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EIGHTEENTH YEAR OF PUBLICATION

The CANADIAN MINING REVIEW

Established 1882

Vol. XIX—No. XII. OTTAWA, DECEMBER 31st, 1900. Vol. XIX—No. XII.

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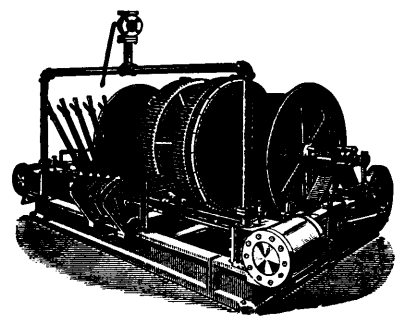

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We are manufacturing headquarters for all classes of Pumping Machinery. We have been in this business for a great many years and have given special attention to the construction of Mine Pumps. We are prepared to quote on Station Pumps; Pumps for bad Mine water; Pumps actuated by Electricity, Compressed Air or Steam; Sinking Pumps or Pumps for any special duty.

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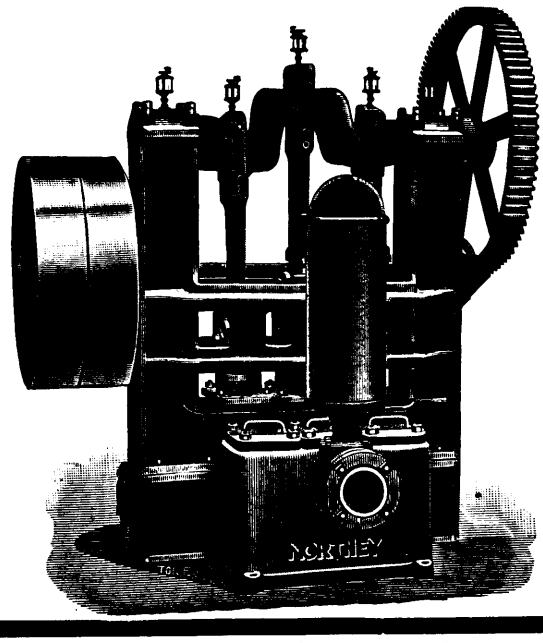

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18th YEAR OF PUBLICATION.

The Canadian Mining Review

Established 1882

THE OLDEST AND ONLY OFFICIAL MINING AND ENGINEERING JOURNAL PUBLISHED IN THE DOMINION OF CANADA.

B. T. A. BELL, Editor and Proprietor. Secretary, Canadian Mining Institute, etc.

Published Monthly.

OFFICES { Sinter Building, Ottawa; Windsor Hotel, Montreal.

VOL. XIX., No. 12. DECEMBER, 1900. VOL. XIX., No. 12.

The Centre Star Report.

We have been favored with a copy of the Report of the Directors of the Centre Star Mining Company, Limited, submitted on 27th ultimo, to the second annual meeting of shareholders. Since the market price of this stock has ruled between $1.40 and $1.60 during the time it has been on the market we have carefully studied this document with the object of ascertaining the facts and reasons why this premium of 40 p.c. to 60 p.c. should obtain.

The report of the Directors contains no statement particularly new or worthy of notice, but is remarkable for some things it does *not* say, for example—no allusion is made to Mr. John B. Hastings' retirement from the staff of the Gooderham-Blackstock properties; no parting words of praise or of blame are given, but 40 p.c. of the Directors' Report is devoted to Mr. Wayne Darlington, and extracts from his communications. Three lines contain all the allusions made to the historic circulars dated January 16th and February 5th, 1900, which knocked away the props from the "War Eagle" boom and delayed the placing of the Centre Star stock on share-lists Also, it would have been interesting to the public to have had *in print* some of the Vice-President's declamations which have been heard *in private*.

The Directors make a brief allusion to the existing differences between the Company and the Canadian Smelting Works regarding treatment charges at Trail which at present amount (including transportation) to $6.00 per ton, and hint, though very briefly, that negotiations exist which look to the smelting of their ores at cost. It is stated that the average rate of shipment since September 4th has been 2,000 tons per week.

From the financial statement printed we learn that $3,300,000 of the total capital of $3,500,000 is issued and therefore liable, or rather available, to receive dividends. The profit and loss account for the year is put at $182,122, and there are among the liabilities a personal one to George Gooderham of $30,000, and a corporate one to the Bank of Toronto of $227,000. With these liabilities existing it would be permissible to ask the Directors to explain the payment of a dividend amounting to $35,000; especially since the loss is some $68,000 greater than in 1899. The loss on operating account was $37,223.69, decreased by interest and fees to $33,574.51, which added to the loss or deficit of the preceding year makes a total of $147,121; in the face of this the Directors pay dividend No. 1, amounting to $35,000, which increases the total deficit to $182,122. There are misguided people who will think such a procedure very wrong, but it certainly was kind of the President to advance the money for this dividend out of his personal account.

The report of General Manager Kirby begins with a table showing the net tonnage sold and the values received; we have alluded in previous issues to the form in which this Company chooses to give its shareholders a statement of the values and smelter charges, but it is not difficult to pick out the figures which concern directly the investor. The gross value of the 24,525 tons shipped appears to have been $16.50 per ton, against which is charged $6 per ton for freight and treatment, $6.73 per ton for expense of development, and $3 per ton for stoping expense, or a total cost of $15.73: the margin therefore would appear to be only *84 cents* per ton. It may be noted that the actual stoping cost, as given by the last table in the report, is $3.59 which is reduced by Mr. Kirby to $3.00 through adding to the tonnage obtained from the stope the ore taken out in development. The actual cost however, so far as stoping alone is concerned, would add another 59 cents or a total cost of $16.32 against a total value of $16.57—a margin of profit of 25 cents per ton, considering the stopes only. These costs are not so very far removed from similar costs at the adjoining mine, the War Eagle, with the exception of the cost of development per ton of ore sold. Comparing the figures in the last annual statement of the War Eagle Co. we find (the transportation charge being the same) the cost of ore extraction for the last three months of their year amounted to $5.23, or a total amount of $11.22 charged against the value of the ore. Assuming that the costs in the War Eagle for the last three months of 1899 will be approximated in future workings of the Centre Star, and assuming that the smelting charge will ultimately be reduced to two-thirds of the present price, *i. e.* to $4.00 per ton, the actual future cost of extracting, shipping and smelting a ton of ore will not be far from $9.22. This figure reminds us that the Montreal *Herald* in an able discussion of the War Eagle property last spring put the total costs at $9.00 per ton.

From Mr. Kirby's report it would appear that the development work done has now shown conclusively that the pay ore of the Centre Star mine is confined to the west or main ore shoot, that is to the ore shoot lying close to the Le Roi property. Mr. Kirby says "The ore of the east shoot is of an average grade which is below the present pay limit." The west shoot, or what is today the ore shoot, Mr. Kirby informs us, appears to have a length of about 350 feet *on an average*, with a width ranging from 5 to 45 feet, and a grade of $30, as highest, down to the pay limit which is not stated, and which may be taken, in view of the tables given, as not less today than $12.00. This shoot is continuous from the main tunnel level, or the mouth of

the shaft down to the fourth level; it has a depth on the vein of 431 feet. It must be noted however that between the second and third levels (*i.e.* from 165 to 304 feet) the shoot ceases to be pay ore, and changes into material too low in value to furnish a profit at present. The total production from this main ore shoot to the 30th of September is given at 31,121 tons, all of which has come from above the fourth level and has averaged $11.06 after deducting the $6 00 charged for smelting. Mr. Kirby's estimate of the present ore reserves above the third level is 100,000 tons; he does not think the fourth level ore body sufficiently developed as yet to be estimated; but its value is put by him at about $4,00 less per ton than the average value of the ore extracted above. On the supposition that this body will extend from the fourth level upwards to a height of 50 feet the contents will be close to 20,000 tons, which will make a total ore reserve in sight of 120,000 tons. By way of parenthesis we may say that if this 120,000 tons is added to the 31,000 tons above mentioned we get a grand total of 151,000 tons which closely approximates the figure of 160,000 estimated in February by Mr. Darlington.

