about 25 miles. The land area covered would be more than 150 square miles.

A rich coal strike was made recently near Lingan, N.S., which shows six feet of clean coal land, area of about 100 square miles or 619,520,000 tons of coal.

In the last six months the Nova Scotia Steel & Coal Co., New Glasgow, N.S., have shipped 206,376 tons of coal, against 196,652 tons last year for the same period, an increase of 9,723 tons.

The Dominion Coal Company has purchased 150 new steel cars, each having a capacity of about 100,000 lbs.

A new trial pit is to be put down at the new Dominion No. 4 colliery. It is expected that this pit will be sunk on the Whalen property at Little Bras d'Or, and the company's railway will be extended from Dominion No. 3 colliery to the new mine.

BRITISH COLUMBIA.

Alberta.—In spite of the fact that the Granby Company has discontinued purchasing its coke from the International Coal & Coke Co., work at its collieries is being continued as usual, a daily output of some 700 tons being maintained, of which but 50 tons are used for the manufacture of coke. It is proposed to complete the building of the first battery of coke ovens, which will give 104 ovens in all.

The appeal, in the case of the Attorney General of British Columbia vs. The Wellington Colliery Company, was heard by the Privy Council last month. This involved the legality of the Wellington Colliery Company in employing Chinese underground in the mines in contravention of the provincial act. The company assumed the position that the provincial government had no jurisdiction to prevent the

company from ordering its servants to any part of its own property. The Privy Council upheld the decision of the lower court by dismissing the appeal of the Attorney General.

The coal and coke output of the Crow's Nest Pass Coal Co. for the six months ending June 30th, are as follows:—

Coal.	Tons.
Coal Creek	207,764.03
Michel	162,523.12
Carbonado	47,080.09
Total	417,368.04

Coal Manufactured into Coke.	
Coal Creek	97,863.07
Michel	95,072.02
Carbonado	8,473.13
Total	201,399.02

Nelson.—The Hunter V. mine at Ymir has been leased to the Hall Mining & Smelting Co., and operations have been resumed at the mine.

Mr. A. W. McVittie, P. L. S., of Cranbrook, has located five square miles of coal lands near Okanagan Lake, where there are said to be several promising seams of bituminous coal outcropping on the side of the mountain north of the valley on Short's Creek. The openings made for examination are 1,700 feet above the creek and 2,800 feet above Okanagan Lake.

Lardeau.—Development work is in active progress at the Silver Cup mine, where a level about three hundred feet below the previous workings of the property is now being run and connections made by means of an upraise. Some weeks ago a large body of concentrating ore was encountered, and recently a crosscut from this body opened by a lead of between one and two feet in width, and giving values of between 200 and 300 oz. in silver.

Arrangements have been made for the operation of the McMinnville group of claims on Lexington Mountain, the owners having in contemplation the installation of a stamp mill on the property. The ore is said to average about \$8.50 in gold per ton.

Rossland.—A promising strike is reported to have been made on the Lord group of claims at Sheep Lake, the lead seven feet wide having been opened up at a depth of 30 feet, the ore carrying fair gold and high silver values.

It is reported that negotiations are now in progress for the consolidation of the White Bear, California, Giant, Cariboo, and possibly one or two other properties in the same neighborhood.

The White Bear mine, which has been closed down for the last two months resumed operations on August 1st. The White Bear is said to have an excellent shoot of ore of smelting grade.

COMPANY MEETINGS.

Tyee Copper Company.—The sixth ordinary general meeting of the shareholders of this company was held in London on July 18th last, the chairman, in referring to the report of the auditor, said:—

"The first two items in the revenue account refer to dividends paid, the one of 5 per cent. being on account of the year ended April, 1904, and the other the interim dividend paid in December, 1904. The amount of £11,062 has been placed to reserve, as agreed in 1903. £6,700 is placed on deposit at our bankers, and may be used for the requirements of the mine, but not for dividends. The amount written off plant, mine, and smelter is £9,937. This is the amount spent upon new buildings, machinery, etc.; but as we have no spare capital your directors felt that the best way to deal with it was to write it off. On the credit side there is one item of £836—interest received from the reserve fund investments, and is credited to that fund. Sundry creditors have been all paid, with the exception of income-tax. Although much development work has been done, success has not up to the present time crowned our efforts; but it is fully believed by those capable of judging that in a short time our hopes will be realised. Your board feels that the shareholders will be greatly disappointed at their decision not to recommend the payment of further dividends until a fresh ore body is cut and proved—but they hope that they will soon be able to resume and pay periodically that which we all desire.

