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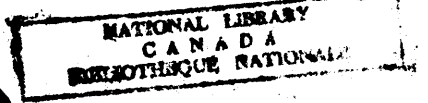
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Established 1882

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OTTAWA, JANUARY 31st, 1902.

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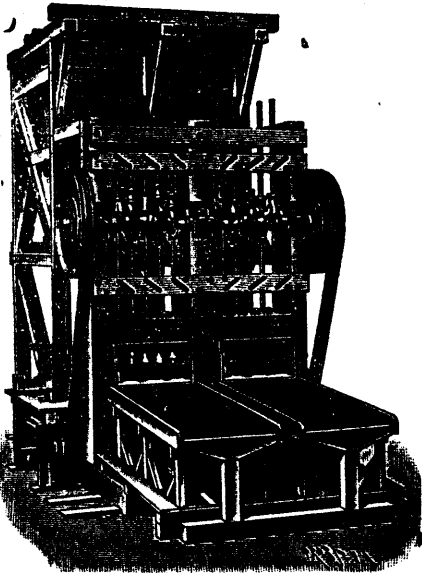
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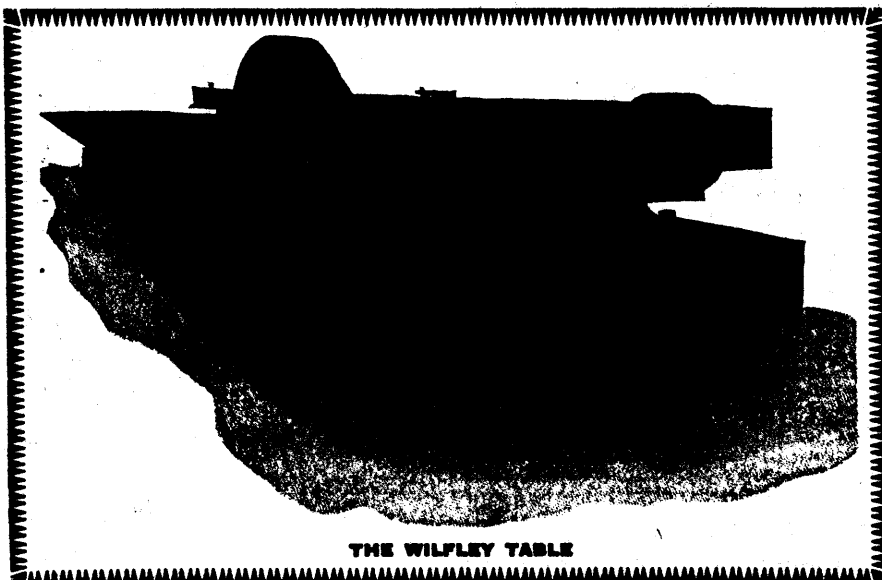
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Hon. Secretary of The Mining Society of Nova Scotia.  
Secretary, Canadian Mica Miners' Association.

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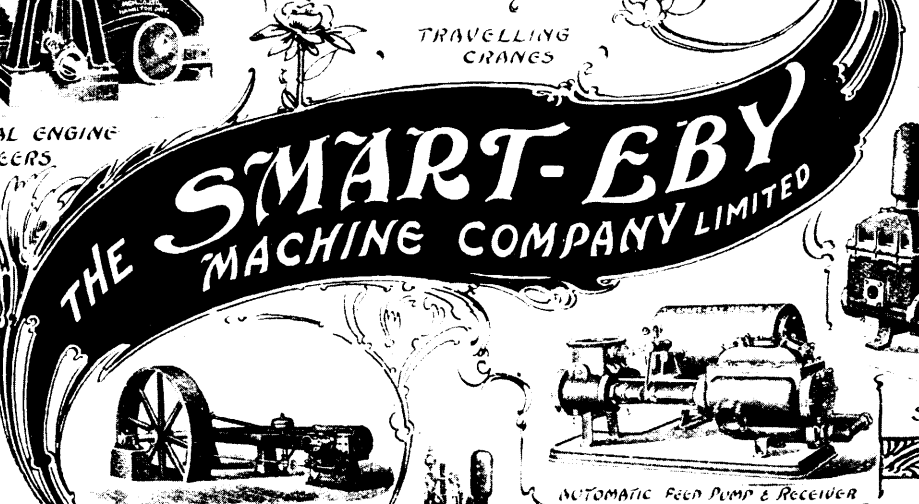
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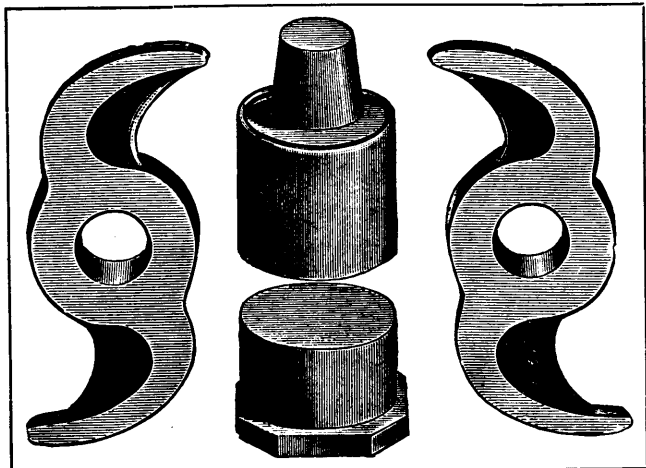
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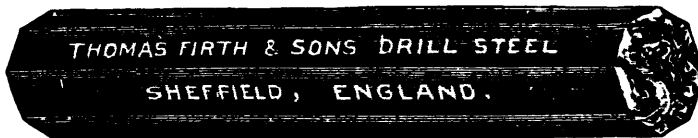
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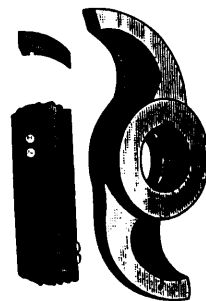
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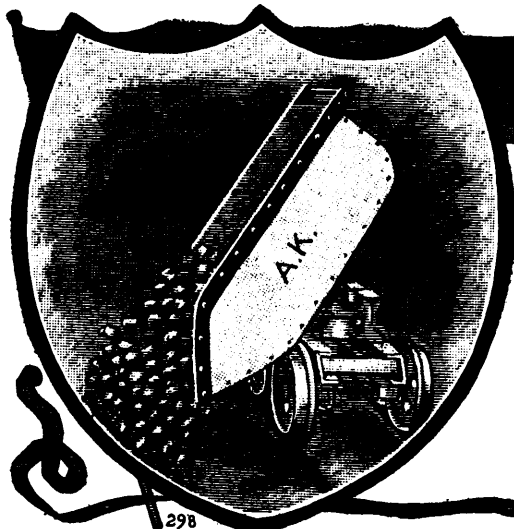
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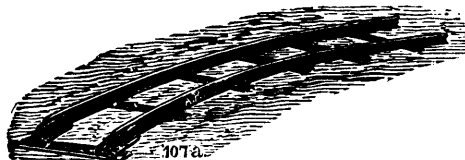
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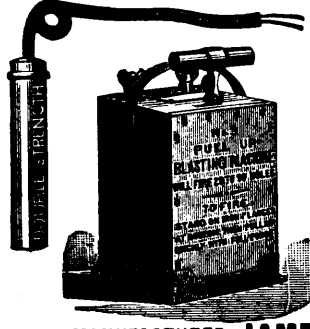
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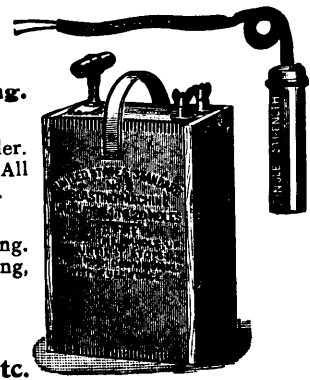
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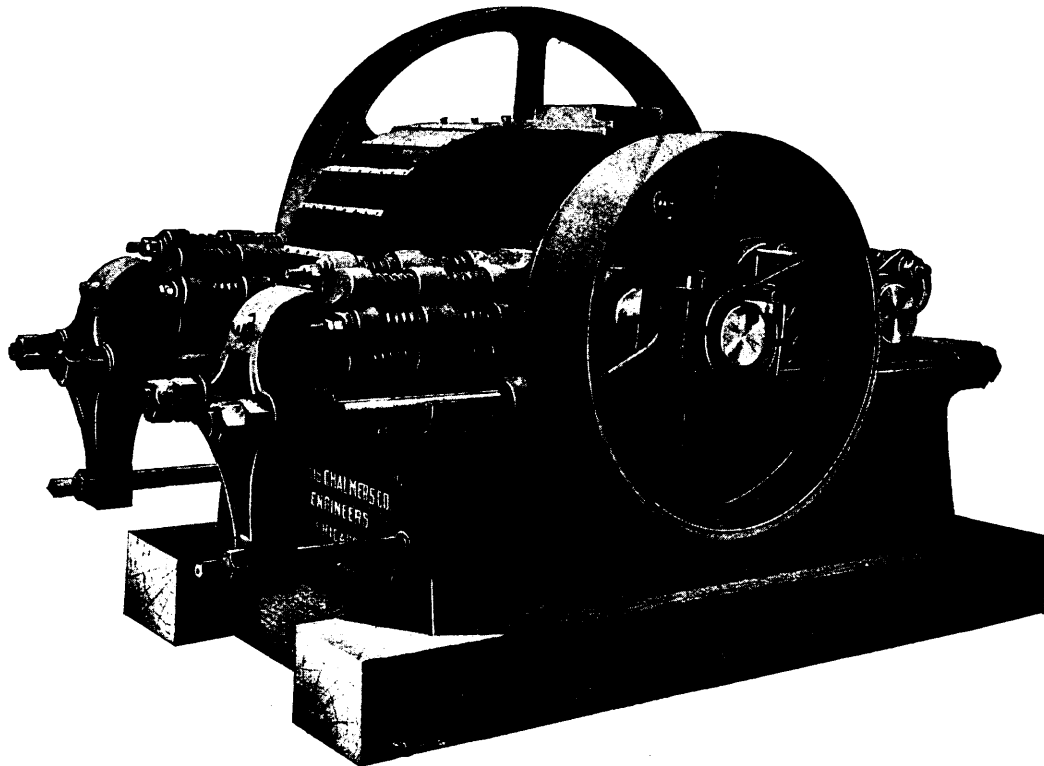
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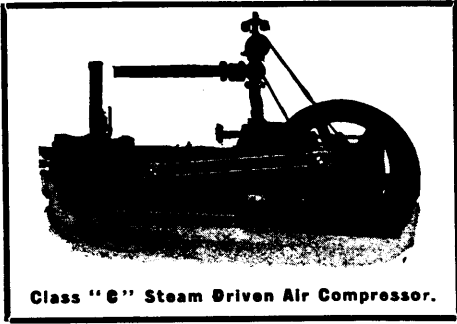
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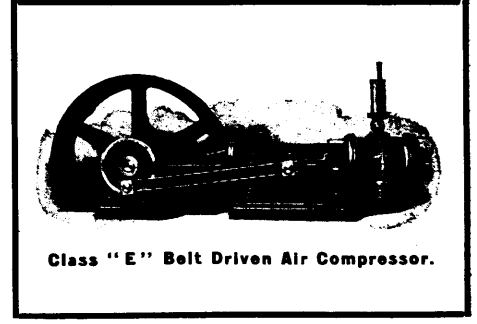
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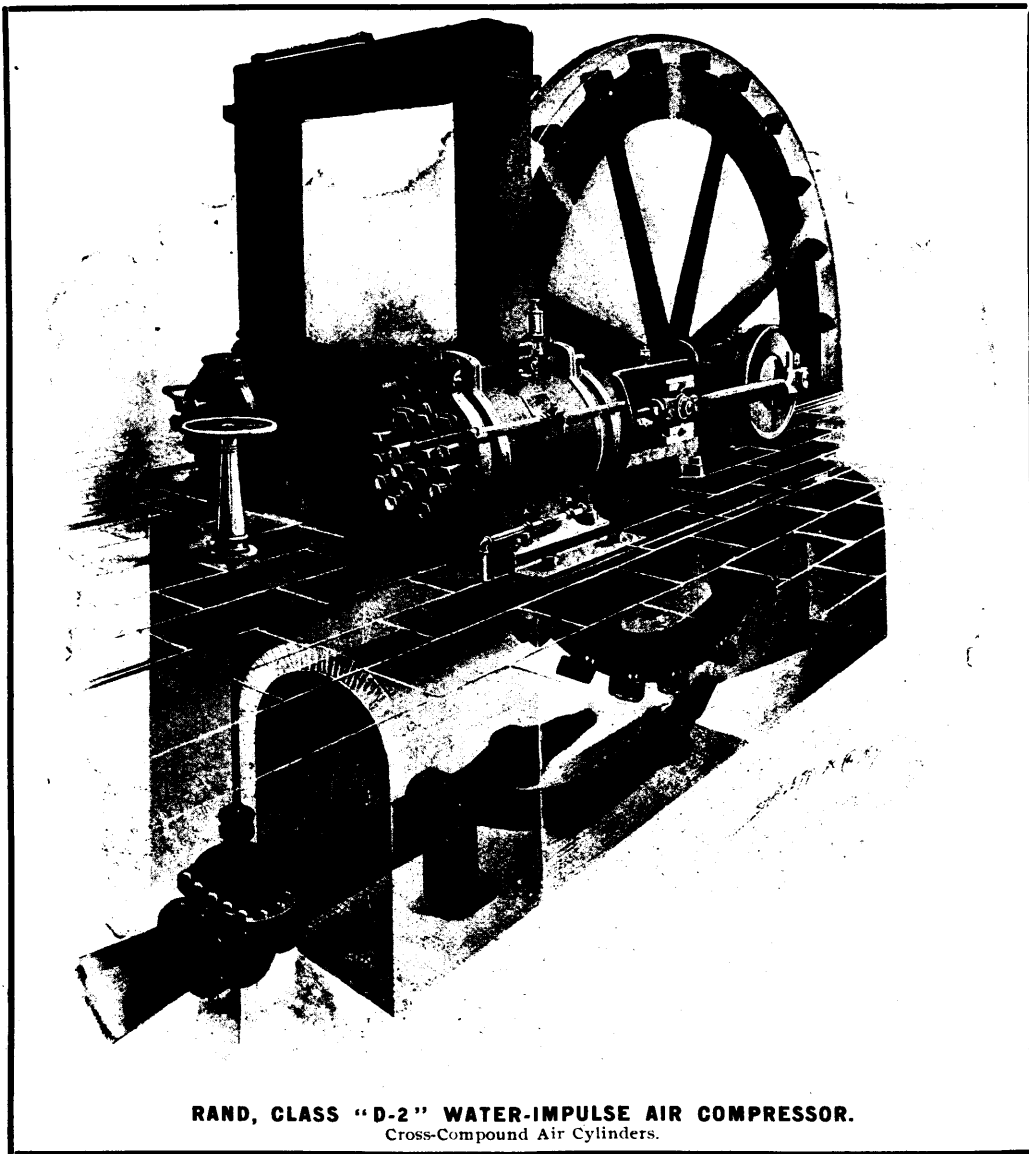
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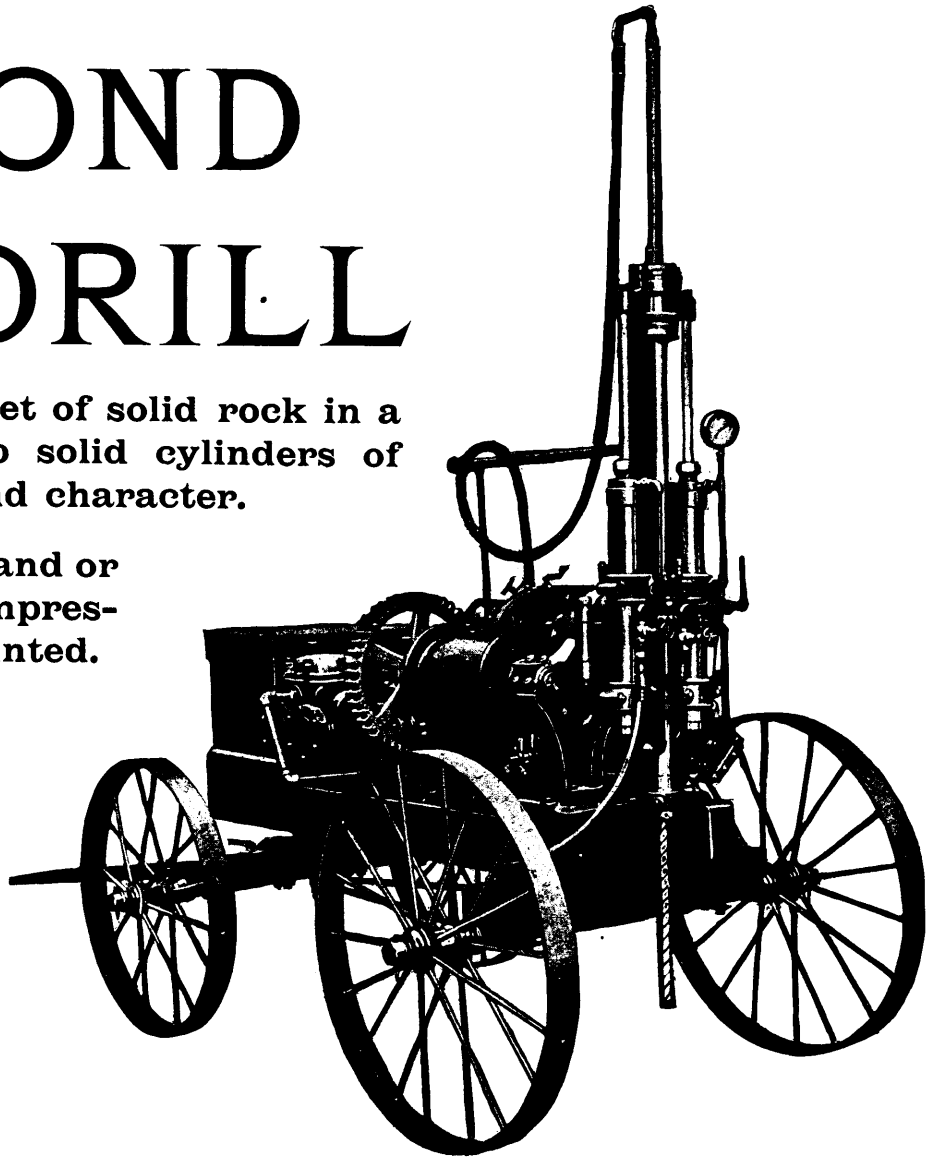
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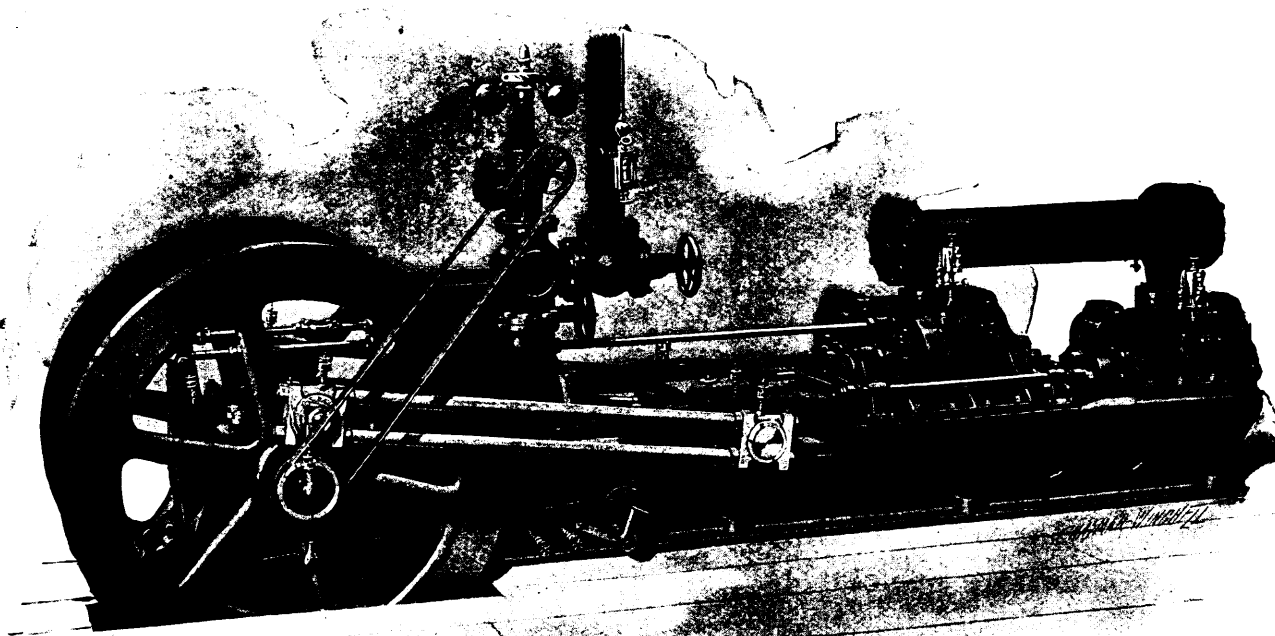
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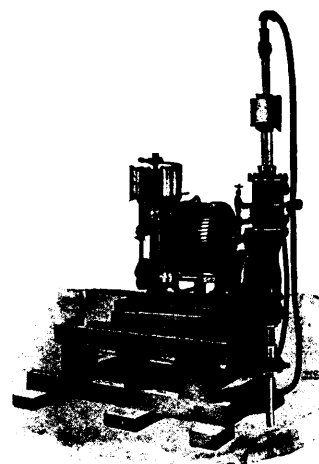
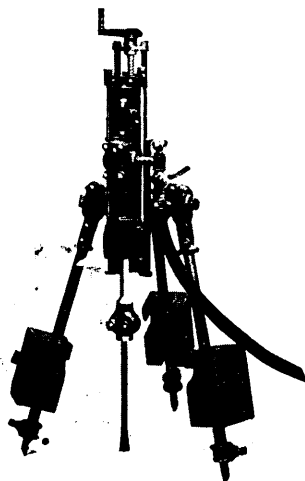
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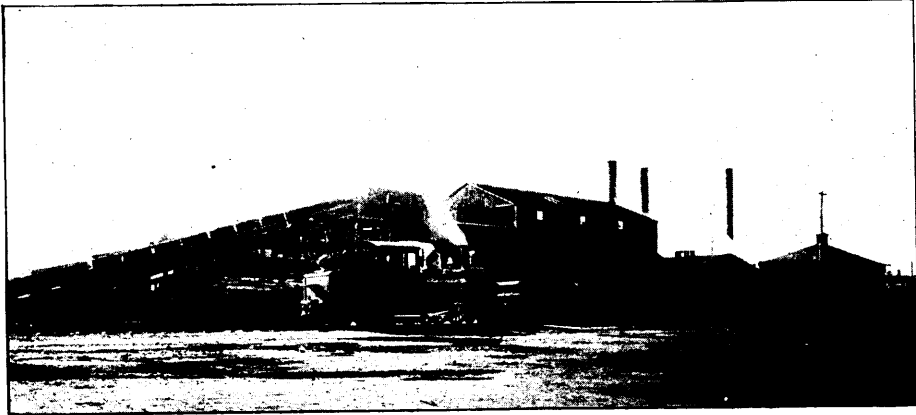
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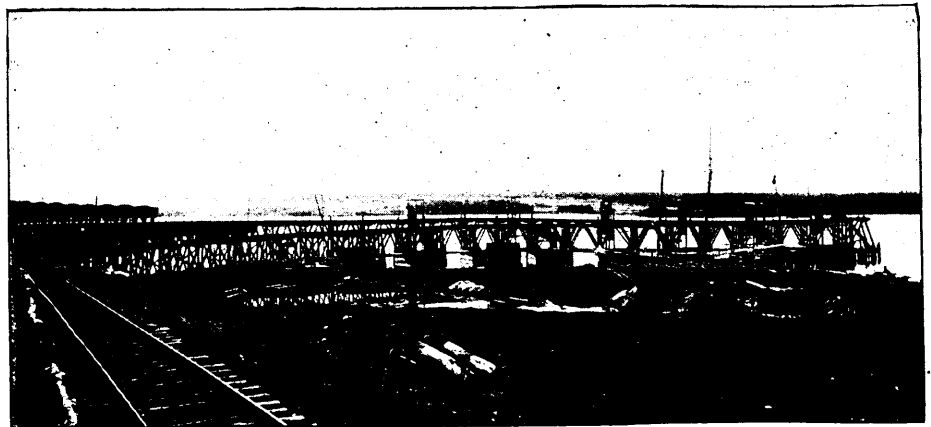
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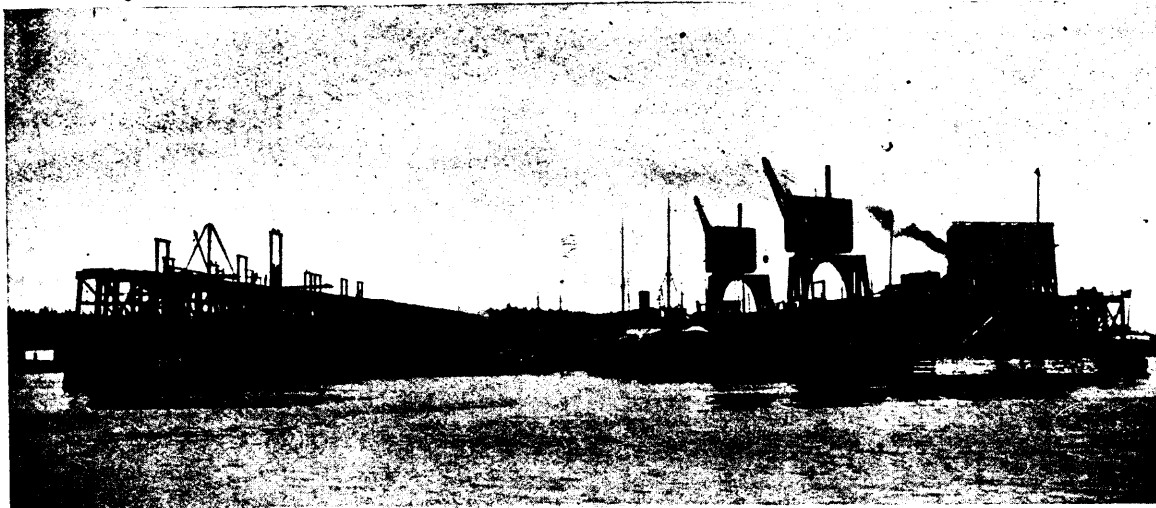
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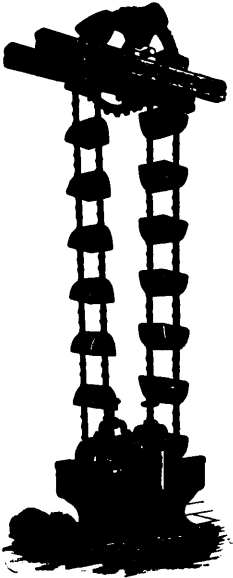
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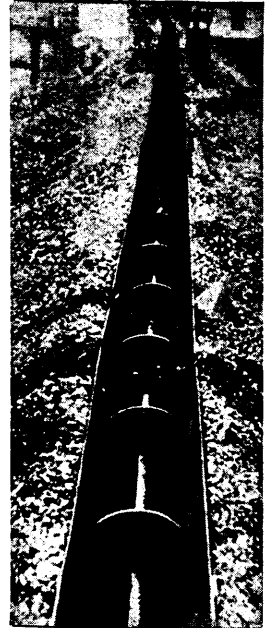