Concerning the eastern ore body, which is too low grade to be mined, the only point of interest is that Mr. Kirby puts the value between $5.00 end $8.00 to the ton, or say an average of $7.50; we note, however, that the assay values given in the full text of the report are $4.50, $4.20, $4.70, $7 00, $4.10, $8.60; which give an average rather less than above $4.00.

The significant statement concerning the east ore shoot is that the management admit that at the present time $7.50 ore cannot be produced at a profit, which is evident from the figures we have already given of the actual costs at the present time. By referring to the full text of the report those of our readers who are at all *au fait* in mining matters will see that not only has this mine one "lone" ore shoot, but also that this ore shoot in the upper levels has been so faulted and disturbed that the estimate of reserves given is certainly abundantly large.

We have repeatedly pointed out in these columns the necessity of considering the difference between mining investments and ordinary investments, and we have shown that a mine must earn, not only its fixed charges, but such a percentage upon the amount of capital invested as will provide for the return of that capital and for a satisfactory interest upon it during that process. In other words we have shown that, unless a mine is exceptionally well developed with an abundance of ore in reserve, such as very few but large mines have, at least 15 per cent. per annum should be considered as a necessary return.

The capital stock of this Company issued, and on which dividends must be paid, is $3,300,000; a yearly dividend of 15 per cent. on this amount equals $495,000 annually, or in round numbers $500,000. We have seen that at the present time the available profit on Centre Star ore is 24 cents per ton, with a possible increase to 84 cents a ton; assume the average of these figures at 50 cents per ton, it will then be seen that with such a margin the property must handle 1,000,000 tons of ore per year in order to return the dividend necessary. Since Mr. Darlington put the total amount in sight last February at 160,000 tons, and Mr. Kirby under date of September 30th puts the total amount in sight at 120,000 tons, our readers can judge for themselves the probability of this property making an output of 1,000,000 tons per annum. To engineers who know the figures and are capable of drawing correct conclusions from them, the outlook certainly does not justify the price of $1.50 for Centre Star stock. At that price the mine would be worth $5,000,000; from the amount of ore reserves in sight and the net profit thereon the valuation of the mine, by conservative engineers, would not exceed the sum of $200,000. It is a trite maxim with business men that figures talk, and that nothing but figures should be considered in investments. We commend to their perusal and to their arithmetical calculations the data shown in this report.

"DIRECTORS' REPORT.

"Submitted herewith are the statement of accounts and the report on the mine, brought down to the 30th September last.

On the 5th day of February last for reasons, some of which were then disclosed and others of which have since become sufficiently clear, the mine was closed down.

Two months later your Directors were enabled to introduce the contract system of mining under which payment is made for the work done instead of for the time employed. Under this system the development of the mine is now developing at about twice its former rate, while the miners are able to earn higher wages and the cost to the Company is at least 30 per cent. less.

Further benefits too have accrued from the fact that the larger wages earned under this system are attracting a superior class of miners to the camp.

During the time shipments were suspended the new hoist and compressor, which had been previously ordered, were installed and are now working satisfactorily, as more fully appears from the Manager's Report submitted herewith.

As you are doubtless aware it has been the custom in British Columbia mines to work on Sundays as on week days. As this seemed objectionable on many grounds your directors determined last summer to test the practicability of closing down on Sundays. The experiment has been in operation since the 1st of September, and so far has proved satisfactory.

Next in importance to the question of mining costs and our relations with labor, is the question of smelting rates. This has engrossed the attentiod of the Directors during the last five months. Under the existing contract this mine and the War Eagle are bound to deliver nearly 200,000 tons at a charge for freight and treatment of $6.00 per ton. The Canadian Pacific Railway has offered to cancel this contract and substitute therefor another providing for the delivery of 600,000 tons at a rate averaging $1.25 per ton less than the one now in force.

Your Directors, while recognizing the fair spirit in which the Canadian Pacific Railway has approached the discussion of this matter, have not been able to see their way to tie up the mine for so long a time at that rate, and preferred to fulfil the present contract. Shipments were accordingly recommenced on the 4th September, and since then have been continued at the rate of about 2,000 tons per week.

Negotiations, however, are still afoot looking to the smelting of the Company's ores at cost. About this it would be premature to say anything further at present.

Your Directors have had the benefit of the assistance of Mr. Wayne Darlington, the eminent American mining engineer, throughout these negotiations, and take this opportunity of thanking him for his conspicuous services.

Mr. Darlington has during the year made several reports upon the mine, from which the following extracts are taken:—

From a telegram dated 7th February, 1900:

(a) 'My estimate of the ore in sight is 160,000 tons, and the estimated value is $1.800,000, of which $950,000 is available for dividends, besides which the low-grade ore body, 61,000 tons, has so far been unprofitable, but now shows considerable signs of improving in the lower levels eastward. In addition to this there are a great number of tons of low grade ore, of too low a grade for shipment at present. In the bottom of the shaft the vein carries 18 feet of first-class ore. The mine is looking well and promises better. Concerning shut-down, I believe it will probably result in cheaper work. Future prospects are excellent.'

From a report dated 10th February, 1900:

(b) 'The Centre Star has a great future; greater, I think, than any yet opened in the district.'

From a letter dated 23rd October, 1900:

(c) 'The Centre Star is improving in depth. The fourth level is opening out a very fine body of ore in the west, and on both sides of the fault, which broke up the third level, while the fifth level, 175 feet deeper, has broken into a fine body of ore where the station is just being cut at the shaft. This new level should be entirely free of the fault in the west end, and great things are expected of it. Although I have been through the Le Roi mine, and have seen the stopes 100 feet wide, I must still hold to my belief that the Centre Star will yet prove the biggest mine in the Rossland camp.'

In conclusion your Directors desire to express their appreciation of the manner in which the Company's manager, Mr. E. B. Kirby, has managed its affairs throughout the past year, often under very critical circumstances, and to say of the office staff generally that it has continued, both at the

Head Office and at Rossland, to fulfil its duties in a manner satisfactory to the Board.

All of which is respectfully submitted.

GEORGE GOODERHAM, *President.*

Toronto, 27th November, 1900.

FINANCIAL STATEMENT FOR THE YEAR ENDING 30TH SEPT., 1900.

Assets.

Centre Star Mine		$3,300,000 00
Cash in Bank of Toronto, Toronto		365 45
Stores on hand as per inventory		11,258 08
Machinery, buildings and equipment		225,835 97
Furniture of Offices		1,113 46
Invested in War Eagle Hotel		12,000 00
Unexpired Insurance		500 00
Accounts Receivable		74,040 49
		$3,625,113 45
Profit and Loss		182,122 10
		$3,807,235 55

Liabilities.

Capital Stock		$3,500,000 00
George Gooderham		30,108 03
Bank of Toronto, Rossland		227,127 52
Working Capital		50,000 00
		$3,807,235 55

PROFIT AND LOSS ACCOUNT.

Dr.

To Balance		$113,547 59
" Cost of mining and developing	$238,715 52	
" Diamond drill prospecting	11,565 64	
" Extralateral litigation	30,953 22	
" Other legal expenses	2,500 00	
" Registration fees	2,117 20	
" Consulting engineer's salary	3,000 00	
" Toronto office expenses	735 64	
" Travelling expenses	244 50	
" Sundry expenses	3,347 41	
		293,179 43
" Dividend No. 1		35,000 00
		$441,727 02

Cr.

By net proceeds from ore sales	$259,108 19	
Less Provincial ore tax	3,152 45	
		$255,955 74
" Transfer fees		117 75
" Interest		3,531 43
" Balance		182,122 10
		$441,727 02

GENERAL MANAGER'S REPORT.

The Centre Star-LeRoi vein is a strong well-mineralized vein, which, in general, is 20 to 40 feet in thickness, and has a dip of 70 degrees from the horizontal. The two neighboring properties adjoin each other, and their underground workings are connected. On the west, the Le Roi mine, which is the older of the two enterprises, has now developed the vein for 1,500 feet along its length, and 900 feet in depth. The ground thus opened up has been found very productive, and has so far given no indication of any decrease of productiveness with depth.