A shareholder asked why, with £22,000 on the balance sheet in view of the statement that 2,000 tons would pay all expenses and give them ten per cent. on the nominal capital, the directors wished to hold back the money in hand?

Another shareholder remarked that at present the company had about £73,000, and he thought the shareholders ought to have a little bit of that to go on with.

Mr. Ludwig Loeffler said some gentlemen appeared to take a very sanguine view of the future of the property, and he hoped their anticipations might be correct, for the sake of all the shareholders. He, however, was not sanguine, and he would give his reason for saying so. Quite in the early history of the company, in 1901, a note of warning was sounded as to the character of the mine depth by Mr.

Thompson, the well-known mining expert, who then acted as consulting engineer to the company, and had examined the mine on different occasions. He did not feel satisfied with the appearance of the ground at the 200 feet level when reached, and recommended to the board the sinking of a shaft to a greater depth to ascertain the character of the formation below the surface ore body. Some time after the most sanguine hopes of finding ore bodies were entertained by the management in respect of the 400 feet level; but, notwithstanding extensive exploration, they proved a disappointment. The same occurred at the 600 feet level, and, unfortunately, they had experienced the same disappointment at the 800 feet level—the lowest point they were able to reach with their present hoist and power. Under these circumstances they ought not to act on hopes and expectations of so uncertain a nature, but only on existing facts and data. Such were contained in the report of their mining engineer, Mr. Musgrave. As far as it was possible to arrive at figures from his statements, he (the speaker) concluded that their present ore reserves, at the reduced output of 2000 tons per month at which they were now working, might only last for another year or eighteen months. If by that time they had not found new ore bodies, either in depth or in any of their other claims, their position would be a very serious one. Their other claims had yet to be proved. The most promising amongst them, the X L., had been seriously taken in hand during the year with which they were dealing. Considerable work had been done by way of sinking and cross-cutting; but, to their great disappointment, the result had been practically nil, and no ore body had been found. The business of their smelter for custom ores was at present too small to be taken into consideration. They, therefore, had to face the situation that at a very near period they might find themselves without ore, and that they would require all the cash reserves which they had accumulated. They would soon have to meet heavy expenditure to increase their plant and provide for sinking and other exploration work, and if all their endeavours to find ore should prove unsuccessful, as was quite possible, they might have to consider what other arrangements could be made under the circumstances in which they might then be placed. Should they be lucky enough to meet with large ore bodies, such a fortunate incident would, of course, at once change their position for the better, and would enable them to appropriate such part of their savings for dividends as the improved circumstances might reasonably warrant. On May 9th, 1902, the colonial holding amounted to 19,013 shares; on April 20th, 1904, the total colonial holding was 12,233 shares; and on June 26th, 1905, when the saving in and the reduction in the output took place, it was reduced to only 2,926.

The Chairman stated, that the directors considered it a wise policy to write down the buildings and machinery, and so place the balance-sheet on a sound basis. He did not think the shareholders need despair about the property.

COMPANY NOTES.

Princess Royal Gold Mining Co., Ltd.—This company has been registered at Somerset House, London, with a capital of £500,000 in £1 shares. Objects: To acquire from the Princess Royal Gold Mines, Limited, certain mineral areas, to adopt an agreement with the said company and the Hon. W. Pugsley, and to carry on, in British Columbia or elsewhere, the business of miners, prospectors, metallurgists, refiners and dressers of and dealers in ores and minerals, etc. Mr. Tweedie, the Premier of New Brunswick; Mr. Pugsley, the Attorney General, and several other prominent residents of New Brunswick, are, it is understood, largely interested in this property, while a son of Mr. Tweedie is acting as mine manager.