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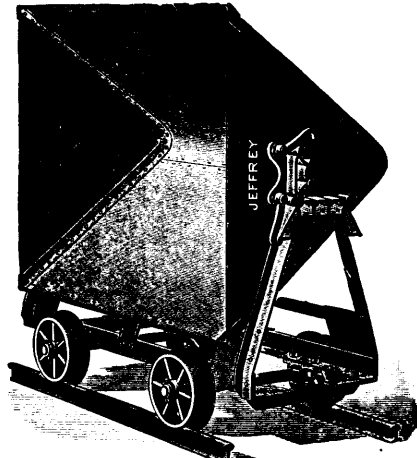
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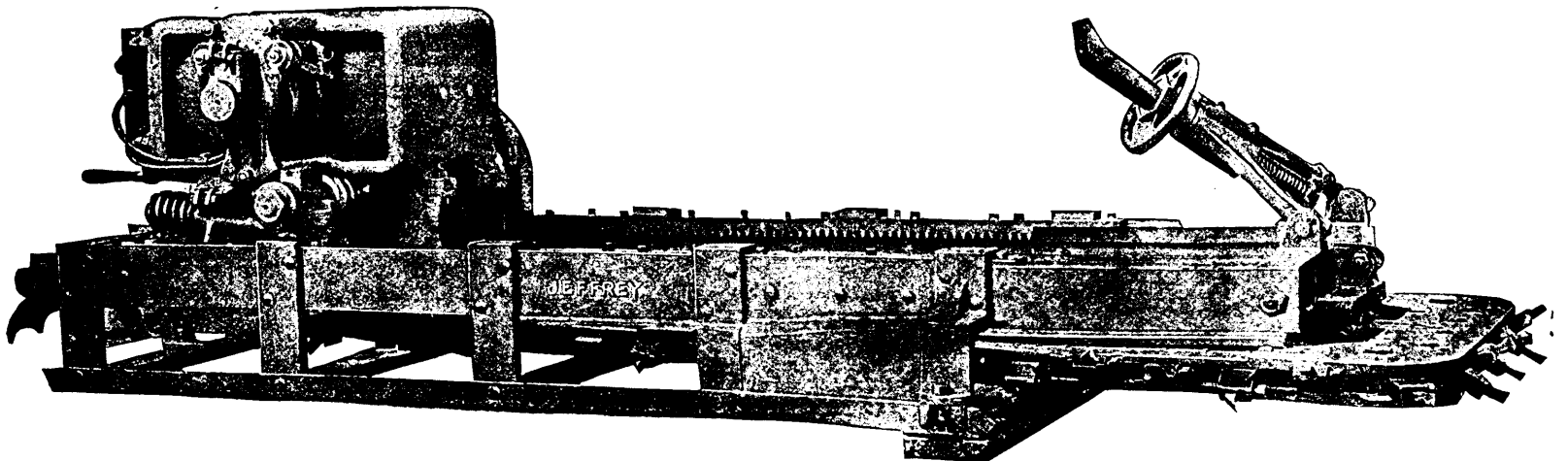


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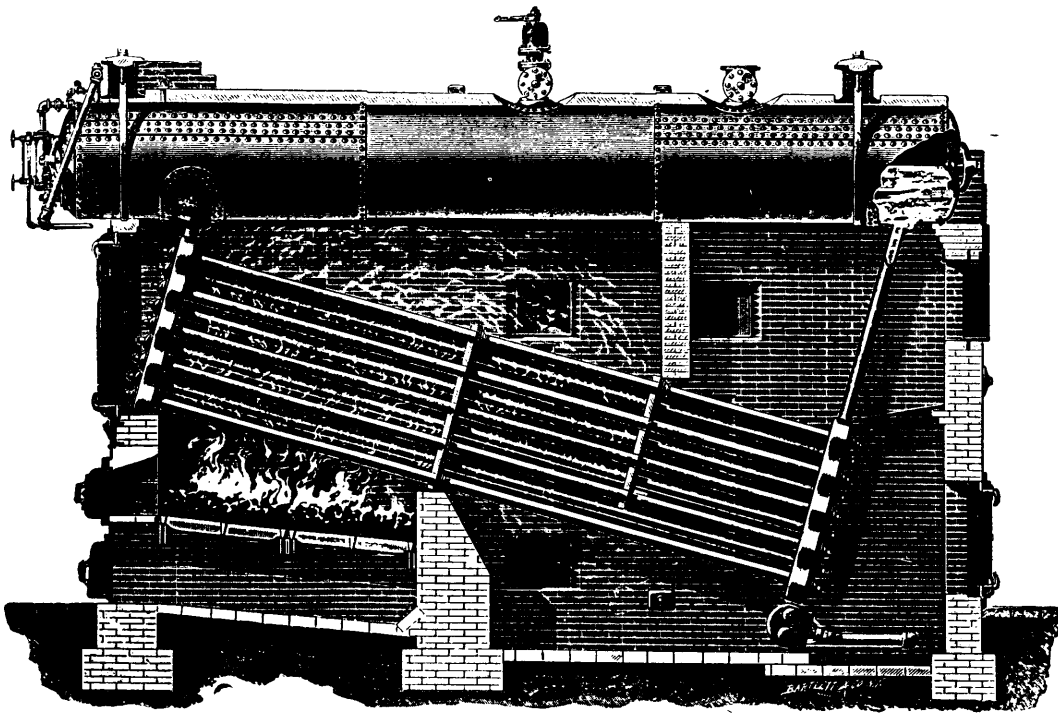
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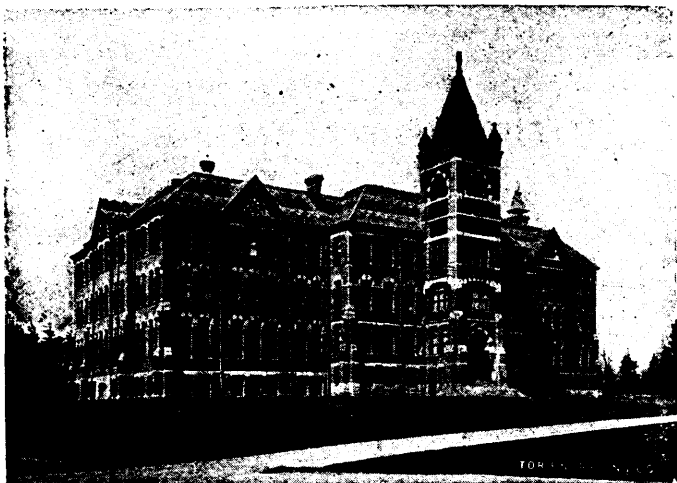
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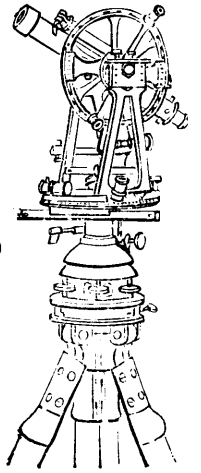
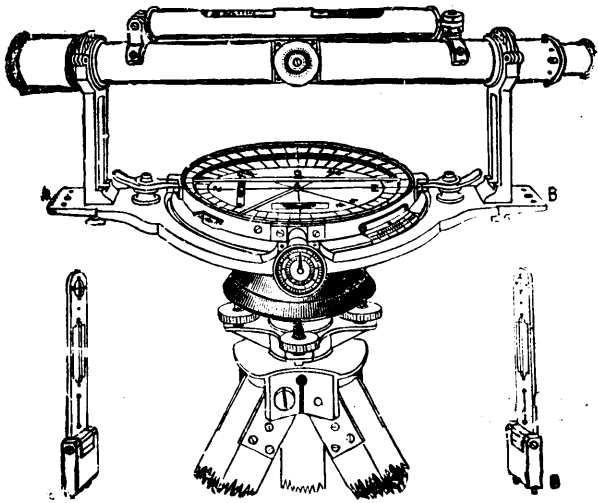
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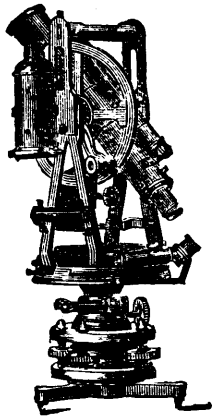
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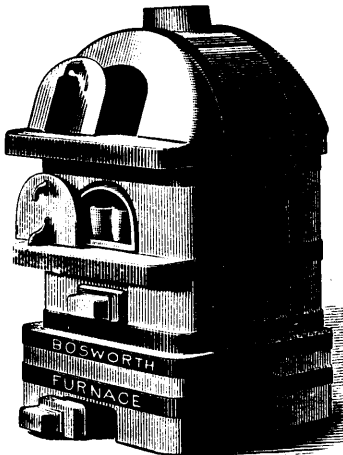
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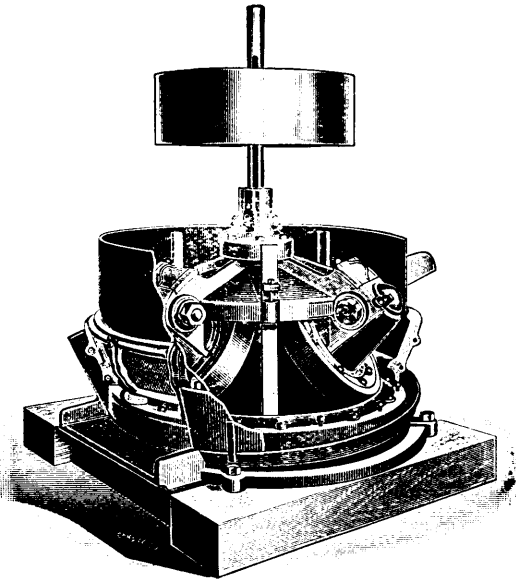
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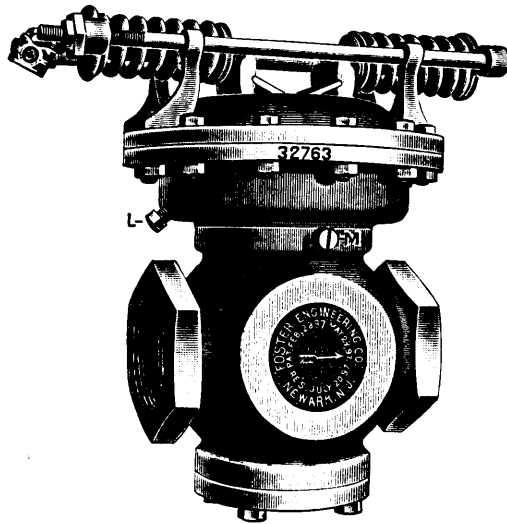
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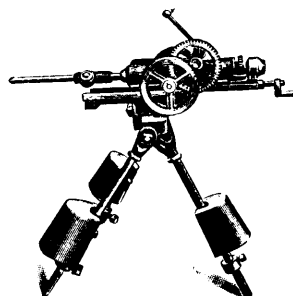
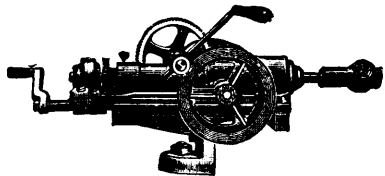
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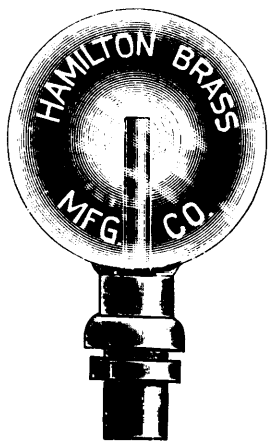
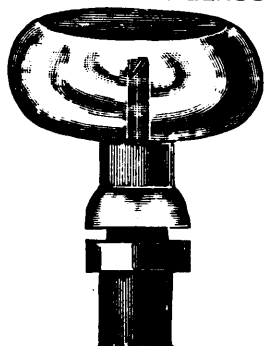
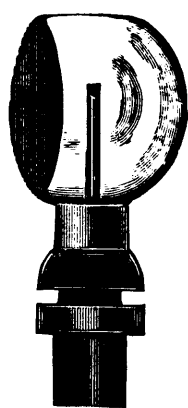