On the east, the Centre Star Mine has developed the vein, speaking generally, for an average distance of 1,000 feet along its length, and to the fourth level, a depth of 431 feet measured on the vein. The main shaft is going down rapidly and has nearly reached the fifth level, located at a depth of 609 feet, measured on the vein. This exploration has exposed two ore shoots, one known as the west or main ore shoot, and the other as the east or low-grade ore shoot. Practically all of the pay ore so far discovered, *i.e.*, under present conditions—is contained within the limits of the main ore shoot. The ore of the east or low-grade shoot is of an average grade below the present pay limit, but it will be available later on when the costs of mining and treatment are sufficiently reduced. As a rule, the vein exposed outside of the limits of these two shoots is either barren, or so low in grade, as to be of no prospective value.

THE MAIN ORE SHOOT.

The main ore shoot is irregular in form, so that its average dimensions and trend will not be clear until the work has extended to greater depths. It appears to have a dimension of 300 to 450 feet along the vein, and is located in the 510-foot space between the shaft and the Le Roi territory on the west. As usual, the vein area included within the shoot-limits carries pay ore in irregular patches or masses, interspersed with barren material or ore too low grade for pay. The different pay ore bodies vary in grade from $30 down to the pay limit, and range from 5 to 40 feet in thickness. The vein structure is somewhat complicated by numerous dikes and faults.

In the upper levels the shoot has a dimension of 300 feet along the vein, and shows a continuous body of pay ore extending from the surface down to a point between the second and third levels, where it changes into barren material or low-grade ore. At some point between the third and fourth levels, this again changes into pay ore. On the fourth level the shoot has been explored for 450 feet in length, the pay ore bodies so far aggregating over 300 feet of this distance. The block between the third and fourth levels has not yet been explored, and how far the pay extends above the fourth level is at present unknown.

The main ore shoot has yielded almost the entire past production of the mine. This came mostly from the upper ore body, a small proportion having been derived from the shaft and fourth level development work. This production amounts to 31,121 tons, averaging $17.06 smelter's gross assay value. The average metallic contents were gold, 0.793 ounces per ton; silver, 0,365 ounces per ton copper, 1.25 per cent. The present mine ore reserves above the third level are estimated as about 100,000 tons, and of an average smelter's gross assay value of $16.00. As explained, the fourth level ore body cannot yet be estimated, but its exposures along the fourth level indicate an average smelter's gross assay value of $12.00. If it extends to an average height of 50 feet above the level this block will contain 20,000 tons. The ore body is found in the shaft for 30 feet below the fourth level, and its dip then carries it away from the course of the shaft. The fact that the fourth level ore is of lower grade than that in the upper levels is not proof of any permanent change of the shoot with depth. It is probably due to one of the fluctuations usual in the ore shoots of Red Mountain, and it is likely to average up with richer bodies as the shoot is explored to greater depths. In this respect it is not likely to differ materially from the neighboring Le Roi shoot which is now developed to a depth of 900 feet.

THE EAST OR LOW-GRADE ORE SHOOT.

This ore shoot is located about 390 feet east of the shaft. It is explored mainly by old workings, and is also partially developed by the third level. Owing to the fact that only small patches of pay ore have been found within its limits, little effort has been made to define its extent, or to establish the exact average value of its contents by a number of trial shipments. This work was put off to a later date, when reduced costs of mining and treatment would make these contents available. Developments, so far, indicate a large ore body, with a dimension of several hundred feet along the vein, and an average grade between $5.00 and $8.00, smelter's gross assay value.

DETAILS OF DEVELOPMENT.

First Level.—Same elevation as the top of shaft.

The first or tunnel level is located west of the main shaft. It crosscuts the formation for 100 feet and then follows the vein in ore for 230 feet. The ore is exposed for 5½ feet of its width, averaging $23.50, smelter's gross assay value. Two crosscuts show a total width of ore of 19½ feet, averaging $14.40, smelter's gross assay value.

Second Level.—165 feet in depth, measured on the vein.

This level runs west to the Le Roi line. It encounters the ore shoot 180 feet west of the shaft, and continues in pay ore to a point about 410 feet west. This body is being stoped. The ore is 20 to 40 feet wide, averaging $16.50, smelter's gross assay value. Three raises connect with the first level above, all being in solid ore of this grade. At 410 feet west, the vein is shifted by a fault, but beyond the fault the pay ore continued for 90 feet to the Le Roi line. This portion is stoped out.

The second level east is an old tunnel, the mouth of which is 870 feet east of the shaft. It cuts occasional areas of low-grade ore, the principal one being the east or low-grade ore shoot located about 390 feet from the shaft. The shoot above the level is exposed more or less by old workings which include a shaft, upraise, and intermediate level, with crosscuts.

Third Level.—304 feet in depth measured on the vein.

The third level west runs to the Le Roi line. From 80 to 140 feet west, crosscuts expose ore 16 feet wide, averaging $6.00, smelter's gross assay

value. A. 220 feet west a crosscut exposes ore 34 feet wide, average $10.00, smelter's gross assay value. At 220 feet west, raise No. 386 connects with the second level. The lower half of this raise is low grade, and the upper 60 feet in pay ore. At this point an intermediate drift exposes ore for 135 feet of its length and for its full width, averaging $16.50, smelter's gross assay value. Three hundred and ninety-five feet west of the shaft raise No. 387 connects with the second level. The lower part of this is low grade, but the upper 25 feet exposes ore for its full width, averaging $6.40, smelter's gross assay value.

The third level east extends to a point 630 feet from the shaft. At 80 feet east of the shaft, a crosscut shows the ore 25 feet wide, averaging $4 50, smelter's gross assay value. From 80 to 120 feet east, the ore exposed for the full width of the drift averages $4.20, smelter's gross assay value. From 120 feet to 210 feet, no value. From 210 to 230 feet, $4.70, smelter's gross assay value. From 230 to 285 feet, no value. From 285 to 375 feet the ore exposed for the width of the drift averages $7 00, smelter's gross assay value. From 375 feet to 425 feet, no value. From 425 to 590 feet exposes ore for the full width of the level, averaging $4.75, smelter's gross assay value. From 590 to 630 feet, vein barren. Five hundred and thirty-five feet east of the shaft, raise No. 353 connects with the second level. The lower 26 feet exposes 6 feet of ore, averaging $4.10, smelter's gross assay value. The upper 74 feet exposes 6 feet of ore, averaging $8 60, smelter's gross assay value.

Fourth Level.—431 feet in depth measured on the vein.

The fourth level west extends 460 feet from the shaft. The first 88 feet exposes ore 10 feet wide averaging $13 00, smelter's gross assay value. From 88 feet to 115 feet is barren. 115 feet to 140 feet exposes ore for the full width of level averaging $9.40, smelter's gross assay value. At 140 feet, the vein is shifted by a fault. The level after passing through the faulted ground crosscuts the vein at a point 240 feet west of shaft, where it is found 21 feet wide, averaging $11.50, smelter's gross assay value. 300 feet west of the shaft, the level encounters another fault, on the other side of which the ore has been exposed for 100 feet, averaging 12 feet in width, and $11.50, smelter's gross assay value.

The fourth level east extends to a distance of 130 feet from shaft. The first 30 feet exposes ore 10 feet wide, averaging $13.00, smelter's gross assay value. From 30 feet to 60 feet, vein barren. From 60 to 120 feet, the ore is 4½ feet wide, averaging $4.40, smelter's gross assay value.

480 feet west of the shaft, an old shaft, extended by a winze, has a total depth of 700 feet from the surface.

Fifth Level.—609 feet in depth measured on the vein.

The shaft has nearly reached this level.

GENERAL REMARKS.

At the beginning of the fiscal year, the machinery equipment of the Centre Star Mine consisted of a small compressor and hoist, intended for temporary use in maintaining development and a small ore production. A new steam hoist and compressor were ordered, and construction of the permanent plant and equipment was begun. On February 6th it became necessary to temporarily suspend shipments from the mine and cease dividends, for the reasons explained in the following letters:

ROSSLAND, B.C., Jan. 16, 1900.

The Centre Star Mining Co., Limited, Toronto, Ont.

Gentlemen,—The stoppage of War Eagle shipments makes it necessary to also suspend shipments from the Centre Star Mine. As you are aware, the Centre Star hoisting equipment is only temporary, and was intended merely to bridge over the interval until the new machinery and headworks are in place. The minimum tonnage required by the smelter has been made up from the joint productions of the Centre Star and the War Eagle mines. The Centre Star equipment is sufficient to handle its present share of the tonnage, but it is not able to meet the requirements of the mine if a large production is attempted. The new machinery has been greatly delayed by the inability of manufacturers to get their materials on time. Moreover, our construction is being pressed in the dead of winter, in the face of unusual difficulties. It will therefore be several months before the new equipment is in place. Meanwhile we will be able to continue our development and to place it well in advance.