Montreal & Boston—Shareholders of the Montreal & Boston Company, according to the Wall Street Journal, subscribed to less than one-quarter of the \$700,000 bonds of the Dominion Copper Co., the reorganized company, which were offered to stockholders at 90 with a 200 per cent. stock bonus. This was probably as the underwriters desired, for no facilities were given stockholders to subscribe for the new bonds, nor were they given a very long time in which to subscribe. Underwriters secure the bonds at 80. Mr. S. Newhouse is now in charge of the properties, and his representatives are now in the Boundary preparing to resume operations. The smelter will be doubled, a converter plant installed, and the mines will be opened to permit of a much larger production.

Notice is given by the Montreal & Boston Consolidated Mining & Smelting Co., Limited, that the sale of the company's property to the Dominion Copper Co., Limited, under the agreement of May 11 has been completed, and that the stock of the latter company is now ready to be exchanged, share for share, for the stock of the Montreal & Boston. Stockholders are requested, in view of probable early proceedings for the dissolution of the Montreal & Boston Co. to exchange their stock as soon as possible. Holders of certificates not standing in their own names should send their certificates to the Securities Transfer & Registrar Co., the transfer agent of the company, for transfer to their own name.

Ymir (Nelson)—Return for June: 30 stamps ran 27 days and crushed 2,000 tons (2,000 lbs.) of ore, producing 363 oz. bullion. The estimated realisable value (gross) of the product is \$3,390; 205 tons of concentrates shipped; gross estimated value, \$4,400; cyanide plant treated, 1,700 tons (2,000 lbs.) of tailings, producing bullion having estimated gross value of \$1,000; sundry revenue, \$80; equal to \$8,870; working expenses, \$8,714; profit, \$156. There was expended during the month on development \$2,870.

Tyee Copper (Vancouver Island)—Cablegram received recently, giving results for the month of June as follows:—"Smelter ran thirteen days and smelted: Tyee ore, 1,988 tons; customs ore, 294 tons; total, 2,282 tons. Matte produced from same, 267 tons; gross value of contents (copper, silver and gold), after deducting costs of refining and purchase of customs ore, \$30,950." N.B.—Part of June product was treated in the first few days of July, in order to suit the visit of the American Institute of Mining Engineers on the 4th instant.

Cariboo Consolidated—The latest news from British Columbia is contained in the following cablegram from the resident manager just to hand:—"During the month of June washed 565 cubic yards of gravel, yielding 1,130 dollars. Impossible to deal with cost of extraction by cable I will write you fully by next mail." Office Note.—This gravel has only been obtained from development drives in order to enter the channel proper, and is not from the centre pay lead, but regular drifting will shortly be commenced.

Le Roi Mine—The following cablegram has been received from Rossland:—"Shipped from the mine to Northport during the past month, 8,788 tons of ore, containing 3,430 ozs. of gold, 3,200 ozs. of silver, 163,600 lbs. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realisation, depreciation, \$13,500. Expenditure on development work during the month, \$10,000. Experimental concentration mill commenced running on July 1st. Nothing new to report in the mine of importance."

MINING AND INDUSTRIAL SHARE MARKET.

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

Public attention is turning again to mining stocks, and though as yet to a limited extent, there is more enquiry than has been noticed for a considerable time past. This is due partly to the pending consolidation of the large mines in British Columbia, and to favourable reports of the week going on in various properties. Indications are that speculation in mines will become a feature before long, but on a more substantial basis than in past years. The industrials are without special feature, prices hold firm but the transactions are small, and in some, quotations are nominal. A fair sized trade being apt to make a fluctuation of several points either way.