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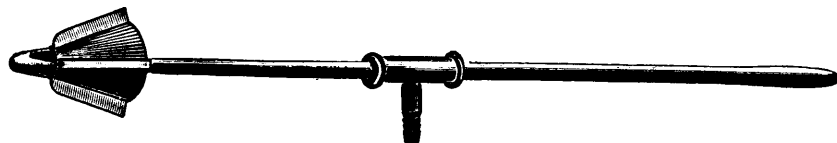
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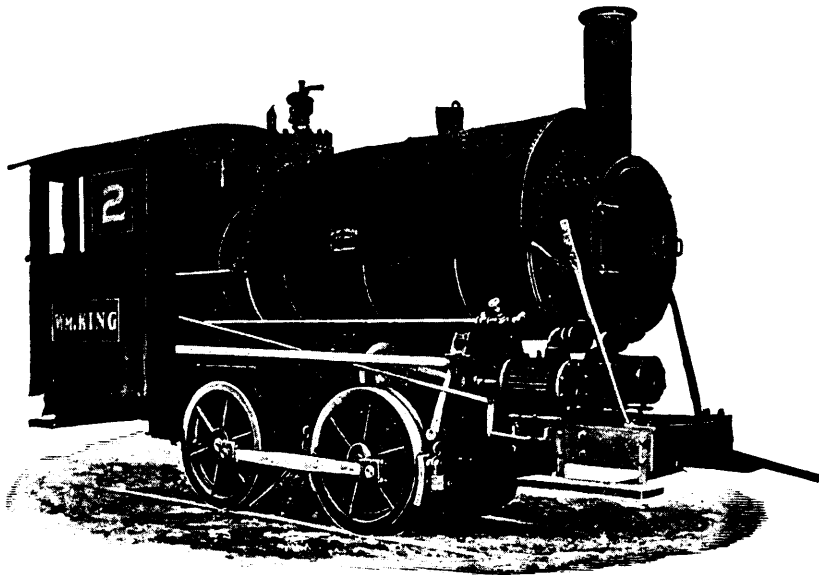
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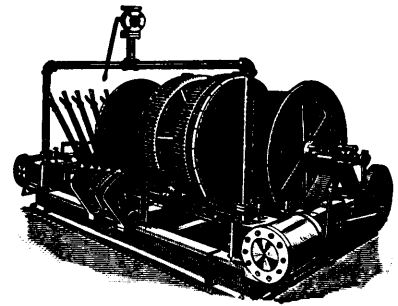
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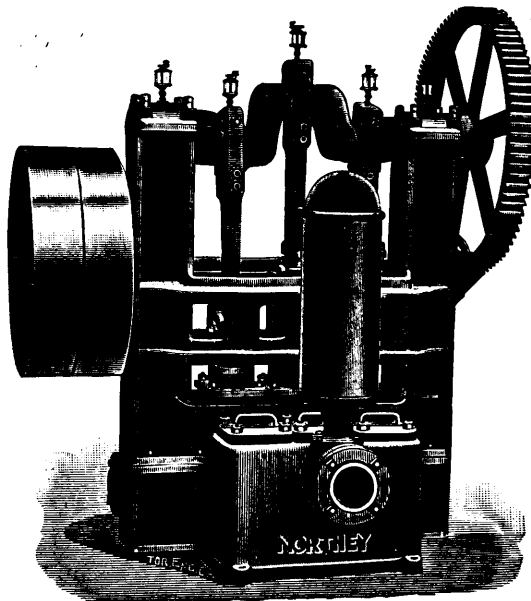
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Windsor Hotel, Montreal.

VOL. XXI., No. 1.

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## The Le Roi Mining Company.

On another page we reproduce in full the report on the property and the late management of the Le Roi Mining Company, Limited, which has been made by Mr. R. J. Frecheville, M. I. C. E., the managing director of the Company, to his Board. This report is of special and peculiar interest, both on account of the conditions under which Mr. Frecheville was invited to become Managing Director, and also, by reason of the very high and unblemished character of the gentleman who has made it.

This gentleman, as our readers may know, was, for a time, H. M. Inspector of Mines for Cornwall and Devon. He is a professional mining engineer of about fifty years of age, and is thoroughly well posted in his profession. The circumstances which led to the making of this report are but too well known to our constituency, and further allusion to the Whitaker Wright combination, and their methods and management is not necessary. Mr. Frecheville came out to Rossland on the 30th of September last, and spent over two months on the property of the Company, during which time the managers of both the mining and smelting departments were discharged and new managers installed. He was assisted in his investigation by a chartered accountant of the well known firm of Price, Waterhouse & Company, and the report referred to contains their summary of an exhaustive examination of the books of both mine and smelter for a period covering more than 28 months, which is practically the whole of the active life of the company under the old regime.

It is a source of special gratification to the REVIEW to present this document in its entirety, and for the reason that it corroborates the views which have often been expressed in these columns during the last four or five years, both as to costs and as to ore values; and also because it is an expression of opinion from the highest and most authoritative professional man who has yet been called upon to study the economic conditions attending Rossland properties. Mr. Frecheville considers the deposits to be the result of the mineralization of crushed shear zones through the action of deep seated thermal waters.

The report is severe in its strictures upon the past management of both mine and smelter, and some idea of the financial methods of the old management is obtained when loans by the Bank of Montreal, to the amount of \$974,750, were made upon matte, ore and furnace products aggregating a value of \$999,107 *only*: and this too, during the period (or a part of it) when the operating profits were \$568,722: all of which sum was expended on capital account.

The statement of working costs given by Messrs. Price, Waterhouse & Co. we commend to the attention of those Toronto gentlemen who may

be interested in Rossland. The mining cost per ton is given as \$4.146, transportation \$0.51, smelting \$4.834, matte, freight and treatment \$1.234; making the total cost per ton marketed \$10.72. Referring to this, Mr. Frecheville expresses the opinion that considerable reductions can be made in the cost of smelting, and lesser reductions in the cost of mining. The REVIEW has printed numerous articles bearing upon costs in the Rossland District, and, in the issue of December 1900, we estimated the actual future total cost per ton as not far from \$9.22: Mr. Frecheville puts it at \$9.00. We publish these figures to show our readers that the opinions and figures which the REVIEW gives on such matters, from time to time, are obtained from those whose knowledge of existing conditions enables them to compute as correctly as the distinguished engineer above mentioned.

In criticism of the report there are only two points of which we may make mention: the first of these is that since the date of the report (Dec. 4th 1901) the price of copper has fallen tremendously, so that copper, which was then figured at 16½c. is now selling (Jan. 4th) at 12c; the London price dropped from £63 to £47 stg. per ton. We have neither the inclination nor the intention to discuss the copper situation further at this time but it is the concensus of opinion among copper producers that it may be a long time before the price of 16½c. is again realized. This difference of 4½c. a pound would, on the last year's production of this Company (as given in the accounts), have decreased the profit margin by \$1.22 per ton, or something near \$234,000. The margin figured by Mr. Frecheville, with copper at 16½c. is \$2.75 per ton; the present price of copper reduces this to \$1.53 per ton, and the total profit may be only about 55% of his figures, so that a production of 200,000 tons of ore per annum *at present prices* would yield a profit of but £60,000 stg. or 6% upon the capital of the Company. This is the adverse view, but it is quite evident that, for some time to come, copper will not reach 16½c. again, and therefore that the profit will be something less than has been figured on prices which ruled during the latter part of 1901.

The second point to which we may allude is that, of the 604,840 tons which is reported as "in sight" there are 44,800 tons included to which a value is given of only \$6.43. Past costs are given at \$10.72, which Mr. Frecheville believes will be reduced under the new management to \$9.00 per ton; with *costs* at \$9.00 per ton and *values* at \$6.42 it is difficult to see the reason for including this block of ground among "Reserves", since there would be a loss of \$2.58 per ton, or a total loss of over \$115,000, if this block was extracted.

Messrs. Price, Waterhouse & Co's. estimates of current assets and liabilities (on the 30th of Nov. 1901) show a surplus of \$39,991.85. From the figures of costs, and of gross values in sight, there would appear to be at present an asset of *nett* ore values in sight of about



\$950,000, making the total *nett* assets on Dec. 1st, 1901 something like \$990,000, or in round numbers, £200,000.

From these somewhat depressing figures we get relief as to the future of the mine by the statement that the pay chutes (not yet opened but now being opened) in the lowest workings west of the Combination Shaft give an average assay value of \$15.75. The length of this chute is given at a maximum estimate, at 700 feet but its decreased length is well compensated by the greater average value, and the driving of the 1050 ft. and the 1200 ft. levels may show greater lengths for the chute, and possibly yet greater values.

The thorough investigation by the Managing Director of the origin of the strike at Rossland last summer has led him to the conclusion that it "was mainly brought about by the injudicious and arbitrary action" of the late manager of the smelting works. It is gratifying to note that all the positions in the smelting works are now filled by non-union men, and that the entire force necessary at the mine will shortly be composed of entirely non-union men also. No prediction is ventured as to the probable daily tonnage that may be expected as output, but Mr. Frecheville does not hesitate to criticise the useless work that has been done, and the "unnecessary machinery" which has been purchased. He characterizes both the plant and the new Combination Shaft as "out of all proportion to the capacity of the mine." "They are imposing to look at, but the money they have cost would have been better appreciated if it had been distributed in dividends."

We commend a thoughtful perusal of this report to all our readers who are interested in Rossland properties. The lessons of overcapitalization, and of extravagant and loose management, which these columns have pointed out for many years now are emphasized by the publication of this report.

Mr. Frecheville's report which we reproduce in full, is as follows:—

ROSSLAND, B.C., 4th December, 1901.

The Directors and Shareholders of the

LE ROI MINING COMPANY, LIMITED.

*Gentlemen*,—Acting under the instructions given me at the Extraordinary General Meeting of your Company held at the end of last August, I have examined your Mines and Smelting Works, and the manner in which your affairs have been conducted.

On the 2nd November last I found it necessary in your interests to remove Mr. Bernard MacDonald from the position of General Manager, and to undertake the duties of this position myself, pending the arrival of Mr. J. H. Mackenzie, whom I have appointed to manage your business. Mr. Mackenzie arrived here on the 26th November, and since then I have been posting him in the details of the undertaking.

The many complicated matters that required looking into and adjusting, together with the details of management, somewhat retarded my examination, so that I was unable to make a definite statement concerning your property until the 25th November last, when I sent you the following cable:

"Auditors make profit from Mine and Smelting Works for the year ended 30th June \$586,000.00. This was used for improvements; all the plant first class. I estimate reserves of ore at date above the 900-ft. level 434,000 tons of 2,000 pounds, value per ton, \$11.75. The total cost per ton in the future ought not to exceed \$9.00. The lowest level in the mine so far as driven shows chute of ore 170 ft. in length, 24 ft. in width, assays average \$15.75 per ton. Shaft is down 1,050 ft.; will start driving levels as early as possible. Inventory 23rd November, Smelting Works shows ore, matte on hand and in transit, supplies, \$1,045,000.00, at the mine low grade ore dump \$100,000.00 net."

NOTE.—Since the date of this cable Messrs. Price, Waterhouse & Co. have made further adjustments, resulting in the profit for the year ended 30th June, 1901, being reduced to \$568,722.06.

The data on which the above cable was based are given in the following report, which is accompanied by—

- (a) Plan of the Le Roi Mine and adjacent properties.
- (b) Vertical projection of the workings of the Le Roi Mi
- (c) A complete set of assay plans.

ACCOUNTS FROM 15TH FEBRUARY, 1899, TO 30TH JUNE, 1901.

Messrs. Price, Waterhouse & Co., who have exhaustively examined the books at both Mine and Smelter, have to-day handed me the following statements in advance of their official report:—

ROSSLAND, B.C., December 4th, 1901.

R. J. FRECHEVILLE, ESQ.,

Managing Director, Le Roi Mining Company, Limited.

Dear Sir,—In accordance with your instructions, we have examined the books of the Le Roi Mining Company, Limited, and of the Northport Smelting and Refining Company, Limited, at Rossland, B.C., for the period from the 15th February, 1899, to the 30th June, 1901, and after making certain adjustments of the book figures, we find the profits to have been as follows:—

15th February, 1899, to 30th June, 1900..	\$527,562.92
1st July, 1900, to 30th June, 1901.....	568,722.06
	<u>\$1,096,284.98</u>

We find these profits to be represented on the Rossland books at the 30th June, 1901, by a surplus of assets over liabilities made up as follows:—

Plant, Buildings and Equipment—

Mine Machinery and Plant .....	\$188,378.48
Surface Improvements at mine.....	89,026.51
Mine Equipment.....	45,558.70
	<u>\$322,963.69</u>
Smelter Plant.....	130,986.32
Flora Lime Quarry.....	7,544.55
	<u>\$461,494.56</u>

Mine Exploration and Development .....	153,048.69
James Breen's interest in Northport Smelter..	300,000.00
La Fleur Comstock, &c., Property .....	50,000.00

Stock of Ore at Mine and Smelter	
Product on hand and in transit.....	731,933.27
<i>Less—</i>	

Loans by Bank of Montreal secured on same..	616,290.59
	<u>115,642.68</u>

Stores on hand at Northport Smelter.....	57,367.53
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Debtors—

Le Roi No. 2, Limited, Cash Advances....	76,881.43
Rossland Great Western Mines, Limited,	
Cash Advances.....	41,769.25
Sundries.....	67,169.79
	<u>\$185,820.47</u>

<i>Less—</i>	
Sundry Creditors for Wages, Taxes, &c.....	133,464.10
	<u>52,356.37</u>

Cash in Bank.....	14,933.74
London Office—Cash remittance.....	39,760.05
	<u>\$1,244,603.62</u>

*Less—*

Ore in Dump at 15th February, 1899, transferred from the	
London books to the Rossland books .....	148,318.64
	<u>\$1,096,284.98</u>

We propose to explain our adjustments and to refer more particularly to the above figures in our detailed report.

Yours faithfully,

(Signed) PRICE, WATERHOUSE & Co.

ESTIMATED STATEMENT OF CURRENT ASSETS AND LIABILITIES,  
30TH NOVEMBER, 1901.

Matte in Transit... 27'000 lots at \$14,000.00.....	\$378,000.00	
High Grade Matte.. 132'689 tons at 14,000.00 p.30 tons	61,920.00	
Low Grade Matte .. 669'545 " " 300.00 per ton.	200,863.50	
Calcined Briquettes. 85'000 " " 300.00 " "	25,500.00	
Sows .....	14'422 " " 446.86 " "	6,444.61
Bottoms and Furnace Receivers, say .....	10,000.00	
Flue Dust..... 1,100 tons at \$28.95 per ton.	31,845.00	
Ore Stock at Smelter. 23 766'355 tons at 7.00 " "	166,364.50	
Ore in Dump at Mine. 34,252 " " 3.45 " "	118,169.40	
	<u>\$999,107.01</u>	

<i>Less</i> Loans by Bank of Montreal secured on same	974,750.12
	<u>\$24,356.89</u>

FOR KING AND EMPIRE.



MAJOR W. HAMILTON MERRITT, M.E., A.R.S.M.,  
Who has gone to South Africa as Second in Command  
of the Canadian Mounted Rifles.

## Stores on Hand—

At Mine, say.....	\$50,000.00	
At Smelter, say.....	35,000.00	
General Stores at Smelter.....	\$47,968.83	
Less Amount owing on same.....	34,109.11	
	<u>13,859.72</u>	98,859.72

## Debtors:—

Le Roi No. 2, Limited.....	\$62,047.35	
Rossland Great Western Mines, Limited.....	17,449.67	
Sundries.....	16,724.09	
	<u>\$96,221.11</u>	
Less Creditors for Wages, &c.....	103,792.66	
	<u>\$7,571.55</u>	

## Cash:—

At bank, overdraft.....	\$79,104.94	
On hand, Northport Office.....	3,451.73	
	<u>75,653.21</u>	83,224.76

Surplus..... \$39,991.85

## MINING PROPERTY.

The ground owned by you on Red Mountain, near Rossland, consists of the Le Roi and Black Bear Mineral Claims, together with the Le Roi Star, Pearl, and Ruby fractions, having altogether an area of 71.44 acres.