Respectfully yours,

EDMUND B. KIRBY, *Manager.*

TORONTO, 5th February, 1900.

To the Shareholders of The War Eagle Consolidated Mining and Development Co., Limited, and the Centre Star Mining Co, Limited.

Dear Sir,—In accordance with the advice of the management at Rossland, as set forth in the accompanying letters, the Directors have decided to close down the mines for the present. We desire to add that we have every confidence in the future of the mines when the plant, etc, is in good working condition.

Yours truly,

GEORGE GOODERHAM, *President.*

It was decided to take advantage of the opportunity afforded by the stoppage to make a radical change in the method of employing labor. The costs of mining during the preceding year were very exces ive, and it had long been apparent that the principal cause of this unusual expense was due to the inefficiency of wage labor under the conditions prevailing in Rossland. The quantity of work done per man for the wages paid was not satisfactory. Repeated efforts had shown that it was impossible to make any satisfactory improvement under this system, and it was therefore decided to introduce the contract system, whereby miners would be paid according to the quantity of work performed, instead of by the time spent in doing it. On March 12th this system was presented to the employees of the Centre Star, War Eagle and Le Roi mines. At first many of the miners opposed the change, fearing that it would be injurious to their interests. The issue remained unsettled for several weeks, during which the mines were closed. On April 5th the question was settled amicably with the miners, who decided in favor of adopting the new arrangement proposed. As the new system had to be inaugurated by degrees, it was some time before the development headings were fairly under way.

Under the contract system it was necessary to furnish contractors with a steady supply of compressed air for power. A large compressor, which was to ensure this air supply, had been contracted, under penalty, for shipment March 10th. Owing to unusual difficulties experienced by the manufacturers in securing their material, this shipment was unfortunately delayed until June 15 It arrived at the mine July 7th, and it was the latter part of August before the installation was completed and tested. During all this period the supply of power was sufficient for development work, which was steadily pushed. It was necessary, however, to defer steady ore production, and shipments did not begin until September 4th.

The reduction of costs effected by the contract system will appear in the cost sheet for the coming year. It does not show in the table of average costs for the past year, published herewith. These are excessive, because most of the work represented there was done under the old wages system. Moreover, it includes the fixed and general expenses during a more or less complete stoppage of nearly three months, and a subsequent period during which little ore was produced. The results of the new system are now clearly established by the work of several months, and the improvement shown is even in excess of what was expected.

In shaft sinking, 129 feet of contract work compared with the last 100 feet under the wages system, shows that the average rate of advance has been increased from 23½ feet per month to a present rate of 47½ feet per month. The cost for drilling, blasting, shovelling and timbering shows a reduction from $65.30 per foot of advance to $44.30 per foot. This comparison is on a basis of three shifts (12 men) daily, and a 30-day month.

In drifting, the rate of advance for headings has been increased from the former average of 52 feet per month by the wages system to the present average of 94 feet per month by contract. The comparison is on the basis of two shifts (4 men) daily, per heading, and a 30-day month. The cost of drilling and blasting shows a reduction from $8.93 per foot of advance to $5.41 per foot.

In stoping, by contract the average ore broken per man per shift for the month of September is 14.4 tons. The former average, under the wages system, was 4.3 tons. The cost of drilling, blasting and explosives for the same period was 37 cents per ton of ore broken, against a former average of 94 cents per ton under the old system.

The results of the new system have been equally satisfactory to the contractors, who have averaged good pay, considerably above the standard rate of daily wages.

The main features of the mine equipment are now completed. They include a 200 horse-power steam-geared hoist, large headworks nearly completed; a large compound condensing steam compressor of the latest design,

Comparative Statement of Work Done and its Cost, General Expenses Included, Per Foot or Ton, to September 30th, 1900.

and with a capacity of 3,960 cubic feet of free air per minute; a plant of several small compressors; and a boiler plant of 700 horse-power; a timber framing plant and also a repair and machine shop are now under construction. A large amount of work has been done in the way of accessory appliances, water supply, plant for fire protection, ore bins, grading, construction of timber yard, etc., etc.

The rate of production which it is desirable to maintain from the mine is fixed by the amount of pay-ore reserves in sight. The importance of not having ore extracted faster than it is exposed by the new development is self-evident. If, as is probable, the vein continues its productiveness at lower levels, the present rapid progress of development work should so increase these reserves that it will be possible to increase the rate from time to time.

I must also advise that, as soon as convenient, a suitable reserve be accumulated in the treasury. This is necessary to tide over the emergencies to which mining is always subject, such as fire, accidents, fluctuations in the ore shoot, additional plant, etc., etc.

In conclusion, I must add that we have been fortunate in securing the aid of an unusually able and energetic staff, and I take pleasure in expressing my appreciation of their earnest co-operation. The chiefs of departments are Mr. Carl R. Davis, E.M., Mine Superintendent; Mr. Alfred C. Garde, M.E., Mechanical Engineer, in charge of construction and machinery, and Mr. Charles V. Jenkins, in charge of the accounting and purchasing.

Respectfully yours,

EDMUND B. KIRBY,

Manager.

Comparative Statement of Work Done and its Cost, General Expenses Included, Per Foot or Ton, to September 30th, 1900.

	Oct. 1st, 1898, to Sept. 30th, 1899.			Oct. 1st, 1898, to Sept. 30th, 1899.			
	Work Done Feet or Tons	Total Cost	Cost Per Foot or Ton	Work Done Feet or Tons	Total Cost	Cost Per Foot or Ton	
DEVELOPMENT WORK							
General Work, Stations, Re timbering, Machinery Repairs, etc.	.....	$12,223 38	.....	.....	$15,216 59	.....	
Sinking—Main Shaft.....Feet.	344.	34,941 19	$101 57	228.5	28,250 81	$123 63	
Sinking—Small Shafts or Winzes "	319.5	16,075 95	50 31	103.5	6,107 39	59 01	
Raising ..... "	371.5	15,275 81	41 17	903.5	50,606 61	56 01	
Drifting ..... "	2,375.5	56,663 59	23 85	2,421.	64,942 85	26 82	
Total Development Work ... "	3,410.5	$135,179 92	.....	3,656.5	$165,124 25	.....	
ORE PRODUCTION							
Ore from Development Work, Sold....Tons	63.5	.....	.....	4,034.94	.....	.....	
Ore from Dumps, Storage, etc. " .... "	.....	.....	.....	.....	.....	.....	
Stoped Ore Sold..... "	6,533	$19,054 59	$2 91	20,489.95	$73,591 27	$3 59	
Total Ore Sold..... "	6,596.5	$19,054 59	$2 89	24,524.89	73,591 27	$3 00	
SUMMARY							
Expense of Development (per ton of ore sold)	6,596.5	$135,179 92	$20 49	24,524.89	$165,124 25	$6 73	
Expense of Ore Production " "	6,596.5	19,051 59	2 89	24,524.89	73,591 27	3 00	
Total Expenditure " "	6,596.5	$154,234 51	$23 38	24,524.89	$238,715 52	$9 73	

TOTAL HEADINGS OF CENTRE STAR MINE

September 30th, 1900.

	SINKING		RAISING	DRIFTING
	Main Shaft	Small Shafts and Winzes		
	FEET	FEET	FEET	FEET
Distance from present mouth of main shaft to point where sinking began.	3.5	.....	.....	.....
Portion of shaft length included in old tunnel	14.5	.....	.....	.....
Total measurements to Sept. 30, 1898...	.....	1019.	.....	3528.5
Advance of headings, Oct. 1, 1898, to Sept. 30, 1899.				
Development of mine	344.	319.5	371.5	2375.5
Development for litigation	.....	110.	.....	679.
Advance of headings, Oct. 1, 1899, to Sept. 30, 1900.				
Development of mine	228.5	103.5	903.5	2421.
Development for litigation	.....	40.5	242.	178.
Total mine development ...	590.5	1442.	1275.	8325.
Total development for extralateral litigation with Iron Mask Co.	.....	150 5	242.	857.
Total headings of the mine Sept. 30, 1900	590.5	1592.5	1517.	9182.