Quotations at Aug. 15th were as follows:—

Par value of shares.	Asked.	Bid.
.10 Canadian Gold Fields Syndicate..	.05	.04½
1.00 Centre Star .....	.35	.33
1.00 Deer Trail Consolidated .....	.01½	.00
1.00 Giant .....	.03½	.00
10.00 Granby Consolidated	7.50	7.25
10.00 Montreal and Boston	—	—
1.00 North Star .....	.02	—
1.00 Payne .....	.02	.01
1.00 Rambler Cariboo .....	.20	.15
1.00 Republic .....	.00	.00
1.00 St. Eugene .....	.50	.47
1.00 War Eagle .....	.19	.17
1.00 White Bear .....	.04	.02
100.00 Nova Scotia Steel (common)	65.50	63.75
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 (common)..	22.50	22.75
100.00 Ditto ditto ditto (pref'd.)...	73.00	72.00
— Ditto ditto ditto(bonds)...	85.00	83.50

INDUSTRIAL NOTES.

The Robb Engineering Company is building two 200-horse power Robb-Mumford boilers for the Cumberland Railway & Coal Company, Springhill, while the Dominion Iron & Steel Company have also recently ordered a 150-h.p. boiler of this type.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, have established a branch office at No. 216 Dooly Block, Salt Lake City, Mr. Harry V. Croll, M.E., having been appointed manager thereof. Inquiries addressed to the Salt Lake City office will have Mr. Croll's personal attention.

The Canadian Pacific Railway Co. has purchased four large steam shovels from the Locomotive & Machine Company of Montreal. This order is the first of its kind to be placed in Canada, all steam shovels having been purchased heretofore in the United States.

A special despatch from Nelson states: "The contract for the hydraulic and electrical machinery for the City of Nelson power plant on the Kootenay River has been awarded to Allis-Chalmers-Bullock, Limited, Montreal. The tenders were: Canadian General Electric Co., \$32,000 for the electrical machinery; the Canadian Westinghouse Co., \$31,376 for the electrical machinery, and Allis-Chalmers-Bullock, Limited, \$29,985 for the electrical and \$13,600 for the hydraulic machinery. The latter company having tendered for both the hydraulic and electrical machinery had an advantage over the other two and were awarded the contract.

That the steam turbine is rapidly increasing its foothold in the power field is evidenced by the remarkable increase in manufacture of the well-known Westinghouse-Parsons type. During the six months ending June 30th, 1905, The Westinghouse Machine Company, exclusive builders of the Westinghouse-Parsons type, have contracted for no less than 82,000 kilowatts in turbo-generating machinery, averaging nearly 1,175 kw. capacity per turbine unit. These machines range in size from 200 kw. to 7,500 kw. The latter will be the largest turbines in the world, and three units of this size are under contract for Greater New York railway and lighting power stations. In the distribution of these machines among the various industries, the electric railway has claimed the largest number of machines, averaging 1,496 k.w. in capacity; next in order, industrial plants, averaging 571 kw. capacity, and light and power plants, averaging 1,529 kw. capacity. In the order of total capacity, railway plants have required 38,900 kw., lighting plants, 26,300; industrial, 12,000; miscellaneous, 4,800. The list bears excellent witness to the increasing possibilities of the turbine, and presages a brilliant future. The equipments noted represent solely actual sales only and not including contemplated business or partially closed contracts.

The Elwood Tinworkers Gold Mining Co., of Elwood, Indiana, has ordered from the Merralls Engineering Co. a six-stamp and roller mill, to handle one hundred tons a day, for their mine at Lardeau, B.C. It will be operated by the water power plant to which recent reference was made in the Mining Rev. w. The Craig Gold Mining & Reduction Co., which has the first Merralls stamp mill in operation in Canada, at its Buckingham mine, will shortly add a roller mill. The Merralls Co. has been incorporated in Ontario for the manufacture of mining machinery at London, Ont. Mr. L. A. Morrison is president and manager; Mr. F. D. Woodworth, secretary-treasurer.

The Sullivan Machinery Company is making some important additions to its manufacturing plant at Claremont, N.H., in order to keep pace with the rapid growth of business in air compressors, coal cutters, rock drills and other mining and quarrying machinery. The improvements comprise six new buildings, practically doubling the present plant.