The developments are wholly in the Le Roi Claim, which has a length of 1,500 ft. on the strike of the veins by a width of 600 ft. This claim is held under the old mining law which was in force at the time of its location. By this law, that portion of any vein contained within the end lines of a claim can be followed down indefinitely. The Black Bear Claim is held under the present mining law, which permits of a vein being followed only as far as vertical planes passing through its side lines.

## GEOLOGICAL FEATURES.

There are in the Le Roi claim the outcroppings of three veins known as the "North" Vein, "Middle or Main" Vein, and "South or Black Bear" Vein. Of these the Middle or Main Vein is the most important, and has been by far the most extensively developed. It strikes 22 deg. south of west and dips north about 70 deg. from the horizontal. The South Vein, on which there are considerable developments, and which has a similar strike and dip, occurs about 250 ft. to the south of the Middle Vein. Of the North Vein, which occurs about 270 ft. north of the Middle Vein, but little is known beyond the outcrop.

The formation of Red Mountain consists of a variety of diorite known as "gabbro." The veins are sheer zone fissures, that is, they are the result of very powerful compression. They have been mineralized by the action of deep-seated thermal waters. In the Le Roi claim they range in width from 6 ft. up to 100 ft. Their filling consists of altered country rock, through which is distributed pyrrhotite and chalcopyrite, with gold varying in quantity from a trace up to over an ounce per ton. The copper contents average about 1.33 per cent., and there is also a small amount of silver.

The veins are intersected by numerous dykes, having a composition very similar to the country rock. These dykes vary in thickness from a few inches to several feet, they interrupt temporarily the continuity of the ore bodies, but do not displace them. The Josie dyke, however, which occurs about 100 ft. east of the boundary line, separating the Le Roi from the Black Bear Claim, appears to be an exception, for no ore-bearing ground has as yet been found to the west of it in the Black Bear claim, although considerable exploratory work has been done at the 600-ft. level with the object of picking up the continuation of the veins to the west of this dyke. The Josie dyke is about 150 ft. thick, and reduces the length of ore-bearing ground in the Le Roi claim to about 1,400 ft.

## MINE WORKINGS.

The Mine is opened out by two incline shafts sunk on the Middle Vein, called the Old Shaft and the Combination Shaft. The former, which is down to the 900-ft. level, is situated about 200 ft. west of the Centre Star boundary line, and the latter which has reached the 1,050-ft. level is 360 ft. further west on the strike of the vein or nearly in the centre of the developed ore shoots.

The Old Shaft has recently been straightened and partially re-timbered at a cost of \$5,500.00, but is not now used and most probably never will be again. This expenditure might well have been saved.

The Combination Shaft is the working shaft of the Mine. It is 27.5 ft. long by 6 ft. wide in the clear of timbers, and is divided into five compart-

ments. At the 1,050-ft. level the station has been cut, but the levels are not yet driven. The 900-ft. level is the deepest level of the Mine. This shaft has cost in round figures about \$100,000.00. It is a fine piece of work, but is unnecessarily large.

The ground proved to be ore-bearing extends from the Centre Star boundary line on the east to the Josie Dyke on the west, a distance of between 1,300 and 1,400 ft. (see Plan A).

At the 500-ft. level the combined length of the pay shoots on the Middle Vein is about 745 ft. On the 600, 700 and 800-ft. levels, it is about 900 ft. for each level. The width of the shoots vary from 6 ft. up to 100 ft. On the 900-ft. level, which is only partly opened, the pay shoot has a length of 170 ft. by a width of 24 ft. The general trend of the ore bodies appears to be to the west, thus at the 900-ft. level no pay ore has been opened out east of the Combination Shaft (see Plan B). If the present shoot now being opened out at this level extends uninterruptedly up to the Josie Dyke, its length cannot exceed 700 ft. This shortening of length is so far compensated by considerably greater average assay value.

The western portion of the South Vein has been opened by cross-cut from the Middle Vein at the 500 and 700-ft. levels, showing a shoot of ore about 140 ft. long, with an average width of 18 ft. The ore is of lower grade than that of the Middle Vein.

## ORE PRODUCTION.

The ton used in this Report is the American ton of 2,000 lbs. In stating values, the basis taken is, gold \$20.00 per oz., silver 60 cents per oz., and copper 16.5 cents per lb.

About 20 per cent. of waste is sorted out of the ore hoisted from the Mine, so that the shipping ore is of higher grade than the Mine ore.

For the year ended 30th June, 1900, 102,784.04 tons, containing a gross value of \$1,441,128.40, that is \$14.02 per ton, were shipped over the Great Northern Railway to your Smelting Works at Northport, distant 18 miles from your Mines.

For the year ended 30th June, 1901, there were shipped 202,582 tons of a gross value of \$2,665,689.06, that is \$13.16 per ton. For the first seven months of this latter year the ore averaged \$14.38, and for the last five months \$11.80 per ton. It is thus clear that the cream of the reserves was skimmed off during the first seven months.

During July, August and September of the present year no ore was mined on account of the strike. In October 9,734 tons, averaging \$11.67 per ton, were shipped, and in November 12,943.95 tons, of an average assay value of \$11.57.

## MIDDLE VEIN—QUANTITY AND VALUE OF ORE RESERVES.

In the following estimates 10 cubic ft. of ore in place are reckoned as equal to 1 ton.

As no proper assay records have ever been kept, and as I found all the information given me to be most misleading, I found it necessary, in order to arrive at the quantity and value of the ore reserves, to prepare a complete set of assay plans. Owing to the wide vein and the hard character of the ground, it was not possible to take more than about fifteen samples per day. As nearly 700 samples were taken altogether, the arduous and lengthy nature of this work of sampling the Mine will be apparent.

Between the 300-ft. level and surface the ore-bearing ground is all worked out, with the exception of three small blocks to the east of Old Shaft, containing 21,540 tons, of an average assay value of \$10.75.

Between the 300-ft. level and 450-ft. levels there is no pay ore left; where any ground is standing the values are practically *nil*.

Between the 450-ft. and 500-ft. levels there are 57,740 tons, of an average assay value of \$9.90.

Between the 500-ft. and 600-ft. levels there are 27,440 tons, of an average assay value of \$12.92; where this ore stands the ground is so badly caved that it is questionable whether this ore can be mined.

Between the 600-ft. and 700-ft. levels there are 113,980 tons, of an average value of \$10.99.

Between the 700-ft. and 800-ft. levels there are 215,340 tons, of an average value of \$10.32.

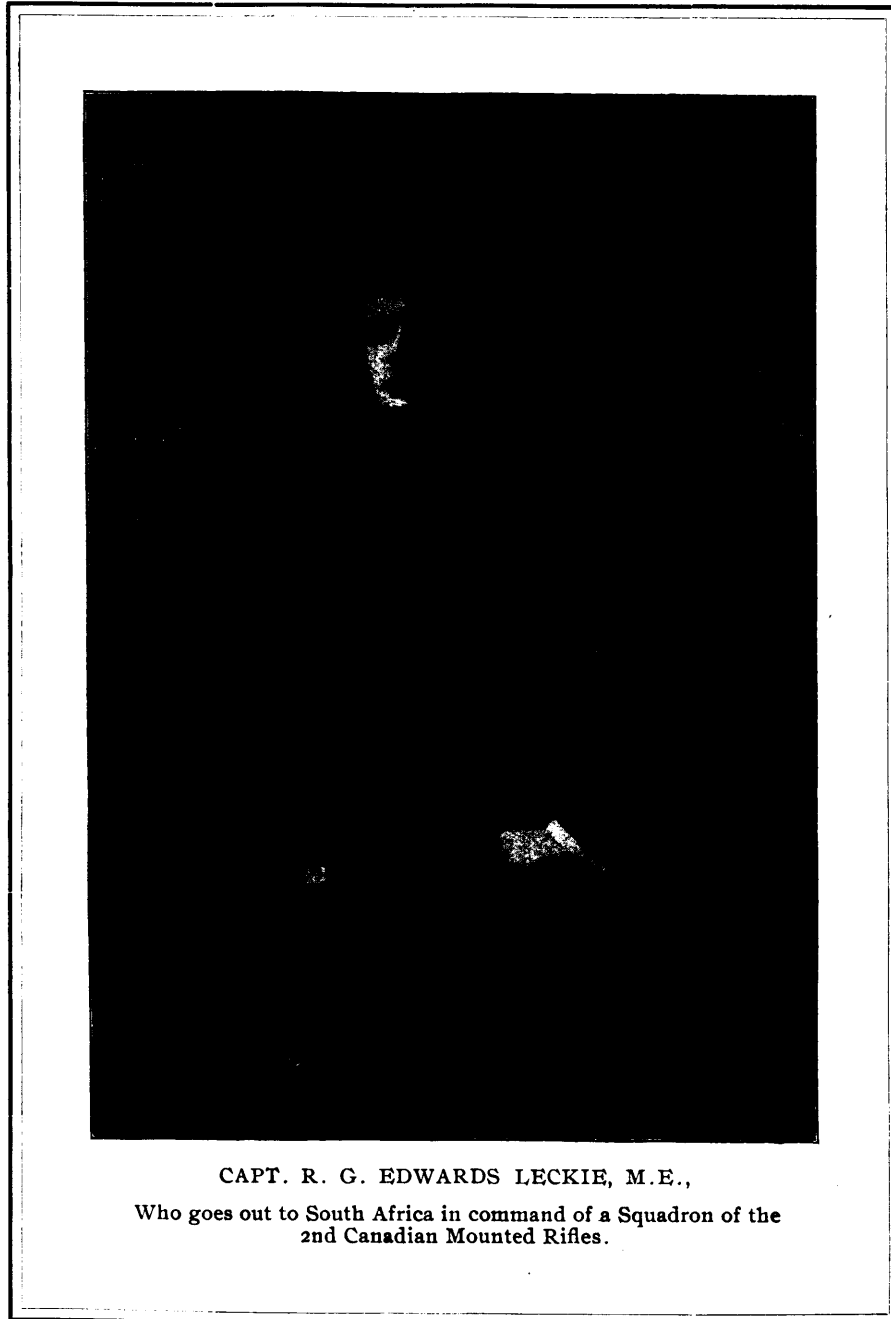
Between the 800-ft. and 900-ft. levels there are 96,000 tons, of an average value of \$11.32.

## SOUTH VEIN.

Between the 500-ft. level and surface there are 28,000 tons, of an average value of \$9.31.

Between the 500-ft. and 700-ft. levels there are 44,800 tons, of an average value of \$6.42.

FOR KING AND EMPIRE.



CAPT. R. G. EDWARDS LECKIE, M.E.,  
Who goes out to South Africa in command of a Squadron of the  
2nd Canadian Mounted Rifles.

## SUMMARY OF RESERVES ON BOTH VEINS.

The above figures show that there ARE IN SIGHT ON BOTH VEINS 604,840 tons of Mine ore of an average assay value of \$10.36.

The Mine ore, after passing through the crusher on the head-gear of the Combination Shaft, falls into receiving bins, and from these is fed automatically on to three steel endless conveying belts, each 100 ft. long, travelling at the rate of 45 ft. per minute before the sorters, who pick out the waste. A daily record is kept of the number of tons of waste trammed to dump. From these records it appears that 20 per cent. of waste is picked out from the ore hoisted. I had all the waste dumps carefully sampled, several bulk samples of about 30 tons each being taken and passed through the sampling mill. These samples showed the waste dumps at the Combination Shaft proceeding from the sorting tables now in use to assay on the average \$5.32 per ton; we have then:—

604,840 tons of Mine ore at \$10.36 per ton, containing a gross value of.....	\$6,269,713.25
Less 120,968 tons of waste at \$5.32, containing a gross value of	643,549.76
483,872 tons shipping ore, containing.....	\$5,626,163.49

that is \$11.75 per ton. The metallic contents per ton of this grade of ore are—Gold 0.35 oz., Silver 0.6 oz., and Copper 1.33 per cent.

## USELESS WORK.

At the 900-ft. level, opposite the Old Shaft, a cross-cut has been driven to the north for a distance of 870 ft., passing through the Josie claim into the Number One Claim. This cross-cut, which cost \$23.75 per foot, was driven for no other purpose than developing the Le Roi No. 2; nevertheless, the whole cost, amounting to \$20,662.50, has been paid by you.

## WORKING COSTS.

Messrs. Price, Waterhouse & Co. make the total costs on this side for the year ended 30th June, 1901, to be \$10.72 per ton of ore, segregated as follows:—

	Per Ton.
Stoping, hoisting, tramping, sorting and loading ore.	\$3.487
Exploration .....	.423
Depreciation—	
Mine Equipment .....	.080
Surface Improvements .....	.050
Mine Machinery.....	.106
	————— \$4.146
Freight on ore to Smelter .....	.510
Smelter expenses .....	4.465
Interest and discount (on ore in yard) .....	.137
Depreciation.....	.232
	————— 4.834
Matte expense—	
Sacking and Crushing.....	\$1.044
Freight on Matte to Refiners.....	.536
Eastern Representative.....	.028
Bank Charges .....	.092
Refiners' Toll and Deductions .....	.534
	————— 1.234
	————— \$10.724

The average gross value of the 202,582 tons of ore shipped to your Smelting Works at Northport during the same year was \$13.16 per ton. The above working costs make the net profit on this ore \$2.44 per ton, or \$494,300.08 on the whole tonnage.

The actual profit based on matte sold cannot be given, as together with your ores were smelted about 26,000 tons of purchased ores and concentrates.

The management has been most loose and extravagant; great reductions can be made in the costs of both mining and smelting, especially the latter; much useless extraneous expenditure can be cut off, the result being, I am of opinion, that in the future the total costs will not exceed \$9.00 per ton. With the grade of ore you now have in reserve this will leave a profit of \$2.75 per ton.

## SECOND-CLASS ORE DUMP.

This dump was taken over at the time of the purchase of the mine. During the year ended 30th June, 1901, 10,454.935 tons were sold to the Trail Smelter, where they were used as a flux for lead ores, and realized net \$50,556.85; deducting from this amount 25 cents per ton for loading on cars, the balance of \$47,943.12 is profit; but of this amount only \$12,409.29 should, in the opinion of Messrs. Price, Waterhouse & Co., be credited to the profits

of the year under review, the balance being credited to the cost of property account.

Since June 30th last, a further 11,270 tons have been sold, realizing \$53,921.89. Just how much of this dump remains it is impossible to say, owing to the irregularities of the ground occupied by it, and the fact that it merges into and is partly covered by a dump of waste, but it may be taken as an asset representing about \$100,000.00 net.

## WASTE DUMPS.

There are four of these dumps, containing altogether about 90,000 tons. Half of this tonnage proceeds from the sorting tables at the Combination Shaft, and assays per ton as follows:—Gold, 0.125 oz.; silver, 0.3 oz.; copper, 0.8 per cent.; that is, a money value of \$5.32. The other half is from the previous sorting, when the mine was worked through the Old Shaft, and assays:—Gold, 0.18 oz.; silver, 0.4 oz.; and copper, 1.1 per cent.; that is, \$7.47 in money.

These dumps are now being added to at the rate of about 3,000 tons per month, but the value of the waste now sorted out has been reduced to under \$5.00 per ton, due to a system that I have introduced of having it sampled and assayed daily. It may be that this waste can in the future be profitably treated, and experiments are now in progress as to the best method of accomplishing this.

## MINE EQUIPMENT.

At the Combination Shaft there is a fine massive head-gear, 85 ft. high, with first-class crushing, conveying, sorting and sampling machinery, all driven by electric power. There is also an automatically working aerial tramline leading to the ore bins on the Great Northern Railway.

There are two double-cylinder modern type winding engines, one of 1,000 nominal horse power, and the other of 500 nominal horse power. The larger engine is used exclusively for hoisting ore, skips of four tons capacity being used. The smaller engine is used for the purpose of raising and lowering men, tools, timber, &c.

The boiler and compressor plant, together with fitting shop, timber framing shed, blacksmith's shop, store, &c., are situated on the Black Bear Claim about 800 ft. distant from the shaft. There are eleven boilers of a capacity of 2,000 nominal horse power, and two large cross compound air compressors, each capable of running forty 3¼-in. drills at sea-level.

The plant is substantially erected and first-class in every respect, but both it and the Combination Shaft are out of all proportion to the capacity of the Mine, as they could easily handle 2,000 tons of ore per day. They are imposing to look at, but the extra money they have cost would have been better appreciated if it had been distributed in dividends.

## UNNECESSARY MACHINERY.

At the Combination Shaft there is a fine Corliss engine, mounted but not in use, and an electric generator unmounted. I was told by the late manager that they had been purchased to hold as a club over the head of the West Kootenay Power and Light Company, so as to prevent this Company from increasing its rate for power and light. The cost of this machinery landed here was \$5,300.94. It will never be required.

The Mine is drained of water by means of pumps driven by compressed air. These pumps work about eight hours per day only, the water being very light; nevertheless, there arrived here about a month ago two magnificent electric pumps with the motors for driving them, their cost landed here is \$7,278.52. This machinery was certainly not wanted, and what makes the matter worse is, that the dimensions of the pumps and fly-wheels do not admit of their being let down the shaft. If ever used, they will have to be cut up into sections.

Two skips were purchased for the Old Shaft; they cost \$1,619.25, and will never be used on your Mine.

Two cages were purchased for the Combination Shaft at a cost of \$1,580.79, but their dimensions are unsuitable for the track.

Evidently the appetite for purchasing machinery grows with feeding.

## THE NORTHPORT SMELTING WORKS.

These works are owned by the Northport Smelting and Refining Company, Limited, an American organization, with a nominal capital of \$1,000,000, divided into shares of \$1 each. The shares are all owned by your Company.

The works are situated at the town of Northport on the Columbia River, in the State of Washington, and are connected with your mines by a branch of the Great Northern Railway.

They consist of five large water-jacket copper-matting furnaces, with

another on the ground ready to erect, two large automatic single-hearth calcining furnaces, and one large double-decked calcining furnace, pug-mills, briquetting machines, &c. The full capacity of the plant when No. 6 furnace is erected will be from 1,200 to 1,500 tons of ore per day.

There is in course of erection an endless chain haulage system to deliver the ores from the receiving bins to the roast heaps, and an electric railway to take the ore from the roast yard to the bins at the back of the furnaces. The trucks will be loaded at the roast heaps by means of a steam-shovel now on the ground. These new additions to the plant will, if they operate successfully, save a considerable amount of manual labour.

From the books it appears—

That during the year ended 30th June, 1901, 234,357 tons of ore were received at these works, of which 31,771 tons were purchased.

That there were smelted 191,144 tons, having a gross value of \$2,678,909.39, or \$14.02 per ton (of this ore about 26,000 tons were purchased).