TABLE OF MINE COSTS

For Twelve Months ending September 30th, 1900.

	DEVELOPMENT WORK				Stoped Ore Sold
	SINKING Main Shaft	SINKING Small Shf's	RAISING	DRIFTING	
Total advance, feet	228.5	103.5	903.5	2421	.....
Ore stoped, tons.....	.....	.....	.....	.....	20490
COST PER FOOT.					COST PER TON.
Drilling and Blasting	$24 70	$20 13	$16 77	$7 25	$0 70
Explosives.....	4 39	5 19	4 06	2 45	11
General Mine Supplies.....	2 78	1 47	1 76	92	12
Mine Lighting—Candles.....	74	41	47	25	3
" " Electric.....	90	..	17	20	2
Smithing.....	1 99	1 90	1 94	77	8
Trimming and Shovelling—Direct.....	10 12	..	31	74	14
Trimming and Shovelling—Apportioned.....	6 30	5 06	5 01	2 44	48
Timbering—Labor.....	19 11	2 33	5 16	24	43
" Material.....	5 31	50	70	5	13
Machine Drill Fittings.....	1 46	1 53	1 83	65	6
General Mine Labor.....	6 90	2 85	3 77	2 11	27
Hoisting, Underground.....	10 44	8 69	..	..	..
" Main Shaft.....	6 57	..	1 70	1 63	22
Compressed Air.....	3 48	3 26	3 07	1 35	14
Mine Ventilation.....	1 26	50	71	38	5
Assaying.....	12	13	32	24	5
Surveying.....	1 71	50	65	39	4
General Expenses.....	15 35	4 56	7 61	4 76	52
Total.....	$123 63	$59 01	$56 01	$26 82	$3 59

ORE SOLD

Stoped.....20,489.95 tons
Met in Development..... 4,034.94 "

24,524.89 "

In addition to above tonnage there are on hand about 8,500 tons of ore, produced mainly from development and accumulated during the suspension of shipments.

CANADIAN MINING INSTITUTE.—The annual meetings of this representative Canadian organization of mining engineers and mine managers will be held in the Club Room, Windsor Hotel, Montreal, on 6th, 7th and 8th March next. The programme of papers, we understand, is if anything more liberal than previous years and that is saying a good deal for the energy of the Council. Mining men from all over the Dominion will be able to attend these meetings at a single fare rate, this concession having been granted by the Canadian Pacific, Grand Trunk, Intercolonial, Quebec Central, and Canada Atlantic railways.

Bell Island Iron Ores.

We are pleased to reproduce the following excerpt from a letter received from Mr. A. J. Moxham, Vice-President and General Manager of the Dominion Iron and Steel Company, Limited, concerning the quality of the iron ore being mined by the Company on Bell Island, Conception Bay, Newfoundland:—

"The Bell Island hematite has not the excess of phosphorus your article indicates; it will make pig iron running from 1.3 to 1.5 in phosphorus, which is about the average used in the English Basic Steel Works, while considerably lower than the average used in Basic Bessemer practice, which runs to 2 per cent.

The amount of ore above water level at Bell Island, is just what it has always been known to be. This is a matter of exact knowledge; not a matter of supposition, and as it is sampled, it improves in quality rather than the reverse.

The necessity for securing large supplies of ore from other sources is not a matter of importance to us in any shape. While we are sellers of pig metal, we purpose furnishing our customers exactly what they want and their wants are assorted. To this end we shall use other ores in admixture, in small quantities—sometimes to increase and sometimes to decrease the phosphorus and the manganese, as the case may demand. Even this is not a necessity, but it is considered a conservative course by the management until our markets have developed in positive lines. For the manufacture of our own steel the Bell Island ore cannot be improved upon."

Golden Star Reorganization.

The Golden Star Mining and Exploration Company of Ontario, Limited, which has had a career checkered with vicissitudes, giving rise to no little unfavorable comment and more or less justifiable suspicion, has aggravated the doubts entertained concerning it on the part of the general public through a call for support in a scheme of reorganization which apparently involves an assessment amounting in the aggregate to about $50,000. That a reorganization is needed would appear to be indubitable, but the company is placed in the very undesirable position of having no plan to offer at the coming meeting, or else of having one which it fears to submit to previous scrutiny. At all events its announcement is vague and singularly lacking in straightforwardness. The suspicions of the public are further encouraged by the total absence of any statement as to expenditures, of details as to these outlays, and of work done. If the money has been honestly expended, and we have no reason for thinking contrariwise, then the prospects of the company will be greatly improved by explicitly showing where it went. If the results have been negative this proves nothing against the property, if it still offers ground for hope under a reorganized management. It might demonstrate errors of judgment, but a reorganization is a confession of error which it is hoped to retrieve, and it is well that the stock-buying public should know just what errors have been committed. These would not condemn the company so strongly as an effort to escape censure by concealing the facts. We have been insisting upon the need of greater frankness in the official statements of the operations of mining companies, and the recent action of the Golden Star is an excellent example of the fault we have been condemning. This is the sort of thing that deters the growth of the mining industry, that warns away prudent business men from such ventures, and lowers them to the plane of gambling. If investors will severely ignore all companies which do not regularly issue lucid and detailed official reports, and put their money into those ventures which can present a clean sheet, the gambling element will soon be expunged from mining, to the good of all concerned.

Standard Mine Machinery.

A plea for standard mine machinery is put forward by *Mines and Minerals*, in its December issue, which must appeal to mine managers very strongly. Unfortunately the plea seems to be made in a luke-warm spirit, which probably reflects the writer's feelings as to the hopelessness of the attempt. But, is it hopeless? A similar feeling obtained many years ago among railroad men concerning rolling stock and general railway equipment, but today the tendency is all toward definite standards. While the engineering societies have done much to bring about this desirable result, the greatest influence has been exerted by such associations as that of the Master Car Builders, which have supplemented the work of the technical societies in a most useful manner by dealing with the lesser practical details which a body of engineers could hardly be expected to take under consideration. Yet it is precisely in such details where standard methods can be introduced to the highest economic advantage.

If there were an association of master mine workmen (foremen, timbermen, etc.), it might accomplish much toward standard equipment for mines and reduction works, as well as create an *esprit de corps* which would lead to better administration in all departments. Such an institution should prove a most useful auxiliary to the existing mining institutes in this and other countries.

Manufacturers of equipment can never be expected to lead in reforms of this kind. Their tendency is always towards differentiation, although in the end they would lose nothing by conformity to standard types, such as cars, car wheels, drills, hoists, and the like. A large part of all compressed air drills might be made according to some established design, and there is no need of diversity in design for small hoists, say up to 50 horse power at least. The list might be greatly extended. A consideration of this subject might be in order for the ensuing meetings of the Canadian Mining Institute in Montreal. The question to deal with is, how far can standardizing be adopted without limiting development toward improved methods? If a solution could be found in the case of railroad equipment, it should not prove impracticable with mining appliances.

Liquid Air as an Explosive.

When liquid air was noisily thrust upon us as the worker of untold wonders, no small portion of the mining world was caught by the fascinating promises made, not only by Mr. Tripler, but by men eminent in science as well. Some of the expectations then aroused will undoubtedly be realized. As a means of supplying pure air and reducing temperature in deep mines, it may find an economical and highly useful application, but its value as an explosive was unquestionably over-rated, and it is extremely doubtful whether it can ever be made practicable. In a certain sense an explosive of this character is not new. It belongs to what is known as the Sprengel class, an interesting group of explosives which has been before the world since 1871, some of which have attained practical importance, particularly in railroad work in new countries. A large amount of rack-a-rock, one of the Sprengel explosives, has been employed by the Russian government in the rock-cuttings on the Trans-Siberian railroad. The principle upon which these Sprengel explosives depend is that of mixing some oxidizing agent with a carbon compound, the several ingredients separately being entirely inocuous. The oxidizing agents most commonly employed have been ammonium nitrate, nitric acid, nitrogen tetroxide, and potassium chlorate, while the carbon compounds have been nitro-benzenes, nitro-naphthalines, picric acid, carbon bisulphide, and various oils of the paraffine series.