Messrs. Babcock & Wilcox, Montreal, have recently installed boilers as follows:—Canadian Pacific Railway Co., Montreal shops, 1,400 h.p. additional, equipped with Babcock patent superheaters and automatic chain grate stokers; Winnipeg City Water & Electric Light Plant, Winnipeg, Man., 500 h.p., equipped with Babcock patent superheaters and automatic chain grate stokers; Winnipeg Electric Railway Company, Winnipeg, Man., 2,000 h.p., equipped with "Neemes" patent shaking grates, etc.; Dominion Coal Co., Sydney, N.S., 2,500 h.p.; J. R. Booth, Ottawa, 2,000 h.p., boilers and superheaters; Belgo-Canadian Pulp & Paper Co., 500 h.p.; Central Electric Co., Montreal, 200 h.p. additional, Canadian Pacific Railway, Winnipeg, hotel and station, 800 h.p., Canadian Pacific Railway shops, Winnipeg, Man., 1,500 h.p., with superheaters, Canada Car Co., Montreal, 1,800 h.p., with superheaters; Calgary City Electric Lighting plant, Calgary, N.W.T., 500 h.p., with "Neemes" shaking grates. F. W. Bird & Son, Hamilton, Ont., 75 h.p.; South Western Traction Co., London, Ont., 900 h.p.; Singer Mfg. Co., St. Johns, Que., 1,625 h.p. The Dominion Government last fall installed Babcock & Wilcox marine boilers in the Dominion icebreaker "Montcalm," which was used so successfully in breaking the ice on the St. Lawrence during the past winter. The Babcock & Wilcox Co. are also installing an additional economizer and induced draft plant for the Canadian Pacific Railway at Fort William, Ont.

THE IRON AND STEEL TRADE IN THE UNITED STATES.

Says the Coal Trade Journal, discussing iron and steel conditions in the United States:—

"Iron and steel and associated products are in demand to such a degree that some of the manufacturers say they are surprised themselves at the volume of tonnage in sight for the next twelve months. It is admitted that the orders already booked will keep mills and furnaces employed at almost limit capacity until well into the second quarter of 1906. Sheets constitute the only item on the list that is regarded as dull, but even here there is expectation of more activity after September 1st. Pig iron is firmer at about old quotations, but sales reported are not in so large a tonnage volume as last month, when buyers evidently sought to cover requirements at the lowest point, and most of them

did so. Out of 41 blast-furnaces in this county, 39 are in blast or will be by the end of this week, and the others as soon as fit for operation. The operations are largely on orders already booked and a new purchasing activity in pig is not expected much before October again. The purchases by the railroads for rails, track supplies and car iron has been a surprise because of the large volume. This is accounted for on the earnings of the roads and the prospects of a large movement of crop products during the winter, which justifies expenditures that have been long needed but held in leash because the money to carry them forward was not previously in sight. Rail orders now booked, with those carried over, including foreign bookings, are authoritatively said to aggregate about 2,700,000 tons, which is pretty close to yearly capacity of all the mills, which is about 3,200,000 tons within the country. Structural materials for bridges, buildings, elevated roadways, ships and miscellaneous uses also embrace a heavy tonnage, while the plate and bar orders constitute a heavy percentage. The iron masters are all in complacent mood, seeing active business with profits ahead for some time, with intimations that before the orders already on hand are filled there will be others of a tonnage that gives promise of a good year for 1906. Machinery makers are busy also, much more so than during the first half of the year. This is due, in large part, to the tremendous development of mining enterprises in the Rocky Mountain States, Alaska, British Columbia and Mexico, to say nothing of countries farther south and abroad. Pittsburg is heavily interested in copper and oil ventures in the West, and machinery orders and pipe and tanks for those sections usually come here.