That the ore smelted produced 5,817.14 tons of matte, assaying gold 16.27 ozs., and silver 30.63 ozs. per ton, with 45.63 per cent. copper, making the gross value of the matte \$2,875,980.17. This shows an extraction of 7.35 per cent. above the metallic contents of the ore, thus making it clear that either the sampling was at fault, the assays too low, or something of both.

That the 5,817.4 tons of matte, less freight and refiner's toll and deductions, realized \$2,656,725.71.

From these records it is an impossibility to arrive at any exact figures as to the profits made from smelting purchased ores; an approximation only can be made by deducting the estimated profit on your ores, and the second-class dump ore sent to the Trail Smelter from the total amount of profit.

Thus I have shown the profit on the ore mined during the year to have been \$494,300.08, and the profit on the second-class dump ore sent to Trail Smelter to have been \$12,400.29. Deducting these two amounts from \$568,722.06, which is the total amount of profit, leaves \$62,021.69 as the profit made on the 26,000 tons of purchased ore smelted.

The metallurgical work has been very bad. By using a strong blast and a very high percentage of coke the ore has been smelted, but at how much extra cost and at how great a loss in flue dust will never be known. Amongst the purchased ores smelted were 923.8 tons of concentrates from the Baker City Sampling Works assaying 3.27 oz. of gold per ton. These were often charged into the furnaces raw without briquetting, the result being that a large percentage of this valuable material has been carried by the strong blast through the condensing chambers, up the stack, and scattered over the surrounding country. It appears, as Mr. Bela' Kadish, the late Manager of the Smelter, is the owner of the Baker City Sampling Works, and was thus in the position of buyer and seller at the same time, that the more concentrates were used the better it was for business.

The new Manager, Mr. Oscar Szontagh, has already made many great improvements. He purchases no more concentrates, as he is able without using them to make matte of the grade in gold required by your contract with the American Smelting and Refining Company. He has completely done away with the granulation and calcination of the low grade matte; this will very largely reduce the smelting cost, and to a great extent obviate the mechanical loss in handling and the loss in flue dust. The double-decked calcining furnace recently erected by Mr. Kadish at a cost, including building to cover it, of \$27,354.86, will never be used on your ores. The consumption of coke has also been reduced, and with all this there has been no reduction in the quantity of ore put through the furnaces, as with four running, over 800 tons of ore per day are now being smelted.

The coke used costs \$10.00 per ton delivered at the works. When the Great Northern Railway Company have completed their branch line now being built into the Crow's Nest Coal Fields, it is probable that you will be able to get coke at about \$8.00 per ton. As about 200 tons per day are used this means a notable saving.

NOTE.—Mr. Miller, the Vice-President of the Great Northern line, informs me that this branch will be ready for traffic by next April.

#### THE STRIKE SITUATION.

I have carefully gone into this matter, interviewing all sorts and conditions of men, and am of opinion that the strike was mainly brought about by the injudicious and arbitrary action of Mr. Bela' Kadish, the late manager of your Smelting Works at Northport, where the strike first commenced. The strike at Rossland is a sympathetic one ordered by the Western Federation of Miners, which has its headquarters at Denver, Colorado, the Rossland Miners' Union being a branch of that organization.

The demand for an increase of 50 cents per day in the "muckers" wages is simply a pretext. More "muckers" than are wanted can be got for \$2.50 per day, which now is and always has been the rate of pay for this class of labour at Rossland. The miners who receive \$3.50 per day have no grievances that I am aware of.

As a matter of fact the strike was, according to the by-laws of the Union itself, illegally called.

The battle having once begun has to be fought out, if you wish to have control over the working of your property.

Any concession, no matter how slight, to the demands of the Union would be hailed as a victory, and would be followed by still further demands.

The rank and file of the Rossland Miners' Union would now gladly call off the strike, but they are powerless to do so, being under the control of professional agitators, who in their turn are ruled by the orders of the orders of the Western Federation of Miners at Denver.

As it is, your mine and smelting works are being filled up with non-union men; the smelting works have already got their full complement, and it will not be long before your mine will be in the same position.

Naturally, at first many of the men were green hands, and work was carried on at a great disadvantage, but this condition of affairs is improving daily, incompetent men are being weeded out and replaced by skilled miners.

For the month of October, when work in the mine was restarted, the output was 9,737 tons, whilst for November it was 14,088 tons.

I predict that, under the new management, your mine will soon be working up to its full capacity, and be at the same time vigorously developed.

#### CONCLUSION.

After the exhaustion of the existing ore reserves, the future of the mine will mainly depend on the results to be obtained by development work to the deep on the Middle Vein. In this connection it is encouraging to note that the pay shoot now being opened out on the Ninth Level west of Combination Shaft has an average assay value of \$15.75. No time will be lost in opening out the 1,050-ft. level, and sinking the shaft for the next level, which will be at 1,200 ft.

My investigation shows that there has been very great extravagance and looseness of management, resulting in unwarranted expenditure and high working costs, also that under proper control your property would have paid dividends from the start.

I leave here for London on the 7th instant, in the full conviction that I have placed your affairs in the hands of a thoroughly capable and conscientious Manager, whose sole object will be to conduct the operations at both Mine and Smelter for the best interests of the Shareholders.

I am, Gentlemen,

Yours faithfully,

(Signed) R. J. FRECHEVILLE.

#### Mining Progress in Nova Scotia During the Year 1901.

Outside of the progress made in coal mining, the direct advance made by Nova Scotia in developing her mineral resources has not been marked during the past year.

In the coal trade the total sales amounted to 3,395,300 tons against 2,810,485 tons the year before. In Cumberland and Pictou Counties business was very slack during the summer. One reason given was the purchase of United States' coal for the use of the Inter-colonial Railway last winter in view of a threatened strike. The sales of the Dominion Coal Company increased from 1,808,694 tons during the twelve months ended Sept. 30th, 1900, to 2,245,000 tons for the year just ended.

The sales to Quebec and Ontario ran a little over one million of tons, and those to the United States were in the vicinity of last year's, about 600,000 tons. A considerable increase took place in the home sales owing to the increasing demands of the Dominion Iron and Steel Company. Sales to other points remain practically unchanged.

In Cumberland County improvements were made at the Springhill Collieries, and at the Joggins. The only point of interest in Pictou County was the opening by the Nova Scotia Steel and Coal Company

of a mine in one of the Marsh seams near New Glasgow, to supply their converters at Trenton.

In the County of Inverness, the Port Hood mine has been put on a producing basis, and will, during 1902, become a competitor in the market. The Broad Cove mine is also being prepared for a large output, and it is reported that the Mabou mine will shortly be opened systematically.

In Cape Breton County the sinking of Dominion No. 2 has been finished and the preliminary opening-out work is well under way. The slope on the Emery seam, Dominion No. 4, was closed, as the seam became too thin for working in comparison with the Phalen. The Gowrie & Blockhouse mines continued driving into their sea areas. The Nova Scotia Steel and Coal Company are engaged in extending their shipping facilities, and in preparing for an enlarged output. The Cape Breton Coal Co. at New Campbellton continued working steadily, and find the quality of their coal improving.

The Government drills were successfully employed during the year. In Cape Breton County the seam at the head of Lingan Basin was traced some distance to the westward, thus adding very materially to the value of the coal field.

The records of the coal sales of Nova Scotia have been kept since the year 1785, and are as follows:—

1785-1830.....	378,296
1831-1840.....	839,954
1841-1850.....	1,533,798
1851-1860.....	2,399,319
1861-1870.....	4,927,339
1871-1880.....	7,317,430
1881-1890.....	13,910,136
1891-1900.....	20,552,536

Gold mining has yielded about 32,000 ounces, or about the same as the previous year. This was obtained from about 90,000 tons of quartz and slate.

The list is headed by Stormont district with 5,000 ounces from about 30,000 tons of crushing material. The well-known Richardson mine has continued yielding steadily. The western extension of the ground worked by this company is being developed by the Dolliver Mountain Mining and Milling Co. and it is expected to be a large producer this year. The Waverley returns show 3,000 ounces from 9,000 tons of rock, the production of the Waverley Gold Mining Company.

Discoveries of promising leads are reported from several points and it is hoped that 1902 will show a decidedly increased production. Application was made for a Government drill to bore on the anticlinal at Goldenville, but the parties interested changed their minds. The subject of deep mining and of the exploration of underground reefs is one that appears worthy of the consideration of the Government, as it has a most important bearing on the permanent mining development of our gold districts.

The Nova Scotia Steel and Coal Company continued working their Nova Scotia mines, and extracted about 10,000 tons of ore. No other iron ore mining was done in the Province. The explorations at Torbrook, Annapolis County, were concluded in the spring, after showing that the tonnage of the district could be counted by hundreds of million of tons. It is apparently one of the largest iron ore deposits on the continent. The deposits of magnetite at Whycomagh, Inverness County, were traced still farther to the north.

The Nova Scotia Steel and Coal Company have completed a block of retort ovens at North Sydney, which supply coke to their Ferrona furnace, and will ultimately form part of their steel plant. Their production has been about 26,000 tons of pig iron.

The Dominion Iron and Steel Company have three furnaces running which have produced about 90,000 tons of pig. Their converters

are practically completed and they enter on the second state of their large enterprise with the New Year.

In connection with the operations of these two companies about 400,000 tons of Wabana ore have been imported, and about 150,000 tons of coke have been burned. During the year about 80,000 tons of limestone have been quarried by them. As these two companies extend their operations toward their completion, it is realizable how important an addition they will form to our coal and quarry development.

The extraction of gypsum may be estimated at 135,000 tons. Most of this is shipped from Windsor to the United States, on barges towed by powerful tugs.

About 600 tons of barytes were mined at Cape Rouge, Inverness County, intended for consumption at Halifax.

The extraction of tripoli has been continued with a production of about 800 tons. No systematic copper mining has been carried on during the past season. Explorations were continued at Coxheath. In the Mira district Mr. W. N. Young did some work on medium-grade copper ore deposits which are proving to be of large extent. The Munro-Thompson Company report that their mine at Wentworth, Cumberland County, contains an extensive deposit of fair grade ore, and that they are preparing to equip the mine and build a smelter. At Cape d'Or, in the same county, a large expenditure has been made by the Colonial Copper Company, on several large zones in the trap which carry native copper, and they feel confident of an extensive deposit.

#### Cyanide Practice.

A volume of considerable interest and value to Canadian mining men, and particularly those of them who are interested in gold extraction, has just been published from the pen of Mr. Alfred James, M.E., F.G.S., late technical manager and special expert of the company introducing the cyanide process. In a prefatory note Mr. James points out that his excellently printed and beautifully illustrated volume on "Cyanide Practice" is not intended to furnish a complete history of the cyanide process, or a law report of the various battles of patents to which the process has given rise. Nor does it give details of all equations that have been published regarding the chemistry of the process, or of the more or less successful modifications which have from time to time been propounded or adopted in various parts of the world. The earlier chapters have already been contributed by the author to the proceedings of The Institution of Mining and Metallurgy and The American Institute of Mining Engineers, and are now, with additions and some detail illustrations, brought up to date and assembled into book form. A considerable portion of the contents has, however, been written specially for this volume, and is now published for the first time. It is hoped that the process section will give sufficient information to enable the mining engineer to accurately test his products, design and erect efficient and economical plants, and work them successfully. The practical details concerning the construction of vats and the method of arranging the foundations of double treatment plants should be of some use to the engineer called on to deal with such propositions. The latter portion of the book specializes and shows the advances which have been made in the treatment of dry crushed and roasted ores, and in the treatment of slimes by filter-press and other methods. This section shows the general tendency of the various fields of the world to evolve types of plant peculiar to their own requirements. We commend this serviceable work to all who may be interested in cyaniding. It is published by E. & F. N. Spon, London, and may be obtained on this side from the Engineering and Mining Journal Company, New York. Price, \$5.00.

**Presentation to Mr. J. Geo. Rutherford, M.E.**

Mr. J. Geo. Rutherford, who, for the past twenty years, has occupied the important and arduous position of mining engineer and assistant manager of the collieries operated by the Acadia Coal Co., in Pictou County, N.S., has recently severed his long standing connection with that company and has gone to the Joggins colliery of the Canada Coals and Railway Co. at Maccan, where he assumes Mr. Archibald's position of general manager. The position which Mr. Rutherford occupied at the Acadia was one of great responsibility and could only be successfully filled by an engineer of more than ordinary ability; and in the performance of his duties Mr. Rutherford has had many trying, even hazardous, experiences, through all of which, happily, he passed safely and successfully. On such occasions he showed great solicitude for the safety of the men under him. At the explosion in the slopes of the Albion collieries some twelve or thirteen years ago Mr. Rutherford had a very close call. On the morning of the accident he was engaged with a number of workmen in walling off part of the pit when through the leakage of gas, etc., it became almost unbearable for human beings to breathe; and the work being nearly finished, and

have had all times, and under all circumstances the fullest confidence in you as a mining engineer.

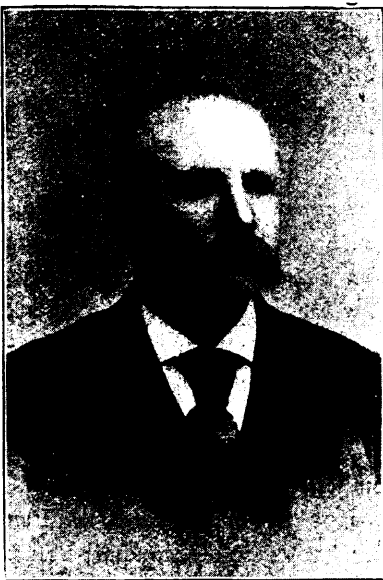
We are not ignorant of how much depended on your skill, care and judgment, not only to the company for which you worked, but also to us even to our lives, yet we are pleased to state that we never feared through any want of confidence in you.

We know of the dangerous nature of your work oftentimes. During our connection as official aud workmen, we recollect many times of extreme danger, at all of which we have admired your bravery, unselfishness and consideration for others.

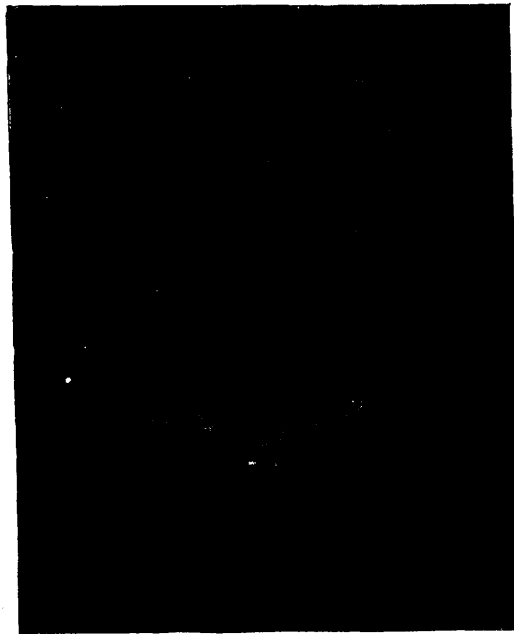
In your dealings with us we can truthfully state that we can always remember you as a fair, courteous and gentlemanly official whose word was not to give a command to "go" but rather an invitation to "come."

Having, therefore, full confidence in you and entertaining for you as we do feelings of deep gratitude and respect, is it any wonder that we look upon your removal from us with some concern? We would not however, be selfish, but we would rather rejoice that you are to occupy a position of greater trust in which we feel assured you will be equally successful and popular.

The citizens of this town unite with us in giving expression to their sense of loss in your departure from their midst. Your estimable wife and interesting family will be greatly missed. We have the most pleasant recollections of these years of citizenship and our earnest desires are for your prosperity and welfare wherever you may be.



MR. JOHN JOHNSTON,  
Appointed Resident Manager of the  
Sydney Mines Colliery of the Nova  
Scotia Steel and Coal Co.



MR. J. GEO. RUTHERFORD, B.A., M.E.,  
Appointed General Manager to the Canada Coals and  
Railway Company.



MR. T. J. BROWN,  
Appointed General Superintendent of  
the Nova Scotia Steel and  
Coal Company.

fearing the worst, he ordered all the men that were not absolutely needed to go above ground and he himself would stay with three other men and finish the work. Just as the car containing the men was leaving the bottom, Mr. Rutherford, seeing the work about finished, thought it better for them all to go together. They did so, and were no sooner at the surface and away from the mouth of the slope when the explosion occurred. This is one of a number of instances in which Mr. Rutherford showed not only presence of mind but solicitude for those working with him at a critical moment.

Before leaving, the citizens and miners entertained Mr. and Mrs. Rutherford at a public meeting in Stellarton and presented them with an address and a handsome service of plate. The address was to the following effect:—

J. GEO. RUTHERFORD, Esq.,

Dear Sir,—We, the members of Buller Lodge, No. 31, P.W.A., together with the other citizens of Stellarton, on the eve of your departure from our midst, desire to bear testimony to your worth in your profession and position, as well as a citizen.

During your service of twenty years with the Acadia Coal Co., Ltd., we

We ask of you to accept this gift as a token of our esteem, hoping that some time in the future it may cause your mind to revert to the workmen and citizens of this town whose best wishes are for the success and usefulness of both yourself and family.

**Anglo-Canadian Lead Syndicate, Limited**—The following is excerpted from the Directors' Report under date of 19th December, 1901:—"It will be remembered that the Syndicate's capital is almost entirely invested in the British and Canadian Lead Co. Ltd., whose report and accounts to 30th June last (submitted and passed at the company's annual meeting on the 7th ult.) were issued for information to the shareholders of the Syndicate. The directors need not, therefore, refer in detail to the mining operations which were therein described. It will be seen that the various shipments of concentrates from the mine have shown satisfactory assays—that arriving in July last being better than any previous one. Advice has been received of a shipment recently arrived at Antwerp (102 tons) and of a probable further shipment of 200 tons before the close of navigation for the winter. In addition to other unforeseen drawbacks and hindrances at the mine, the exceptional drought in Canada which interrupted navigation on the lake (Temiscamingue) prevented the results being realized which were confidently anticipated at the last annual meeting of the Syndicate. Mr. Walsh, the manager of the mine, having tendered his resignation a new manager (recommended by Mr. Robert, of Montreal, after careful enquiry) is about to be appointed. The directors are hopeful that this change will result in more rapid developments and more frequent shipments, though the latter, in any case, will shortly be suspended until the navigation is re-opened next spring."



### An Appeal to Cæsar.

The Hon. Clifford Sifton, M.P., Minister of the Interior, is face to face with an important problem, the satisfactory solution of which will require the exercise of all those statesmanlike qualities which he is known to possess.