As examples we may cite the following: Rack-a-rock, containing 79 parts of potassium chlorate and 21 parts of mono-nitrobenzene. The chlorate of potash is specially prepared so as to be uuusually absorptive. It is put up in sticks of cartridge form, which are immersed in the liquid mono-nitrobenzine immediately before use. Thus a quite homogeneous mixture is produced, and the cartridge so prepared will develop a power as great as that of dynamite when fired with a strong detonator. Another variety termed hellhoffite was patented in 1885. It consists of 47 parts of meta-di-nitrobenzene and 53 parts of nitric acid. The product is a dark red liquid, of very high power when detonated with a strong exploder. Other explosives of this class are oxonite, panclastite, and romite. None of these but rack-a-rock have attained any practical importance. The difficulties are that greater skill and care are required in making the admixture of the ingredients than can generally be depended upon in the ordinary mine foreman, and also, in the cases of those which are liquid, there is danger of leakage of the explosive into seams where it may lurk to do d mage by accidental discharge later on.

In the use of liquid air as an explosive it is the oxygen which, when mixed with a suitable carbon compound, produces that sudden evolution of combustion products at a high temperature that yields explosive effects. So far the most suitable compounds have been found to be the oils of the paraffine series. Of these, solar oil has generally been preferred. The mixture is a liquid, which, as explained above, would be highly objectionable in mining and quarrying. To overcome this difficulty Professor Linde, of the Polytechnic High School of Munich, has been experimenting with various absorbents, after the manner of dynamites. Following the German practice he employed Kieselguhr (diatomaceous marl), first mixing the solar oil and marl. and then gradually adding the liquid air, until a stiff paste was made. This was then compressed into cartridge form. Again the mixture of marl and oil was put into the cartridge, which was enclosed in a lead case with a layer of felt between, and the liquid air was then poured in until the paste was completely saturated. The tests, however, showed that the explosive was less effective than dynamite, gun cotton, or blasting gelatine. Furthermore, the evaporation of the liquid air was so rapid that a cartridge was so weakened by fifteen minutes' exposure that there was no certainty of its discharge. It would appear from this that liquid air offers no promise of yielding a successful explosive. It is also stated that even when successful explosions were accomplished with it, considerable free oxygen was evolved, which would indicate that more than the requisite quantity for the combustion of the oil had been present. Owing to the rapid evaporation of the liquid air it was impossible to know how much available oxygen was in the liquid at the time of mixing with the oil, so that another element of uncertainty is here introduced, and either a wasteful mixture may be made, or else the mixture may contain insufficient oxygen to effect the explosion.

Present Tendencies in Concentration.

Perhaps the most notable tendency in concentration methods is a return to a wider use of the jig The merits of this ancient device are becoming more highly appreciated, and the later improvements in mechanism for operating it have given to it a delicacy of adjustment which it has never before possessed. Like all good things, however, it is liable to abuse, and the efforts to treat fine sands upon jigs are manifestly unwise, although it is questionable whether as good work may not be done with these machines on 60 to 100 mesh material as is actually obtained with vanners and riffle washers in very many mills. An important point in jig management, which becomes more conspicuous, the finer the grade of material treated, is to suppress the splash and oscillation of the water in the piston compartment. Various devices have been made to accomplish this, but there is no more effective remedy than to place in each piston compartment above the piston a loose board, free to float upon the water. When using this it will be found that the lift of the water in the screen compartment will closely approximate the amount which should be produced by the piston stroke, and also the irregularities in the height of water-lift in successive strokes will be entirely eliminated. It is this irregularity, due to the unequal oscillation of the water surface in the piston compartment which is mainly responsible for the imperfect work done by jigs on fine material. The Evans mechanism, described in a previous issue of this REVIEW, removes entirely the objectionable oscillation of the piston which occurs in the ordinary eccentric type of jig. The way is thus open to a larger application of economic jigging in concentration, and it may be said that it is not well to resort to any other method of treatment for sands which can be successfully concentrated on the jig. So far as it can be used it will do cleaner and cheaper work than any other concentrator.

Apart from this the tendency at present is entirely toward the wider use of riffle washers Nearly every large manufacturer of mining machinery is now offering some form of riffle machine. The success attending their use has been so great that it is evident that they meet the needs of a concentrator which will do good work with very easy adjustment. The great virtue of this type of machine lies mainly in this fact of simplicity of adjustment. The introduction some years ago of the corrugated belt for vanners was a concession to this demand, although a plain belt in the hands of a competent man, and using properly classified sands, is more scientific and will yield better results.

In the use of riffle washers again we note an increasing tendency to misuse a good thing. It is being set to do work which encroaches upon the proper field of jigs on the one side and of buddles on the other. It is well to caution mill men against going to these extremes.

In various forms, so far rather crudely worked out, we observe a tendency to extend the idea of the riffle washer, one recent attempt being to combine the reciprocating riffle table with the perforated-board hydraulic classifier, thus adapting it to the treatment of very fine material. We do not know what success has attended the effort, but it is undoubtedly a step in the right direction, and we will not be surprised if it opens up a new field in the clean concentration of slimes, and by slimes we mean fine pulp containing argillaceous and sericitic material, which constitutes the most difficult problem that can be presented in concentratiou. The introduction of a balanced undercurrent of feed water, in combination with the riffle type of washer, seems in fact the only feasible way in which this problem can be solved.

We have also noted a tendency, as shown in recent patents, to effect concentration by water currents causing the discharge of pulp to take place over an inclined surface, doing away with all mechanical aids, which seem to possess at least the germs of a good idea. The success of the California canvas tables, has shown to some extent the economic possibilities of such a system, but not being entirely automatic there is still room here for improvement, which will assuredly come. The tendency toward more scientific, and therefore more simple and effective methods, may be counted on to lead to important results in this direction.

Bluebell (Rossland) Mine, Limited.—Registered November 3 by Bonner & Co, 165 Fenchurch Street, E.C. Capital, £120,000, in £1 shares. Objects: To adopt an agreement made between the New Gold Fields of British Columbia (Limited) and this company for the acquisition of certain mines, mining rights and other property in Australasia, Canada, America, and Africa, and to develop and turn to account the same. Registered office, Leadenhall Street, E.C.

Rossland Proprietary and Mining Company, Limited.—Registered on October 25, by J. R. Elliott, 15 Gray's Inn Square, W.C., with a capital of £10,000, in £1 shares. Object: To acquire the Derby and Nelson Mineral claims, Kootenay, British Columbia, and certain land at Rossland, British Columbia, and to carry on the business of miners, explorers, contractors, &c.

Mining in the Parry Sound District.

The existence of mineral in the district of Parry Sound was first mooted in 1894, when a farmer named McGown discovered traces of free gold on his land situated about two miles out of the town. Sufficient quantities of the precious metal were secured to enable a local jeweller to hammer a few souvenir finger rings, and the owner of the property felt justified in forming a company to exploit for gold. The subsequent examinations of eminent mining engineers, however, disproved any possibility of profitable free milling gold deposits, and the district fell into a state of inactivity.

In 1898, some boys bathing in a lake adjoining the McGown property discovered a very pretty blue boulder which proved to be Bornite and an investigation discovered several large kidneys of Copper ore containing Bornite Chalcocite and Chalcopyrite in very high percentages. Out of 143 tons sent to New Jersey an average yield of $59 per ton was obtained, and large tracts of mining land were secured by an organization called the Parry Sound Copper Co. Owing to the roseate enthusiasm of the then manager of this company every person owning property in the district became a millionaire in their mind, and in the fall of last year it was a rare occasion where anyone wanting to buy a lot to build a house could do so without almost covering the land with dollar bills. It was the same old story—first a boom then a commonsense reaction. The boom is past so far as Parry Sound is concerned, and commonsense is beginning to ooze out of the ruins.

In the fall of 1899 a large number of prospectors and speculators went into the district, and out of hundreds of propositions a few were located showing promising signs. First of all came the McGown property, which is an irregular series of bornite pockets in a matrix of gneissic rock. There are no really defined veins, and hanging and footwalls are entirely unknown. The entire country seems to be more or less saturated with cuprous oxide, and there is hardly a piece of country rock within a radius of 5 or 6 miles from the town of Parry Sound which does not contain appreciable percentages of copper.

Later on, prospectors found their way to the south of the township, and what is probably the most valuable find of the district was discovered in Cowper township—the Wilcox property. Dr. N. Lehnen, Ph D., of St. Paul, Minn., who is one of the most eminent western metallurgists, reported that after making full allowance for equipment and all expenses there was in sight four and a half million dollars of profit in the mine.