WORLD'S OUTPUT OF COPPER

The production of copper throughout the world in 1904 is placed at 1,407,056,000 pounds, an increase of 7 per cent. over the output in 1903. In fact, the average yearly increase for the past ten years has been 7.3 per cent. The average yearly increase in the United States production during the same period was 3.2 per cent. The United States has been creeping up in its proportion of the world's supply until today its mines furnish 55 per cent. of the world's output.

We give herewith the world's production of copper during the past decade, in pounds, and the yearly percentage of increase:—

Year.	Pounds.	Inc. %
1895..	749,425,600	...
1896..	836,333,120	12.0
1897..	893,659,200	6.0
1898..	961,309,440	8.0
1899..	1,051,254,400	9.0
1900..	1,088,312,960	4.0
1901..	1,444,686,560	5.0
1902..	1,214,453,080	6.0
1903..	1,310,581,440	8.0
1904..	1,407,056,000	7.0
Average.. . . . .	.....	7.3

ANTHRACITE MINING COSTS.

The cost of producing anthracite coal in the United States has been considerably increased since the recent strike. The following table shows the costs of mining of three important companies—the Delaware, Lackawanna & Western, the Delaware & Hudson, and the Lehigh Coal & Navigation Company. The item of improvements at mines is included in the cost of coal, as it is a necessary part of the expenses of mining, and simply means such development as is really required to maintain the production. The averages given in the table are based on the entire quantity of coal handled by the respective companies.—

	D.L.&W.	D.&H.	L.C.&N.
Cost of coal mined and bought.....	\$1.72	\$2.01	\$1.79
Improvements at mines.....	0.08	0.08	0.23
Total cost of coal.....	\$1.80	\$2.09	\$2.02
Transportation and selling	1.79	1.14	—
Total cost	\$3.59	3.23	—
Average selling price	3.97	3.57	—

The Delaware & Hudson costs include a sinking fund charge for all coal mined from the company's estate, which averages four cents per ton on all coal handled by the company.

COAL OIL BOUNTIES.

It is estimated that about \$340,000 was paid in bounties on coal produced in Canada during the last fiscal year. At the rate of 1½¢ per gallon this would represent a net output of some two and one-quarter millions of gallons of crude petroleum. This output of Canadian wells is, while considerable, of course far short of the total consumption. In addition to the home production there was imported during the year about twenty-two million gallons of coal oil, naphtha, gas oil and the like products of petroleum.

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.

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.

Department of the Interior.

Ottawa, February, 1904.