The united press of British Columbia is appealing to him as the recognized arbiter of the destinies of the Province to make a speedy decision in connection with the Government reservation of coal lands in the Crows Nest Pass. The question is removed entirely outside the sphere of politics and the most urgent appeal comes from papers which are not only Liberal but strong supporters of the Government, such as the *Vancouver Province*, and the *Vancouver Colonist*. To these must be added papers published in the immediate vicinity of the coal lands, and which may reasonably be expected to know more about the details of the question than any others. We refer to the *Nelson Economist*, *Nelson Tribune*, *Rossland Miner*, *Fort Steele Prospector*, and *Fernie Free Press*.

These papers are unanimous in declaring that the mining industry of the Province, and especially of the Kootenays, is threatened with a serious drawback in face of a possible monopoly of fuel supply by Mr. J. J. Hill who represents an American corporation.

Upon the question of railway policy and the desirability of allowing the Great Northern to build into the Kootenays nothing is said, it being fully realized that there is a broad distinction between this and the principle involved in the coal policy. There are many who think that it is an excellent thing that the Great Northern should be allowed to build, in affording greater facility of access to the States and widening the market for British Columbia mineral products. Much might be said upon both sides of this question, but we are not concerned now with the railway policy, which has practically been settled by the granting of a charter to build into South East Kootenay. We are, however, very much concerned, together with our contemporaries, with another aspect of the question, which has been patent to those conversant with mining matters for a long time past, but which has only just fastened itself upon the public mind and secured that attention which it deserves.

Our readers may remember that some months ago we discussed the geographical position of the coal lands in the Crows Nest Pass with a special view to show that the policy of the Crows Nest Coal Co. was gradually excluding the Dominion Government from the only favourable position in the coal field, and that unless this policy was checked the Government would ultimately find itself in such a position that no selection of 50,000 acres could be made in accordance with the terms of the statute, which set forth that these Government coal lands should be of "equal value" to the other coal lands. To these allegations a strong denial was made by some of the directors of the coal company. It was stated that there was no attempt on the part of the coal company to monopolize the favourable positions and that there were plenty of places where the Government could still make their selection in consonance with the requirements of the statute. When the matter was before the Railway Committee of the House of Commons the Managing Director of the coal company pooh-poohed the idea that the whole of the valuable coal deposits were within the Pass, and stated that there were millions of tons to the east of the Rockies just as good as the Fernie coal. Subsequent developments, however, have only confirmed the opinions that were then expressed, that such a statement was absolutely devoid of foundation. It is true that millions of tons of coal have been located during last year to the east of the Rockies but so far not one seam has been discovered of equal quality to the Fernie coal or capable of producing a coke which will

for one moment compare with it. This, however, is rather beside the question which is a very narrow one, viz., whether the Government can still make a selection of 50,000 acres which will give coal lands of "equal value" to those held by the Crows Nest Pass Coal Co., and secondly, what steps can be taken by the Government to prevent the creation of a monopoly in this fuel, which would for ever hamper the smelting industry of British Columbia.

Upon the first question the mining experts who have examined the coal fields are unanimous in their conclusion that only one point remains where the Government can secure what they are entitled to, viz., upon Morrissey Creek. That there should have been any hesitation on their part in deciding upon this site is a puzzle to many. However, we are not so much concerned that they should hesitate, if in the end they decide to take up what is in reality the only favourable point left for them. That they have some such intention is evident from the fact that the extensive operations commenced there by the Canadian Pacific Railway Co. and carried on during the whole of last summer have been suspended, in view of the fact that the Crows Nest Pass Coal Co. were allowed, with the full sanction of the Government, to locate a large mine on Michel Creek, outside their own freehold and upon lands which would have been available for selection by the Government, it is hardly likely that they would have caused the cessation of operations of the Canadian Pacific Railway Co. unless they had resolved in the interests of the country to select that site upon Morrissey Creek for themselves. What Mr. Sifton is urged to do by all who are conversant with the situation is to make an immediate selection of the Morrissey Creek site, so that of six strategic positions the Government will possess at least one. The coal company have two upon Michel, two upon Coal Creek, and one upon the north side of Morrissey Creek. If the Minister should fail to do this he will lose the last available site which would be of the slightest value to the country, whatever may be urged to the contrary, for explorations carried out on the eastern edge of the coal field and extending over the whole of last season, show, that except upon the coal company's freehold, there are no valuable coal areas on Martin Creek and that the coal measures on the southern fringe of the basin in the neighbourhood of the North Kootenay Pass and towards the Flat Head country are too broken and disturbed to be of economic value.

Upon the second question, as to what the Government can do to prevent the establishment of a permanent monopoly we find that our contemporaries speak with no uncertain voice, and fully appreciating the practical side of the question they go to the point at once by suggesting that having made a selection of the coal lands to the south of Morrissey Creek the Government should lease to an independent company a sufficient area to enable them to establish mining operations and effective competition. This conclusion is arrived at upon two grounds, the first being that the personnel of the whole directing influence of the Crows Nest Pass Coal Co. has undergone a change since its formation by the introduction of American interests, which to all intents and purposes now practically dominate this concern. We do not regard Mr. Hill as the "bogey man," nor do we share the fear of some of our contemporaries that he will ruin Canadian interests, but we cannot be blind to the fact that in many respects the interests of the corporation which he represents are antagonistic to our own, and no one who knows Mr. J. J. Hill imagines for a moment he has spent the money and devoted the time which his Canadian policy has cost him during the last few years for philanthropic purposes. He represents a corporation having its trunk line in the States, a line to which all the short branches which he may be able to construct into British Columbia will simply be feeders. He is also closely allied with the smelting industries of the States and it is in every way to his advan-

tage to develop the latter whatever the effect may be upon Canadian smelting. It is not a question open to dispute that the coal and coke produced in the Crows Nest Pass are superior to any in this continent, and that so far as research has gone up to date there is none other quite so good likely to be found, at any rate in the West. Manifestly then, if Mr. Hill enjoyed an absolute monopoly of this fuel he could give the American smelters the full benefit of the same and do all that lay within the power of a great transportation company so to cheapen smelting south of the line that Canadian smelters would not be able to compete. Whether such a policy is likely to be pursued may very well be gathered from the steps which have already been taken in that direction, and it can hardly be a pleasant reflection for loyal Canadians that a property which by common consent is one of the most prodigal gifts of nature, one which is absolutely unique in value and kind, should already have passed beyond the control of Canadians to whom it was originally entrusted, should have been officered and managed almost exclusively by Americans, who in several important respects, which need not here be dwelt upon, have begun to show their total disregard both for the sentiments and interest of Canadians.

The second ground upon which our contemporaries base their appeal to Mr. Sifton is that actual discrimination against Canadian interests has already taken place and if the last vantage point is conceded to the enemy we shall be defenceless in the matter.

Whilst Canadian consumers have been clamouring in the past season both for coal and coke, and have often been unable to obtain the necessary supplies to keep our smelters in operation, train loads of coal and coke have been passing daily into the States, either by way of Lethbridge and Great Falls or by way of Creston Junction and Bonners Ferry, and in the late Fall matters reached such a crisis that it was only by determined action on the part of the railway company, who refused to supply cars for the carriage of fuel to American points whilst our own smelters were unsupplied that we were able to get what we wanted.

Further, there has been a constant discrimination against Canadians in respect of the price of coke if not of coal. Coke supplied to the Great Falls smelter has been furnished as low as \$3.50 a ton on cars at Fernie, whilst until quite recently Canadian smelters were paying \$4.75 to \$5.00. Largely owing to the clamour which this aroused and realizing the impossibility of continuing such unfair discrimination the coal company have recently made several reductions bringing the price down to \$4.00 at date. This, however, has only resulted from the force of public opinion and the extreme pressure brought to bear upon them by the Canadian smelters. There is a general consensus of opinion amongst smelter experts that coal and coke at a much lower price than at \$2.00 and \$4.00 f.o.b. will have to be provided if the low grade ores of British Columbia are to be worked, in fact it is not going too far to say that the continued existence of the Boundary country as an ore producer is absolutely dependent on this factor. Mr. Paul Johnson, than whom no higher authority on Canadian smelting is to be found, in a recent issue stated that the cost of smelting Boundary ores had been reduced to the absolute minimum, a statement in which he is confirmed by a no less eminent and independent authority than Dr. A. R. Ledoux, of New York. Mr. Johnson further stated that the cost had been brought within a trifle of \$2.25 a ton, and that of this cost no less than 65% represents fuel. With the low grade value of these ores now fully demonstrated it becomes evident how important a matter it is to secure cheaper fuel and no one doubts that the only guarantee for this would be effective competition with the only corporation producing it. No legal restrictions which could be imposed would be half so effective as a healthy commercial competition, a fact which has been already demonstrated in the history of the Crows Nest Pass Coal Co.

Whilst no one suggests that coal and coke can be produced as cheaply in the West as in the East, it is palpable that with Pennsylvania coal averaging \$1.00 f.o.b. and coke \$1.65, Crow's Nest coal at \$2.00 and coke at \$4.00 is an unreasonable figure, a fact which is further emphasized when we remember that in consequence of this cheap eastern production Pittsburg coke is actually transported three thousand miles to the western smelters and used there today.

We have all along contended that Crow's Nest coke can be produced at \$2.50 and that it should therefore be sold at \$3.00 per ton. We have no doubt whatever that if Mr. Sifton arrives at the decision which may reasonably be expected of him and allows effective competition to be established on Morrissey Creek, we shall within twelve months from the commencement of operations see coke of equal grade to the Fernie coke being sold to Canadian smelters at \$3.00 f.o.b. and coal at not more than \$1.50.

We have the utmost confidence in the determination of the Minister of the Interior to do what is fair and right to the country. He is face to face with a problem, it is true, and a more important and possibly a larger problem than is generally supposed. As was demonstrated by the last Census returns the expansion of the Dominion is practically confined to the great West, and this has been brought about mainly by the mineral development of British Columbia, which compares not unfavorably with the agricultural development of Manitoba. Mr. Sifton has made the West his study and its development his ambition. He is responsible for the construction of the Crow's Nest Pass Ry. which has been the determining factor of the opening up of the Kootenays. We are satisfied, and with confidence add our appeal to that of our contemporaries, that he will not allow any private interests nor the interests of any corporation to have the slightest weight in the matter under consideration, but that on a full consideration of the case he will be prepared to say that no combination of interests and certainly no purely American policy shall prevent the success of the great project he had in view when he fathered the western policy with which his name is identified. He must be aware of what is patent to every one in British Columbia that the control of the coal corporation for whose existence he is also responsible has passed entirely into American hands and that this furnishes an additional reason why he should identify himself with purely Canadian interests by stepping into the breach, making a prompt selection in accordance with the terms of the statute and saying to the people of Canada, "Here are your coal lands, operate them in order that our mining and smelting industries may be free from the control of any monopoly, whether Canadian or American."

## COAL MINING AND TRADE.

On another page we give official returns of the principal producing collieries in Eastern Canada during the calendar year just closed. From these and other data the output in Nova Scotia might be computed as follows:—

Dominion Coal Company.....	output	2,561,783
Cumberland Railway & Coal Co.....	shipments	341,776
Acadia Coal Co.....	output	270,253
Intercolonial Coal Co.....	output	204,402
N. S. Steel and Coal Co.....	(not official)	214,771
Canada Coals and Railway Co.....	output	68,055
Gowrie & Blockhouse Collieries.....	output	20,700
Port Hood Coal Co.....	(not official)	20,000
Inverness-Richmond Coal Co.....	output	13,500
Cape Breton Coal Co.....	output	12,754
Sydney Coal Co.....	(not official)	5,000
Other collieries.....	approximately	6,500

Or a total of ..... 3,739,494 tons  
or a gain in output of over 700,000 tons over the previous year. In our next issue we hope to review more fully some of the more prominent features of this progress.

One of the most hopeful features of the year is that the Dominion Coal Co. will be able to establish a permanent export trade; if so, this will re-act in a most beneficial manner upon their competitors, who will have a better chance in the home market. So far the efforts of this Company have been attended with a fair amount of success. Considerable sales have been made in Sweden, Norway and Denmark, mainly for railway purposes. Sales could also have been effected in the Mediterranean, but this is a more difficult market to handle and will require special care in the establishing of agencies. The general manager, however, is sanguine that within a few months the market will be opened and that it will prove to be one of the most lucrative.

The first cargo of coal has yet to go to England, but we have not changed our opinion that there is a market for this coal, especially in London, and that the result of negotiations will ultimately be to effect an introduction. Midland coal, with which Nova Scotia coal would directly compete, is now costing from 18/- to 20/- per ton in the Thames. The Dominion Coal Co. could well afford to deliver their coal for 16/-, and it is only necessary to break down the prejudice which exists and satisfy consumers that the quality is suitable for the market to ensure trial orders.

We cannot close this brief review of the year's trade in Nova Scotia without commenting upon the splendid showing made by the three large mines of the Dominion Coal Co. It is certain that no coal company in the world possesses three mines with a regular output equalling that of the Reserve, Caledonia, and Dominion No. 1, and we think the company may take equal credit for the fact that no other company is better equipped for the expeditious handling and shipping of coal.

The outlook for next year is satisfactory for the operators inasmuch as the orders already on the books give promise of a full season's work and there is little likelihood of any reduction in prices.

Of course this does not apply to export trade as the price will have to be adapted to circumstances, especially if any coal is sent to the Old Country, but in view of the condition of the iron, steel and coal trades in the United States and Canada and the enormous demand for fuel, it is not likely that there will be any weakening of price on this side of the Atlantic. We think also that during the present year at any rate there will be a demand for every ton which can be produced.

It is with pleasure that we call attention to the substantial increase in the value of Dominion Coal stock, common stock having risen from 35, at which it stood a few months ago, to 60. When it is remembered that this stock was selling as low as 8 in 1895, it will be seen what a substantial advance has been made, and this is especially encouraging because no dividend has yet been paid. The price, therefore, at which it stands evidences the confidence the public have in its ultimate value and also in the management.

Mr. T. J. Brown, who less than a year ago was appointed manager of the Old Sydney mines shortly after they were acquired by the Nova Scotia Steel and Coal Co., has just received another promotion, having been installed as general superintendent of the concern with headquarters at New Glasgow. Certainly our friend T. J. is having a great streak of good fortune. This is the third substantial promotion in two years, which reminds us of the time not so long ago when he questioned whether mining was his true calling and seriously entertained the idea of abandoning it for something else. We wish him every success in what is indeed a most important and onerous position.

We understand that the Gowrie & Blockhouse Co., who have been operating at Morien for two years under the control of Mr. Ochiltree Macdonald, has suspended operations for the present. The reason is not stated, but in view of the fact that development has been very lim-

ited and the output of coal small, we should not be surprised if it portends the adoption of some new policy for the future, as it has always seemed to us impossible for the company to recover coal from the submarine areas under the conditions at present existing. We hope that this enterprise will resume operations, as it means a great deal to the neighbourhood of Morien, which suffered so much a few years ago when the old Gowrie mine was closed down. As the Dominion Coal Co. is very short of miners there will be no difficulty in finding work for the men hitherto employed by the Gowrie & Blockhouse Co., and we understand that Mr. Shields has made arrangements to this end.

Mr. John Johnston, formerly assistant manager to the Dominion Coal Co. and latterly manager of the Port Hood Coal Co., has been appointed to succeed Mr. T. J. Brown as manager of the Old Sydney mines. We congratulate Mr. Johnston as he goes to fill a historic position rendered famous by the Brown family. There can be no question that he will benefit largely by the change. We understand that the position of general manager of the Nova Scotia Steel Co. goes to Mr. Thomas Cantley, who has for many years been the commercial manager of this excellently managed and successful enterprise.

The development of mining operations in the Blairmore district, east of the Rocky Mountains, is proceeding apace, the latest news being that Mr. J. L. Frank has commenced the erection of coke ovens at his mine at Frank, Alberta. This bids fair to be one of the most promising new mines in the West as it produces an excellent quality of steam coal, and a fair, though not first-class quality of coke. The present output is 300 tons a day and it is Mr. Frank's intention to develop a capacity of at least 1,000 tons. He deserves success, for he is one of those Americans who have benefitted Canada by the liberal expenditure of capital, which already approximates \$250,000 00. He has also established a town of which any district might well be proud. It is constructed upon modern sanitary lines with all the necessary public buildings and conveniences. Other investors in the same coal field are bringing in plant and machinery for more extensive operations next season, so that Blairmore and the district is likely to be a very busy place in 1902.

Although the final figures are not to hand we gather that the output of the Crow's Nest Pass Coal Co. last year will be slightly in excess of 400,000 tons, an increase of about 90 per cent. over the previous year. In addition some 200 coke ovens have been added, so that the present capacity is 1,000 tons of coke daily, and we believe the capacity of the mines is not much below 2,000 tons. This shows satisfactory progress since the advent of the new management and justifies the expectation that by degrees Mr. J. J. Hill's enormous total of 10,000 tons daily will be reached. Of this output more than 80 per cent. was produced at Coal Creek, the operations at Michel not yet having been so successful as one could wish. There is every expectation, however, that the new mine on Morrisey will be as good if not better than the Coal Creek mine. The measures at this point are very regular and solid. Five seams have been exposed on the north side of Morrisey Creek and there are two others a little distance away which will no doubt be traced to the Creek. These seven seams would give an average of 152 feet of workable coal.

A branch line has been built under the new charter from the Crow's Nest Pass line to within one mile of the mine where it terminates in consequence of the narrowness of the pass. To this point an electric tramway has been constructed to convey the coal from the mine. The railway is not quite finished, but will be in operation in the course of two months, and as there is every facility for speedy development there is no reason why a fair output should not be obtained during the coming season.

There have been several important discoveries of coal in the Similkameen Valley and one large company has been formed under the title of the Similkameen Valley Coal Co. with \$1,000,000 capital. A first call realizing \$50,000 has been paid and the services of Mr. W. Blakemore engaged as consulting engineer. Under his directions boring operations will be commenced in March and a drill is now being shipped in for that purpose. The coal seams exposed at the surface are lignitic, but there is every reason to believe that beneath these good bituminous seams will be found. A second syndicate with the Hon. G. E. Foster as president has been formed in Toronto by Messrs. Hall & Murray, the well known brokers, who have also engaged the services of Mr. Blakemore as consulting engineer. They will explore coal lands adjoining those of the Similkameen Valley Coal Co. The future of this property will depend entirely upon the construction of a railway through the valley, and to this end every effort has been made to induce the British Columbia Government to move in the matter this year, so that the resources of this fertile valley, both mineral and agricultural, may be marketed. It is not merely for coal and agricultural purposes either that a railway is required, for some of the best copper properties in British Columbia lie between the Boundary district and the Hope Range of mountains, notably Nickel Plate on Twenty Mile Creek and Copper and Kennedy mountains, nearer to Princeton.