Still further south, at the mouth of the Moon River, a property has been located containing, so far as prospecting has gone at present, two veins of well defined pyritic ores, one of which has been tested by the Bank of England assayers, Messrs. Johnson, Matthey & Co., London, and found to contain over $106 per ton from a 200 lb. fair sample. This property was bonded by The Baltimore Copper and Gold Mining Co., of London, Ont., but the people handling the concern do not seem capable of fulfilling their obligations financially, and they are likely to lose the property.

At the present time there are four companies already organized for the purpose of operating in this district:—(1) The Parry Sound Copper Co., (2) The Hattie Belle Mining Co, (3) The Anglo-American Mining Co., (4) The Baltimore C. & G. M. Co.

Besides these there is a new concern started with good backing, viz, The Niagara and Georgian Bay Mining Co, with a capital of $1,000,000.

The whole district, however, is likely to be very soon consolidated by a new organization which is about to be floated with a capital of $2,000,000 backed by big capitalists so that economy can be practised in the operating of the properties. Work on the new company's basis is expected to begin in the spring A. D.

Concentration by Oil—A Likely Process for Treating Our Low-grade Ores.

Considerable interest is being taken by mining men in the Elmore concentration process now in successful operation at the Glasdir Mines, North Wales, and as it is possible, indeed we believe it to be exceedingly probable, that this method of treatment may be adopted with advantage to many of our low-grade copper ores in British Columbia and Ontario which now yield unsatisfactory results by ordinary concentrating machinery, we take pleasure in reproducing a description of the process as embodied in a paper by Mr. Charles M. Rolker, a well-known American engineer, before the Institution of Mining and Metallurgy.

The process is based on a very curious property of oil and greasy substances of attaching themselves to metallic and bright mineral surfaces in preference to any rocky or earthy ones. Experiments and some resulting patents have shown that thin oils will float off metallic surface minerals from a crushed rock containing them, but it was found impossible either by dry, damp or wet treatment of such ores to prevent an impracticable waste of oil by its attachment to the waste largely, as well as the concentrates. A step in another direction was made at the DeBeers diamond mines, where thick grease is used on a shaking inclined surface, over which the broken rock passes, and to which any diamonds present attach themselves and are picked off at intervals.

Mr. Elmore hit on the idea of mechanically mixing a thick residual oil with a flowing stream of pulp from a stamp battery or other wet pulverizer. He found by experiment that the use of a helical trough within a revolving cylinder, furnished with baffle plates at intervals, produced so thorough an agitation of oil and water as to insure contact between the oil and minerals to which it is capable of attachment. Experiments on the length of cylinder necessary to get a high extraction then led to the adoption of three cylinders, one above the other, driven by worm gearing. After trying many methods of separating the oil from its collected minerals, it was found that this could be done most perfectly by a centrifugal hydro extractor, which yields the concentrates in an almost dry condition, and returns the oil free from mineral to re-circulate in the cylinders. The novelty of the Elmore process consists, therefore, in the intermixture of oil with crushed ore and water, and then separating the oil from the collected mineral by a specially constructed centrifugal separator. As stated already, previous attempts to use oil had been mechanical and commercial failures, while the present improvement has not only been fully worked out in detail, but is now established on a regular commercial scale by the treatment of 50 tons of ore per day at the Glasdir Mines, in North Wales, where about 5,000 tons have already been crushed and the concentrates sold to smelters.

At the Glasdir Mines the plant consists of two 5 feet Huntington mills, which crush wet to 30 mesh. The pulp flows direct to two sets of three each revolving cylinders, entering the upper one, where it is joined by a small stream of thick mineral oil, and passing out at the lower end of the cylinder, when it drops into a small pointed settler box. The water and ore pass out at the bottom of the settler into the second cylinder, and the oil with its collected mineral flows off the top to the hydro extractor for separation of the concentrates. In the second cylinder oil is again added, the discharge again passes to a settler, and the pulp from its bottom to the third cylinder for the addition of more oil. The final discharge of the third cylinder goes to a much larger and more perfect settling box to fully float off all the oil. The oil from the three settlers passes to a hydro extractor with a solid basket and projecting flange above. The mineral packs on the inside of the basket, and the oil overflows by the top around the flange, to

be pumped again into circulation through the mixing cylinders. When the centrifugal machine is fully charged with packed concentrates it is stopped and these are dropped through a large opening in the bottom of the pan, and are treated to a further draining with addition of hot water in a second centrifugal machine, this one being filled with a perforated basket.

The ore successfully worked at the Glasdir Mine consists of a fine impregnation of iron and copper pyrites in a hard black slate. It contains, on the average, as worked, only about one per cent. of copper and one dwt. of gold per ton. An elaborate and expensive concentration mill was erected by a German firm to treat this ore, and it was a complete failure both mechanically and commercially. The tailings were full of fine float mineral, and the concentrates were imperfectly cleaned. It was following the failure of this concentration mill that the oil process was developed by successive experiment, and having in this case proved the advantages of the method over well-known concentrating machinery, trials have been since made on a variety of ores from different parts of the world to determine new fields for its application.

Some copper ores from South Africa, which have been very wastefully treated in the past owing to difficulty in concentration caused by the presence of magnetite, have been in small tests enriched from 6 per cent. to 40 per cent. of copper. Another copper ore from Mexico, where the presence of heavy garnets interferes greatly with concentration, has given very promising results by yielding a concentrate of 23 per cent. copper from mill tailings. In both these cases the final tailings after the oil process was quite poor. Free gold seems easily caught by the oil even when quite coarse, although there may be no advantage on such material over existing processes. Some of the copper ores from the Mount Lyell district seem well adapted to the treatment, and experiments with telluride ores from Western Australia are being made which appear very promising.

Generally, it would seem that the process has a future in cases of difficulty by water concentration arising from brittleness or lightness of minerals to be separated, or from heavy gangue accompanying the minerals, such as heavy spar, magnetite, garnets, rhodonite, etc. It does not seem to matter how finely the mineral breaks; if it is a mere scum on the water surface, contact with the oil in the agitating cylinder seems to be insured. Where water is scarce the process has a great advantage, for the rock can be crushed with the minimum quantity for a concentration plant, and by settling can be used over and over again, a little muddiness of the returned water being no disadvantage. In practice it has been found in Glasdir that very little attention is required for the control of the process, that considerable variations in quantity of oil supply and temperature are allowable, and unskilled labor can be made available. The plant is much simpler than that of an ordinary concentration mill, is not expensive to install, is subject to little or no wear or tear, and can be put below any wet crushing machinery. Material as coarse as 20 mesh can be concentrated.

As regards the cost of treatment, this may be taken the same as equal in labor to equivalent concentration plant, (the cost of crushing is, of course, common to both) plus the cost of oil and any royalty for use of process. The loss of oil has been found to be in Wales one and one fourth gallons per ton of ore treated, and may be taken as varying according to ore and other conditions between one and two gallons per ton.

By the Elmore process, at the Glasdir mine, between 70 and 80 per cent. of the values are saved.

The Ophir Litigation.

The Queen's Bench Divisional Court has given an important decision in this hotly contested mining case. The judgment of the Chancellor of Ontario, Sir John Boyd, is affirmed, and the appeal of the Ontario Mining Co. therefrom is dismissed with costs. The decision settles the right of the Province of Ontario to deal with mining lands in what was known as the Disputed Territory. All the judges are unanimous that the gold and silver, being royal metals, belong to the Province. Many counsel were concerned, the leading counsel for the Ontario Mining Co. being Christopher Robinson, Q.C., and for the Ontario Patentees, who succeeded, J. M. Clark, Q.C. The action was brought by the Ontario Mining Co. to set aside Patents granting a two-thirds interest in A.20 Sultana Island, known as the Ophir, to E. Seybold of Ottawa, E. B. Osler, M.P., and J. W. Moyes of Toronto, J. S. Ewart, Q.C., of Winnipeg, and others. The Patents in question were the result of a protracted fight in the Crown Lands Department, in which the Ontario Mining Co were represented by Hon. S. H. Blake, Q.C., and Mr. Seybold, *et al*, who obtained the grant by J. M. Clark, Q.C.

The decision is final, unless leave to appeal is given, and it is said such leave will be applied for by the Ontario Mining Co.