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

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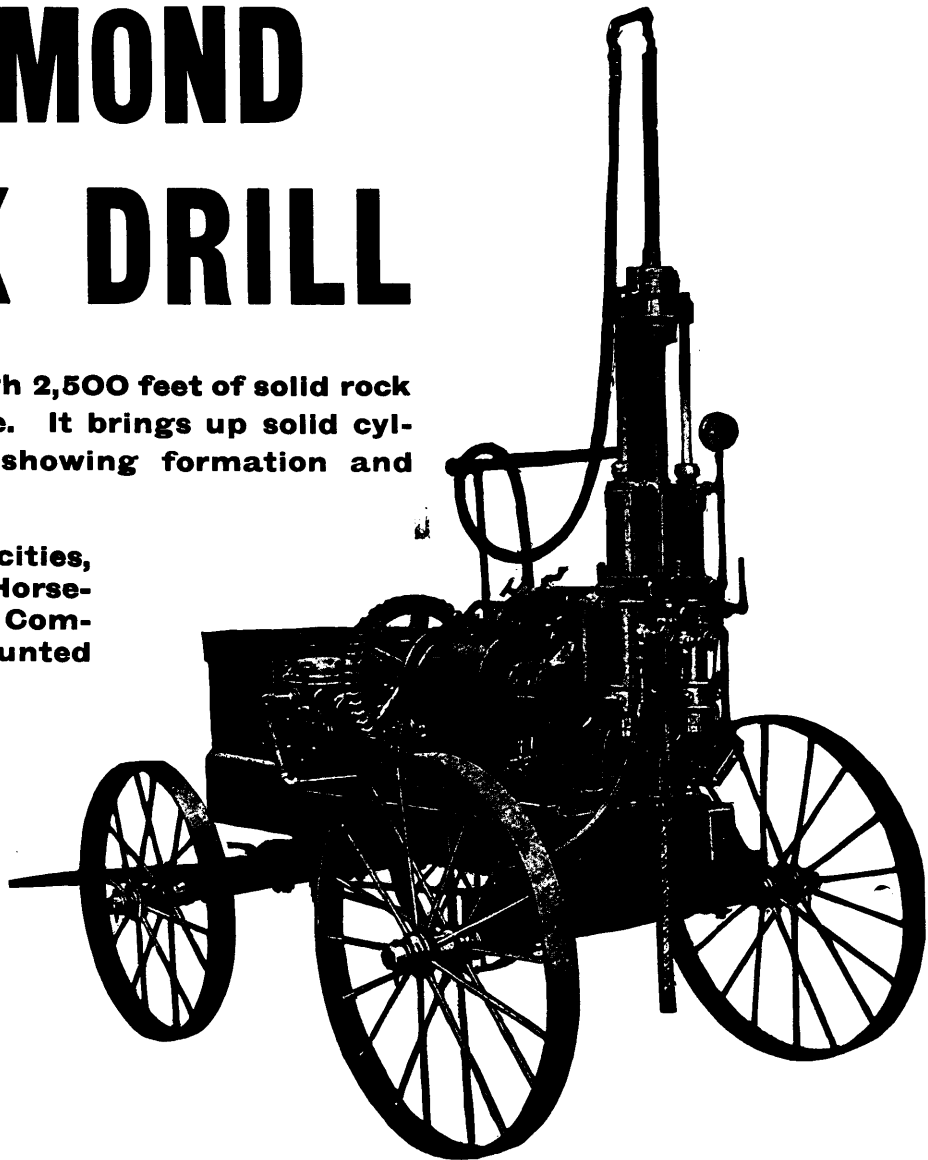
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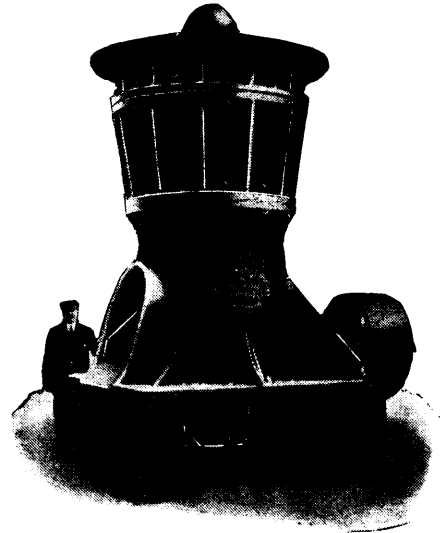
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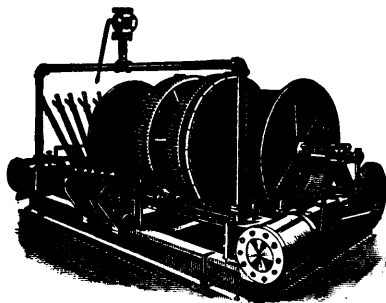


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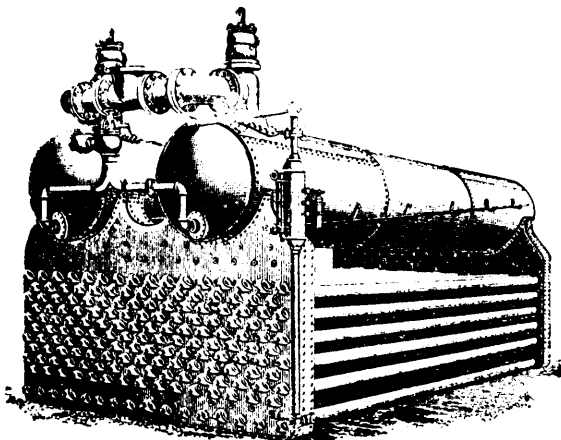
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