The latest information relates to a discovery of bituminous coking coal near Fire Valley twenty miles west of lower Arrow Lake. Here a 4-ft. seam has been discovered and on careful analysis has been found to yield 62.8 per cent. of fixed carbon and 8 per cent. of ash, giving by slow coking a firm, coherent coke. This property, which consists of 6,400 acres, has been bonded by Mr. Blakemore until the first of November, 1902, and it is his intention to make a thorough proof of the seam during the present season. If the coal should be found of sufficient extent to justify the establishment of a mine, its proximity to the smelters of the Boundary district as well as those at Trail and Nelson would give it a preference in the market as it would be at least 100 miles nearer than the product of the Crow's Nest Pass Coal Co.

#### Characteristics of the Atlin Gold Field.

By J. C. GWILLIM, B.Sc., M.E., Nelson, B.C.

The mountains about the eastern shore of Atlin lake are not rugged. They have rather a worn down appearance. If one passes eastwards behind them no great deep valleys are found on the other side but great tracts of evenly sloping ground above and at the timber line; the streams do not appear to have cut deeply into this great mountain mass, which lies immediately about and behind the gold bearing streams.

In considering the two principal placer bearing streams, Pine and Spruce creeks, the valleys in which these streams run appear much too wide and flat bottomed to be the result of the cutting out action of such streams as the present Pine and Spruce creeks.

Both of these streams flow in sharply cut gutters through the general level of the broad valley bottoms, Spruce Creek in places having cut a deep trench two to four hundred feet below the general valley surface.

Leaving out as much of the theoretical origin of these valleys as is advisable, the observed facts appear to point to the conclusion that the present streams did not wear out or form these great valleys.

Above the junction of Pine and Spruce creeks the main valley is over 2 miles wide and at 6 miles east of the lake is 600 feet above it. With such a fall and an uninterrupted period of time to operate in the present streams should have cut out a V shaped valley.

Spruce valley trending off to the south-east rises gradually by its

broad valley to the level of the upland slopes or moors previously mentioned, a height of about 1,700 feet above Atlin lake.

Pine valley goes eastwards to Surprise lake, eleven miles from Atlin lake and 825 feet above it.

These broad raised valleys are floored with serpentine, magnesite, diorite and diabase. The mountains about them are composed of the same material together with some patches and bands of a very granular friable limestone, and a cherty quartzite capable of breaking up into small fragments very easily, and actinolite slates. These rocks with the possible exception of the diabase and diorite appear to belong to the lower Cache Creek series, a formation recognized at various places in a like relation east of the granite Coast ranges for many hundred miles on a south-easterly trend. The Cache Creek series of rocks has been found to be placer-bearing elsewhere. In the Atlin district it is amongst the more basic and magnesian portions of the series that paying placer has been found. Such as the rocks of Pine and Spruce and McKee valleys.

The rock surface or bed-rock underlying the valley of Pine and Spruce Creeks appears to be uneven in a minor degree, there are a few low out-crops of diorite, diabase and serpentinized rock. These inequalities are hidden to a great extent by terrace deposits up to a height of about 600 feet above the lake. Farther up the valleys, at higher levels, there are irregular ridges of drift material and little lumpy hills of clay, gravel and boulders and, on Spruce Creek, these finally give place to the smooth easy slopes of the upland moors above timber line. The occurrence of deep ditch-like canyons made by the present streams appears to indicate that these streams have been rapidly cutting new channels in the old valley for a limited period since the lake receded to its present level.

These streams have cut down through superficial deposits of clay, boulders, gravel and sand. All of which are largely composed of the local rock material. At places this material is false bedded gravel and sand; at other places it is a stiff grey boulder clay containing striated boulders.

On Spruce Creek the present stream has cut through this grey and blue drift material to a depth of two or three hundred feet. It has also cut through bands of diabasic rock forming canyons

Beneath the drift and at about the level of the present stream bed, the action of the stream and the workings of the miners have shown large deposits of yellow gravel, so far traced for about two miles on Spruce Creek, from a point a little above Discovery Claim to about No. 100 below Discovery.

This yellow gravel represents a stream bed formed prior to the drift deposits which now overlies it. It contains gold values sufficient to cause it to be worked on 94 below by wheeling out of a tunnel into the sluice boxes. Near 100 below it is said to have returned six dollars to the yard. At Discovery, two miles above, the bench formed the old yellow gravel bed rock and this has been worked out.

On Pine Creek a somewhat similar deposit is found, but is not here overlain by drift material. A superficial area of this yellow gravel near Willow Creek adjoining Pine, of 100 feet square is said to have cleaned up over three thousand dollars. There is no doubt that these yellow gravels represent pre-glacial stream beds having much the same drainage and depth as the present Pine and Spruce creeks.

These gravels are in an advanced state of decomposition. Outwardly they appear to be composed of rather large shining yellow pebbles in a paste of yellowish mud. They are not usually cemented.

The paste containing the pebbles is apparently nothing more than the completely rotted or decayed gravel of smaller size. The large pebbles easily break with a yellow oxidized fracture, and are of the

same rock as the very tough greenish boulders so prevalent in the present stream bed

The thickness and width of these yellow gravels is perhaps somewhat greater than the corresponding deposits of the present stream beds. They were not observed at any point lower down in the valley than about the level of the present surface terraces five to six hundred feet above Atlin lake.

The gold contents of these pre-glacial streams are concentrations from the wearing out of the pre-glacial valley, and appear therefore to have been locally derived. The change of conditions which brought about the filling in of the pre-glacial stream beds with the drift gave these valleys their present superficial flooring. The post-glacial streams had therefore to cut out new channels for themselves through this drift, and there is evidence to show that several minor channels were formed before the present ones fixed the drainage.

Any such temporary stream bed would concentrate more or less placer gold from the drift which it disposed of, and this accounts for the gold in some of the dry or nearly dry runs, found in these broad valleys.

It is not likely that any of these minor superficial depressions indicate the position of the older pre-glacial stream, excepting where the contour of the rock floor beneath might force the new stream to cut down the drift in its former depressions.

Gold Run, Willow Creek and Trand Gulch may or may not have been the courses of pre-glacial streams—evidence goes to show they were not—but in any case these channels were formed *since* the covering of drift and being in drift still, show no evidence of the pre-glacial drainage. Gold Run is said to have yellow gravel about 30 feet below the superficial channel. Willow Creek is a former channel, on bed-rock, of the present Pine Creek. Trand Gulch has shown no yellow gravel from its pits and shafts, but is a well defined shallow depression now almost dry. The placer gold of the runs and creeks in the valleys of Pine and Spruce seems to have been derived entirely since the period of glacial drift from concentrations of this drift and re-washing of the pre-glacial stream bed by present or past glacial streams. There appears to be, or to have been, no considerable amount of gold added by reason of the denudation or wearing down of the surrounding mountains since the deposition of the drift.

In this they differ from the placer concentration of the minor V shaped creeks tributary to Pine Creek, such as Birch, Boulder, Ruby and Wright. These last named creeks are typical, lateral V shaped streams heading in mountain basins and still cutting down the trough through bed-rock. They carry no apparent evidence of glacial action, the stream beds are filled in with boulders in most places. Bed-rock is usually more in evidence about the middle portions of these streams. This seems to be due to the fact that the upper basins keep filling in with talus while the lower portions are filling up with gravels.

The bed-rock is often actinolite slate, and on Wright Creek is an argillite or soft black shaly slate. Boulder Creek shows an instance of gold on granite bed-rock on its upper portion, not elsewhere found in the district. The bed-rock is granite and the basin at the head of the stream is granite, but the great mass of rock which formerly filled this valley was of the gold-bearing slate variety, and its gold has been concentrated as the stream cut down to the underlying granite.

Ruby Creek has so far been unproductive; originally this creek had cut down more deeply than the other lateral streams through the rocks favorable to placer gold. At a later time it appears to have been partially filled in by a basaltic flow from an extinct volcano on its western side. The stream has not yet cut down through this basaltic covering to the gravels beneath. The glacial drift which lies as an overburden of from a few feet to over three hundred feet in

depth in the Pine-Spruce Valley carries gold prospects in most unlikely places, apparently, such are found amongst the little lumpy hills far up on Spruce Creek. Prospects have been found in the gravel on the exposed summits of these moraine-like deposits; such may be due to a weather concentration by which the lighter materials have been removed leaving a little gold and the gravel behind.

Such a flooring of more or less assorted drift material will naturally contain considerable gold in a more or less concentrated condition; for this drift represents great masses of the gold bearing country rock and vein material of these valleys, and their pre-glacial wash or surface. It is possible that there may be some fairly rich concentrations of gold within the drift itself wherever contemporary streams had their courses during the deposition of this material and it follows that any later stream cutting out and re-washing this drift does little more than concentrate an equal volume of country rock, excepting where it may cut into some such concentration of values. There appears to be some evidence that Pine Creek has cut some earlier concentrations other than its own bench or former stream gravels, and the yellow gravels.

On the south bank of Pine near Discovery there are pay gravels which, from the present contour of the surface, do not appear to underlie any stream bed more recent than the deposition of the drift, and these are not yellow gravels.

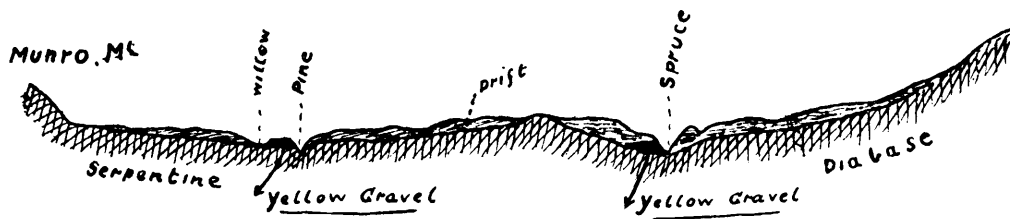
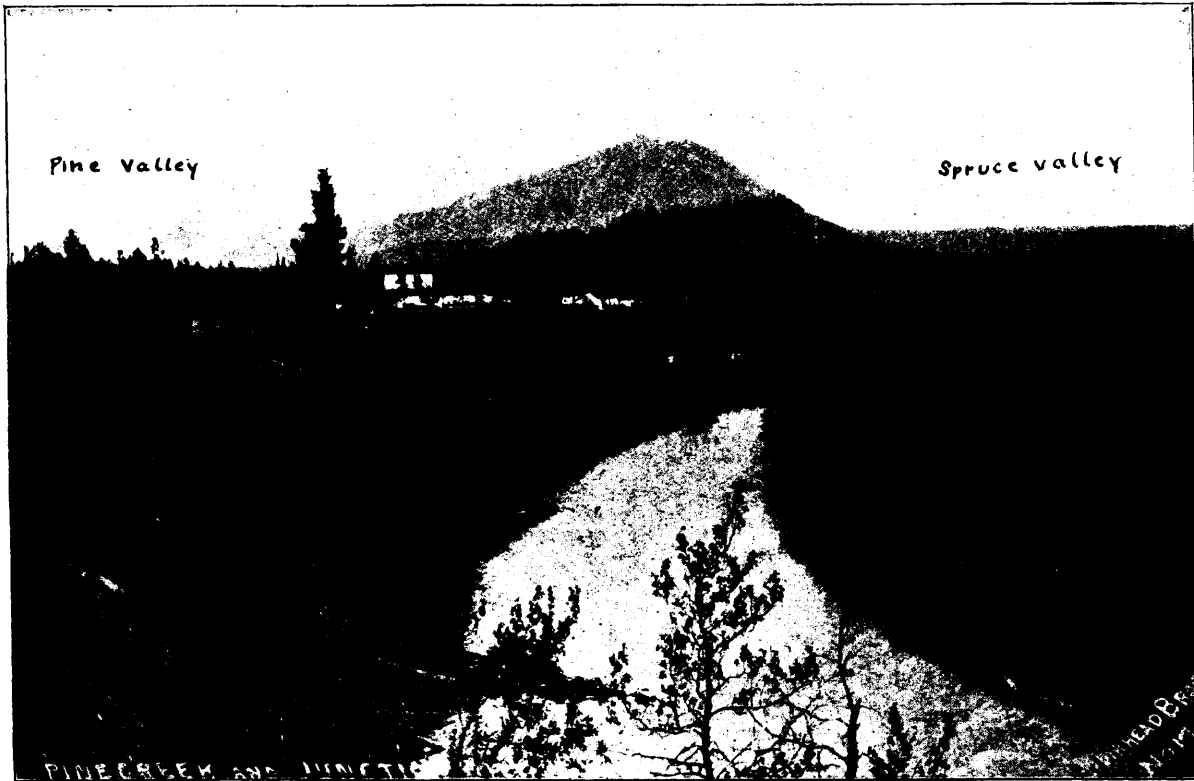
It will be seen that in these wide flat valleys the streams are not now actively concentrating gold from the mountains about them, and that wherever the present small troughs of these streams traverse the unsorted drift they are not likely to have gathered much gold. Hence their richness depends upon their cutting some earlier concentrations which may be in the drift material itself but is more often the pre-glacial yellow gravel. This deposit as already stated exists at about the level of the present stream beds.

The portions of Pine and Spruce creeks now being productively worked coincide with portions of these yellow gravels which have been at these places more or less cut into and re-sorted. That is from Discovery to 140 below on Spruce; and from Gold Run to Stephen-dyke on Pine. If the gold is derived in this manner it follows that the bench gravels or former courses of Pine and Spruce will not be found to be rich, excepting in such cases as Willow Creek and Stephen-dyke where the earlier courses are themselves below the bed-rock of the yellow gravels and have received enrichment from them. At horizons *above* the older deposit, the earlier stream beds or benches contain only what has been concentrated from a very limited amount of drift material, more or less gold bearing according to the amount of concentration it has undergone.

Concerning the origin of the placer gold there are, as is common, reports of mother-lodes. Certainly there are many well defined quartz veins in the district but these as a rule are not rich in free gold. Some large bodies of country rock such as magnesite, and the shaly slates of Wright Creek carry mineral sulphides and more or less gold. There is also some rich gold bearing rock crossing Pine Creek near Willow. This has been credited with mother-lode properties but it does not account for the gold on Birch, Boulder, and Wright and Otter which lie above and eastwards of it.

It is not likely that any great vein or system of veins originally contained this gold, but rather that the different varieties of country rock which limit the field productively are gold bearing either in themselves or in the various forms of dykes, veins, and stringers or segregations of secondary material. At no place has gold been found at all comparable in coarseness with that of the placers, and its fineness varies on different creeks. These characteristics of coarseness and variety may or may not have belonged to the original gold *in*

CHARACTERISTICS OF THE ATLIN GOLD FIELD.



Hor scale 2  $\frac{1}{2}$ " = 1 Mile    Vert scale 1  $\frac{1}{2}$ " = 1000 ft

Cross-section of Pine-Spruce valley from Willow Creek to # 94 below on Spruce

*situ*. The useful results of observation appear to be as shown in this paper that the placer gold is of local origin and that it is found associated with certain distinct rocks not necessarily gold bearing elsewhere, but shown to be so in this district, and that there are certain recognized factors in the enrichment of the gravels.

The Atlin district was first opened up in 1898.

In 1899 about three quarters of a million dollars was taken out.

In 1900 and 1901 the Atlin "Claim" gives the following outputs for the different creeks in ounces:—

	1900	1901
Pine and Willow .....	4918	5330
Spruce.....	1699	2308
Boulder.....	1916	2640
McKee.....	1733	1013
Wright.....	1068	283
Graham.....	19	103
Otter.....	122	143
Birch.....	15	271
Gold Run.....	—	31
Totals.....	11490 OZS.	12122 OZS.

A total of about two hundred thousand dollars for each of these years. This being only the official record and less than the real production.

The falling off is due to the transition from placer to hydraulic mining in a large degree. There is much ground fit for hydraulic working if a sufficient amount of water is obtainable.

McKee Creek appears to combine some of the characteristics of drift deposits and a V shaped valley. No yellow gravel is known to occur but its presence is possible.

The photos and cross-section sketch will illustrate the character of the Pine-Spruce Valley at its principal placer bearing horizon.

## COMPANY NOTES.

**Le Roi No. II.**—The report of the directors of Le Roi No. 2, Ltd., for the year ended 30th September last, states that it had been the intention of the Board to call the shareholders together early this month, but it was found impracticable to do so, at all events, before the month, as the audited accounts could not be received in time, owing to the fact that the auditors requested, late in October, that their representative should proceed to Rossland for the purposes of the audit. The directors have, therefore, thought it would best suit the convenience of the shareholders to defer meeting until after the holidays, and have fixed the date for 9th January, prior to which time the accounts will have been received, and the shareholders will also have the advantage of the presence of Mr. Bernard Macdonald. In his report, Mr. Macdonald estimates the amount of ore blocked out and in sight at 240,000 tons. He shows the net profit on the ore shipped up to 30th September was about \$6 a ton. He states that the present plant is capable of dealing with 250 tons per day. It will, however, be observed from the details of results of ore shipped in October and November, already furnished to shareholders, that the above output has not yet been reached, the amounts treated being:—October, 4,060 tons or about 150 tons per day; November, 4,800 tons, or about 185 tons per day. On the other hand, however, the profit per ton has exceeded the previous results, being for October at the rate of about \$7 per ton, and for November about \$8 per ton. With reference to the items which will appear in the accounts as due to the Bank of Montreal and the Northport Smelting and Refining Company, the latter has since been liquidated, whilst the profits earned during the current month should more than suffice to complete the repayment of the former. There is also an amount of over £20,000 still to be received from the British America Corporation. With reference to the payment of this sum, together with interest, satisfactory arrangements have been made with the special manager of the British America Corporation, acting under the authority of the Court. The Board desire to record their appreciation of the satisfactory way in which Mr. Macdonald has developed and generally conducted the operations at the mine during the period under review, and in particular to testify to the ability and energy with which he has dealt with the recent serious strike. The foregoing statement is personally corroborated by Mr. A. B. Dealty, one of the directors, who has recently returned from the mine. Mr. R. E. Leman and Mr. H. Pelham-Clinton, two of the original directors, have resigned, and on the 4th December, 1901, the following gentlemen were appointed to seats on the Board:—Lord Ernest Hamilton, Mr. Frederick C. D. Haggard, and Mr. Reginald Noton Hincks. Mr. Sinclair MacLeay has resigned the chairmanship, which has been accepted by Lord Ernest Hamilton. Mr. Sinclair MacLeay and Mr. Tyndale White retire from the Board, and offer themselves for re-election. In the general manager's report it is

stated that during the period under review the gross expenditure on account of mining operations amounted to \$277,624.37, made up as follows:—Expenditures on revenue account—Stoping ore, No. 1 mine, \$30,052.64; stoping ore, Josie mine, \$54,017.92. Expenditure on capital account—Exploration and development, No. 1 mine, \$70,205.08; exploration and development, Josie mine, \$99,242.49; mine equipment, No. 1 mine, \$3,442.24; mine equipment Josie mine, \$9,609.19; mine machinery, No. 1 mine, \$2,722.62; mine machinery, Josie mine, \$1,133.23; surface improvements, No. 1 mine, \$5,667.73; surface improvements, Josie mine, \$1,531.13. The amounts chargeable to revenue account are:—Stoping ore from mines, \$84,070.56; depreciation, mine exploration and development, \$3,079.68; depreciation, mine machinery and plant, \$385.59; depreciation, surface improvements, buildings, \$719.88; depreciation, mine equipment, \$2,610.28; a total of \$91,865.99. There were produced from the mines and shipped to the smelting works a total of 24,689 dry tons of ore. The total cost of production per dry ton is as follows:—Stoping and loading on railway cars, \$3.40. Depreciation—Mine exploration and development, \$1.25; mine machinery and plant, \$0.15; surface improvements, buildings, \$0.30; mine equipment, \$0.10; total cost for mining and loading on railway cars, \$3.58. From the beginning of the company's operations to 30th Sept. there were shipped to the smelter 24,689 tons of ore (dry weight) containing gross value as follows:—11,331.24 ozs. gold at \$20, \$226,624.80, or \$9.18 per ton; 37,898.37 ozs. silver at \$.60, \$22,739.02, or \$.92 per ton; 1,131,160 lbs. copper at \$.16½, \$186,641.41, or \$7.55 per ton, making the total gross value \$436,005, the average gross value per ton being \$17.65. The cost of mining and loading on railway cars was \$3.58. Smelter charges as per contract—Freight and treatment, \$6; indirect charges—that is, contract deductions from gross metal values, \$1.98, making the total cost of realization \$11.56, leaving net value per ton (profit), \$6.09. In concluding his report the general manager observes that it is very satisfactory to review the result of the past year's operations of the property, and to be able to confidently forecast even more favorable results for the future. The 240,000 tons of ore blocked out from the surface downward to the 500 ft. level are now ready for stoping, and the noticeable improvement in the size of the ore bodies, so far as depth has been attained on them, is very gratifying, and inspires confidence. That pay ore will extend to the deep is strongly answered in the affirmative by the general dimensions and favourable characteristics of the ore bodies at the greatest depths attained on them. The extensive area of the company's property, stretching, as it does, across the trend of the great mineral zone of Rossland, possessing within its boundaries most of the pay ore veins of the camp, bespeaks for the future of the property immense possibilities. Already the mines are firmly established on a dividend-paying basis, and it is a pleasure to feel warranted to forecast the continuance of this condition indefinitely.

**Superior Copper Co.**—The output last year from this company's mines, which are situated about three miles from Superior Station on the Algoma Central Railway, was about 1,500 tons of ore, averaging about 6 per cent. in copper, \$2.00 in silver and \$1.00 in gold values per ton. Bids for the machinery equipment of the mine are out. The manager of the company is Mr. J. P. Moran, and the head office of the enterprise is Sault Ste. Marie, Mich.

**Molly Gibson.**—Contract has been let for 1,000 feet drifting at No. 5 tunnel, to be pushed as rapidly as possible. Ore sales last two weeks of December, 1901, totalled \$640.56, being an average of \$100.21 per ton net yield. No. 5 tunnel is now in 150 feet and will be extended at rate of about 60 feet per month. On January 16th there were about 800 tons ore sacked ready for shipment. Work at all parts of the mine is being proceeded with vigorously and it is expected shipments will be continuous.

**Canada Consolidated.**—Annual Meeting held Jan. 9, 1902, at which the reports submitted showed the Company to be in a prosperous condition. The purchase of extensive graphite properties is contemplated and if negotiations now under way are successfully consummated extensive work will be undertaken at once.

**Arctic Slope Hydraulic.**—Clean-up for past season was not as large as was hoped, owing to the season's being late in opening and the ice taking early in the Fall. New flumes have been built and another monitor will be sent in next spring. With these improvements it is hoped substantial increase in the gold account may be noted.

**Rock Lake Mining.**—The directors who have returned from an inspection of the mine and concentrating mill express themselves highly pleased with the progress of the company's operations. The mines have been developed by putting in cross-cuts at different intervals along the vein over a distance of two miles and shafts have been sunk, the main one to the distance of over 425 feet, which shows a vein from 24 to 45 feet in width the entire depth. The mine and concentrating mill are in operation and concentrates will be shipped in the next three or four weeks to the smelters in northern Michigan. The directors were accompanied by Mr. John J. Case, a smelting expert, who was investigating the property and adjacent mines of the district on behalf of a syndicate which proposes to put up a copper smelting plant. It is understood Mr. Case's report will be favorable to the project. A plant of a capacity of 800 tons per day is contemplated.

**Dolliver Mountain Mining & Milling Co.**—In a letter to the REVIEW, Mr. G. J. Partington, the energetic manager of this enterprise, describes the progress being made with the opening out and equipment of this promising property at Isaac's Harbor, N.S. He writes: "It may interest you to know that we have been pushing the work here with all possible speed. Our dams, 4,200 ft. of flume, large penstock, and a power-house are all finished. The electric, air compressor, and water-wheel machinery are also on the ground and we are just about to install same. The only thing lacking to complete the work is 500 ft. of 44-in. steel pipe to connect penstock to water-wheel. This pipe is expected daily in Halifax and on arrival will be rushed down to us. We have had quite a battle here, but have won out so far, and trust to be able to turn on the electric fluid some time in February. But the greatest victory of all is our mining work. In the prospecting, or preliminary work, undertaken to gain sufficient knowledge of the property to decide the location for our vertical shaft, I uncovered and traced three ore bodies around the fold or saddle, at sufficient distance apart to obtain a fairly

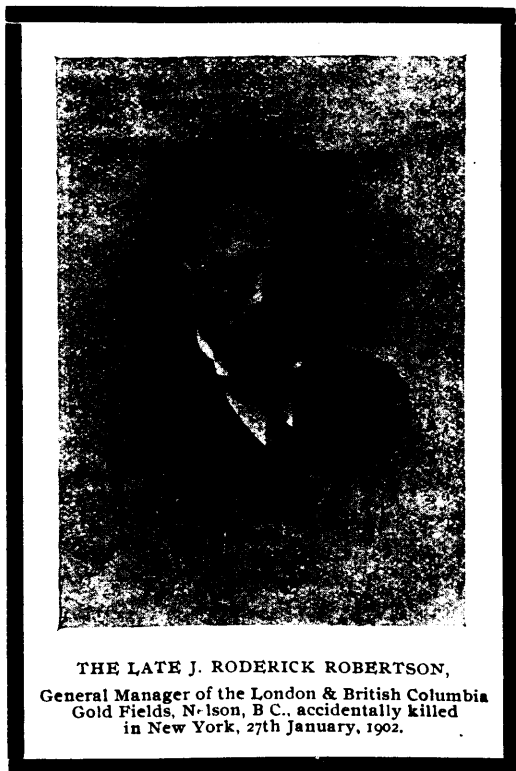
accurate idea of the course of the axis of the anticlinal. The vertical shaft was then located. As we intend to sink this shaft to a depth of 1,000 ft. and expect to have it supply ore to keep 120 stamps busy, provision had to be made to take care of this tonnage when we reach the productive stage. I therefore decided that we should have two hoisting ways and a compartment for ladders, pump and air pipes, and service cage. To do this our shaft in the rock must be 20 ft. long by 8 ft. wide. The surface, through which we had to sink, proved to be quicksand from the grass roots, and to combat that and the depth which, to some extent, was known, I had to start the surface shaft 35 ft. long by 20 ft. wide. It would be difficult to write at length an account of the battle royal this furnished, but we won the shaft to the bedrock, leaving sufficient room to bring up our permanent cribbing and a space for tamping in clay to act as a cofferdam, thus giving us a dry shaft so far as surface water was concerned. We passed through 55 ft. of quicksand and uncovered the bedrock in a choice position, the crown, or axis, of the anticlinal being exactly in the centre of the shaft, with the north, south and east dips well defined. The rock uncovered was smooth, almost polished, and is evidently the quartzite footwall of an ore body just east of the shaft. We are now 8 ft. in this rock and have suspended work pending the installing of permanent timber. About 30 ft. of this timber is in place and cofferdammed and the work is being pushed with all possible speed. When finished we trust to be nearly ready to start work with air drills, but if not will continue with hand steel until the drills may be used. Our mill site has been graded and the foundation walls practically completed, so we may start the erection of building very early in the spring. This building will be 154 ft. by 69 ft. and will cover 80 stamps, with concentrators, etc.

Velvet (Rossland).—It is proposed to reconstruct the company, the scheme providing for an assessment of 2s. 6d. per share, which will produce a sum of £25,000. A meeting of shareholders is called for the 8th inst. to consider the proposal.

**The Late J. Roderick Robertson.**

The last form of the present issue of the REVIEW had gone to the printer before a brief despatch in the evening paper conveyed the sad intelligence of the accidental death in New York of our old friend Mr. J. Roderick Robertson, of Nelson, B.C. Mr. Robertson, it appears, was sitting in his room at the Murray Hotel, when a tremendous explosion of dynamite occurred in a structure at 2nd Street and Park Avenue, used by the contractors of the Rapid Transit Subway, a quantity of iron was thrown through his window and struck him as he sat in his chair, killing him instantly.

Mr. Robertson was the General Manager of the London and British



Columbia Gold Fields, one of the largest, best managed, and most successful British corporations operating mines in British Columbia, and much of the success of this enterprise was due to his keen foresight and sound business methods. Mr. Robertson was also the President of the British Columbia Mining Association. A Scotchman by birth, Mr. Robertson was widely known and greatly respected not only in British Columbia but in other parts of Canada. He was in every sense a lovable character and will be greatly missed particularly by the mining fraternity of Western Canada.

**Black Eagle Gold Mining Co. (Regina Mine)**—The following is an extract of letter received by the company from their manager on the 4th inst.: "I started the machinery yesterday (19th December, 1901) and everything, as a whole, works like a clock, barring a few minor details, which, as usual in starting a large plant like this require adjusting. At the end of another week thirty stamps will be kept dropping night and day for the month of January, and on the last day of that month I will make my first general monthly clean up, when results satisfactory to all concerned may be expected, and, I feel confident will be realized."

**Bosun Mines.**—Manager reports 180 tons galena shipped during December. Smelter returns for 160 tons \$5,935.



**General Mining Association of the Province of Quebec.**

The Annual General Meeting of the Association will be held in the Library of The Canadian Mining Institute, Room IV., Windsor Hotel, Montreal, on Wednesday, 5th March, 1902.

G. E. DRUMMOND,  
*President.*

B. T. A. BELL,  
*Secretary.*

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- (B) Analytical Chemistry and Assaying.

**2—Four Years' Course for a Degree B.Sc. in**

- (A) Mining Engineering.
- (B) Chemistry and Mineralogy.
- (C) Mineralogy and Geology.

**3—Courses in Chemistry, Assaying, Mineralogy,**

and Geology for degrees of Bachelor of Arts (B.A.) and Master of Arts (M.A.)

For further information see the Calendar of Queen's University.

**4—Post-Graduate Course for the Degree of**

Doctor of Science (D.Sc.)

For further information see the calendar of Queen's University.

Next Session begins October 3rd,

. . . 1900 . . .

Matriculation Examination held at Queen's University, Sept. 20th.  
Unmatriculated Students admitted to Special Courses.

The School is provided with well equipped Laboratories for the study of Chemical Analysis, Assaying, Blowpiping, Mineralogy, Petrography and Drawing. In the Mining Laboratory the operations of Crushing, Amalgamating, Concentrating, Chlorinating, Cyaniding, etc., can be studied on a large scale.

FOR CALENDAR OF THE SCHOOL AND FURTHER INFORMATION APPLY TO

**Dr. W. L. GOODWIN,**

DIRECTOR

SCHOOL OF MINING,

KINGSTON, ONTARIO.

# Did You Hear the Thunder?

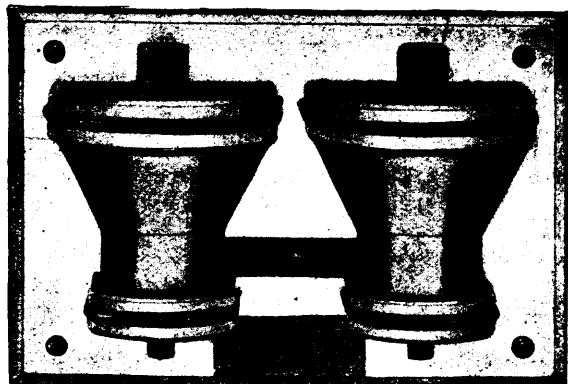
Where there is thunder there is lightning.  
Every electric plant should be provided with  
Lightning Arresters which will **PROTECT!**

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IS THE

# TIME

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## CANADIAN MINING INSTITUTE ANNUAL MEETINGS.

The ANNUAL GENERAL MEETINGS of the MEMBERS of THE CANADIAN MINING INSTITUTE, for the Transaction of Business, the Discussion of Papers, etc., will be held in the

**CLUB ROOM, WINDSOR HOTEL, MONTREAL,**

On Wednesday, Thursday and Friday, 5th, 6th and 7th March, 1902.

**SINGLE FARE ON RAILWAYS.**

Arrangements are being made whereby Members will be carried to Montreal and returned for a **Single Fare** on the Canadian Pacific, Grand Trunk, Intercolonial, Quebec Central, and Canada Atlantic Railways.

**SPECIAL TOPICS FOR DISCUSSION.**

In addition to a record programme of papers to be presented by the most eminent mining authorities in Canada, the following Topics have been slated by the Council for special discussion:—

**GOVERNMENT AID TO MINING.**

By Mr. JOHN E. HARDMAN, S.B., M.A.E., Montreal, Que.

**COMPRESSED AIR.**

By Mr. W. L. SANDERS, New York, N.Y.

**COLLIERY VENTILATION.**

By Mr. CHARLES FERGIE, M.E., Westville, N.S.

**POWER DRILLS.**

By Mr. C. C. HANSEN, Montreal, Que.

**HAULAGE.**

By Mr. WM. BLAKEMORE, M.E., Montreal, Que.

**PUMPING.**

By Mr. JOHN P. NORTHEY, Toronto, Ont.

Syllabus of papers and detailed programme of arrangements will be sent to members in due course.

CHARLES FERGIE, *President.*

B. T. A. BELL, *Secretary.*

## NOW READY

ELEVENTH EDITION

### The **Canadian Mining Manual**

FOR 1901

Up to date particulars of the Organisation, Equipment, Operations, Output, Balance Sheets and Dividends of all Canadian

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### THE CANADIAN MINING REVIEW

OTTAWA, CANADA.



## 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. C. E. CHURCH,**

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.

# 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 unsurveyed territory, \$5 for every 100 acres, and (2) in surveyed 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 HON. THE COMMISSIONER OF COLONIZATION AND MINES,  
PARLIAMENT BUILDINGS, QUEBEC, P. Q.



# 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 \$10.00 per acre for soft coal, and \$20.00 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at such rate as may from time to time be specified by Order in Council 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 \$10.00 per annum for an individual, and from \$50.00 to \$100.00 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 fifteen 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 \$5.00.

At least \$100.00 must be expended on the claim each year or paid to the Mining Recorder in lieu thereof. When \$500.00 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 exceeding 160 acres.

The patent for a mining location shall provide for the payment of royalty on the sales not exceeding five per cent.

#### PLACER MINING, MANITOBA AND THE N.W.T., EXCEPTING THE YUKON TERRITORY.

Placer mining claims generally are 100 feet square; entry fee \$5.00 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 \$10.00 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 \$10,000.00.

#### 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 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, \$100.00 per mile for first year, and \$10.00 per mile for each subsequent year. Royalty ten per cent. on the output in excess of \$15,000.00.

#### 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 obtained 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, and each person in his or its employment, except house servants, must hold a Free Miner's Certificate.

The discoverer of a new mine is entitled to a claim 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 \$15.00. Royalty at the rate of five per cent charged on the gross output of the claim, with the exception of an annual exemption of \$5,000.00.

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, not exceeding ten in number, may work their claims in partnership, by filing notice and paying fee of \$2.00. 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 \$200.00, or in lieu of work payment may be made to the Mining Recorder each year for the first three years of \$200.00 and after that \$400.00 for each year.

A certificate that work has been done or fee paid 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*.

#### HYDRAULIC MINING, YUKON TERRITORY.

Locations suitable for hydraulic mining, having a frontage of from one to five miles, and a depth of one mile or more, may be leased for twenty years, provided the ground has been prospected by the applicant or his agent; is found to be unsuitable for placer mining; and does not include within its boundaries any mining claims already granted. A rental of \$150.00 for each mile of frontage, and a royalty of five per cent. on the gross output, less an annual exemption of \$25,000.00 are charged. Operations must be commenced within one year from the date of the lease, and not less than \$5,000 must be expended annually. The lease excludes all base metals, quartz and coal, and provides for the withdrawal of unoperated land for agricultural or building purposes.

#### PETROLEUM.

All unappropriated Dominion Lands shall, after the first of July, 1901, be open to prospecting for petroleum. Should the prospector discover oil in paying quantities he may acquire 640 acres of available land, including and surrounding his discovery at the rate of \$1.00 an acre, subject to royalty at such rate as may be specified by Order in Council.

**JAMES A. SMART,**

Deputy of the Minister of the Interior.

# 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 1900 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.

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

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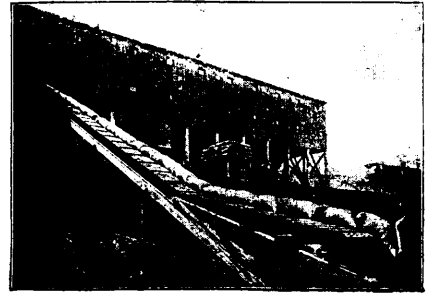
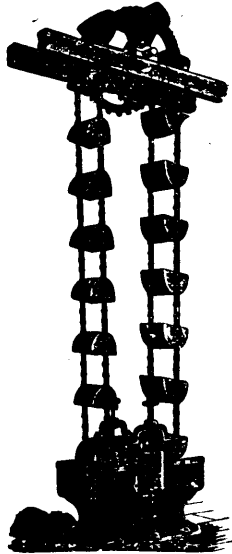
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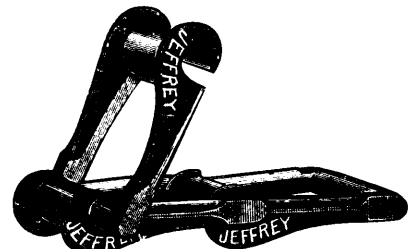
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