COAL MINING AND TRADE.

In Eastern Canada the feature of the month has been the closing of navigation in the St. Lawrence and the ending of the shipping season. Whilst the actual figures are not yet available, it is certain that all the coal mines in the Maritime Provinces will show an increased tonnage. The Dominion Coal Co will probably be in the neighborhood of 250,000 tons ahead of last year. Old Sydney Mines, the Acadia Coal Company and the Intercolonial Coal Company will exceed last year's output by nearly 40,000 tons each, whilst the Canada Coals and Railway Company will show a much smaller increase The Cumberland Railway and Coal Company have had a very good year, their tonnage being from 60,000 to 70,000 tons in excess of last. In spite, however, of these large increases there is a great scarcity of coal throughout Eastern Canada, the requirements at Montreal being at least 200,000 tons in excess of the supply The bulk of this is attributable to diminished tonnage from the Dominion Coal Co., who have been compelled to supply bunker coal under contract at the expense of their Montreal customers.

The financial results of the year's trade cannot but be satisfactory, as increased profits will be shown all round; owing, however, to the unexpected increase in the demand most of the mines were caught with insufficient development work, and also with the bulk of their output already mortgaged to their contract customers. This was especially the case with the Dominion Coal Co. in consequence of their large contract with the New England Gas Co., at Everett, Mass., and it is doubtful—taking the mines all round—whether more than 25 per cent. of the total output has been sold at a largely increased price. High figures have been paid, but in most cases for small tonnages; in the spring of the year as much as $5.00 per ton was offered for special cargoes and $3 50 has been a ruling rate. Until the fall but few of the mines were in a position to avail themselves of this golden opportunity to any considerable extent.

An important development, which is very significant, is noted in the public press this week, in the placing of a contract by the New England Gas and Coke Co. with a Pittsburg firm for 50,000 tons of coal a month for the next five years. This is significant of a decline in demand and in prices in the United States, as the figure is much lower than would have

been accepted even three months ago, and is confirmatory of the rapidly accumulating evidence that the recent period of high prices will give place to much lower rates. This contract will relieve the Dominion Coal Co to a considerable extent, and enable them to place a large portion of their tonnage in more profitable channels, although, at the time their original contract with the New England Gas and Coke Co. was made, it was considered a good bargain, as furnishing a permanent winter trade. It is now an open secret that the price left little or no profit, and that the tonnage could not be supplied in the present stage of development.

Another important matter in connection with the affairs of the Dominion Coal Co. is to be noted. At a recent meeting of the Dominion Iron and Steel Co. it was decided to raise $5,000,000 additional capital, in order to put down steel rail and plate works, and it is understood that until these are ready, which will not be for at least a year, little or no pig iron will be made at the blast furnaces. Already the price of pig iron in the States has fallen so lo · that it would not be possible to sell Canadian iron in competition, and to carry the stock which would accumulate rom four furnaces during the whole of next year, would involve an enormous outlay. The policy decided upon is undoubtedly a wise one and will give the Coal Co. breathing time, and allow them to develop their new mines in anticipation of the large tonnage, which will undoubtedly be required when once the steel works are in operation.

The last feature of the coal trade in the Maritime Provinces worth noting is the condition of the labor market; undoubtedly for the moment labor has the whip hand of capital So many men are required, and comparatively so few have been forthcoming, that wages have advanced probably out of proportion to the actual benefit derived by the employers from the increased price of coal The advances paid to miners during the year aggregate about 25 per cent., and a further advance of 12½ per cent. has been asked for A special meeting was held in Montreal on the 14th inst, at which all the principal coal mines were represented, among those present being Messrs. Graham Fraser, Richard Brown, H. S. Poole, Hiram Donkin and Charles Fergie. The future prospects of the trade were discussed, and it was considered that whilst the outlook was not unfavorable it did not justify the expectation of being able to continue such an advance for any considerable time, even if it were granted. The leaders of the men are to be communicated with and a counter proposition will probably be made. Meanwhile, development is being pushed ahead in every direction, especially in Cape Breton. The tonnage of the Newcastle Coal Co. is increasing. The Inverness Coal Co are opening up their new mine at Broad Cove as fast as possible, and operations at Port Hood are well under way. The latter company has just appointed Mr. John Johnston, for many years a manager with the Dominion Coal Co., as their mining engineer, and hope to be shipping coal as soon as navigation opens next season.

In Nova Scotia proper Mr. Coll has taken charge of the Acadia Coal Co.'s mines and is making extensive developments The Intercolonial Coal Co. have purchased the Simon Holmes coal areas adjoining their own property, which will be of great importance to them in view of the somewhat limited area which they have hitherto been able to operate. V.B.

Mining as an Investment.

The prejudice against mining, like an hereditary taint, still clings to the ultra conservative, the timid and the less ambitious. Such notions and ideas on mining, though well intentioned, are based upon the theory that some one lost money either in mining proper, or mining stock speculation. Millions are sunk yearly in corn, wheat or pork speculation, and yet no one condemns such anomalism except. perhaps, the agriculturist or the suffering poor.

The estimated annual dividends on the nominal capitalization of all mining companies exceed thirteen per cent., being equal to about forty per cent. a year on the actual capital invested. There is yearly as much money invested in mining as there is in banking, but banking does not prove as safe or as profitable as mining. In a time of prosperity the average banking dividends seldom exceed eight per cent. a year.

The number of dividend-paying mining companies is larger than all other combined industries, is fully substantiated by statistics. That mining produces quicker and greater profits than any other industrial pursuit is evidenced by the scores of multi-millionaires. That there are risks in mining as well as in other pursuits is well known to all reasonable minds, but that the immense fortunes of the Mackeys, the Fairs, the Floods, the Sharons, the Stanfords, the Jones, the Stewarts, the Baldwins and hundreds of others, are due to mining, cannot be denied. According to the census there is less than one hundredth part of our industrial population engaged in mining, producing for one year a mineral output of all sorts valued at $679,597,876. If other industries were as productive of wealth as mining, we would have, according to the above ratio, a yearly product of $67,959,787,600, or twenty-two times as much as the estimated circulation of gold and silver money of the entire world.

The yearly product of gold, silver, lead and copper alone, if distributed amongst the miners engaged in the different mining states producing these metals, averages from $1,000 to $3,000 per man, or

St. Lawrence Coal Deliveries, 1900.

We are, as usual, indebted to the courtesy of Messrs. Carbray, Routh & Co., Montreal, agents for The Nova Scotia Steel Co., for the following comparative statement of the coal deliveries to St. Lawrence ports during the season of navigation just closed:—

	Montreal.		Sorel.		Three Rivers.		Quebec.		Total.	
	1899	1900	1899	1900	1899	1900	1899	1900	1899	1900
Nova Scotia Steel Co. Limited	83,005	60,014	7,404	5,154	896	4,080	38,176	24,321	129,454	93,569
Dominion Coal Co.	742,215	571,223	6,757	9,889	20,900	15,636	51,222	46,659	821,094	643,407
Intercolonial Coal Co	33,149	30,742	.....	.....	.....	.....	7,396	13,270	40,545	44,012
Cape Breton Coal Co.	839	.....	.....	.....	.....	.....	.....	.....	839	.....
Foreign	18,369	19,444	1 800	.....	.....	.....	1,863	.....	22,032	19,444
	877,577	681,423	15,961	15,043	21,769	19,716	98,657	84,250	1,013,964	800,432

twenty times as much as the per capita of products of all other combined industries. Mining products, with the exception of coal, which is consumed, are increasing our solid national wealth without being destroyed or consumed like the vegetable or animal products.

California produced in gold alone from 1848 to 1897, the stupendous sum of $1,310,240,000—most of which can yet be found in coins or arts throughout the entire world. The Colorado mines produced in the last sixteen years over $450,000,000 in gold, silver, lead and copper. Arizona in the same period produced over $100,000,000. The Michigan copper mines produced in the last ten years $124,434,440. Tremendous fortunes have been realized from mining in these four states. The St. John del Key distributed an average profit of 47.8 per cent. during fifty years of continuous prosperity. From 1876 to 1879 the profits in these mines ran from 88.10 per cent. to 194.13 per cent. The Proprietary mining companies distributed in the last six years in dividends and bonuses the handsome sum of $18,943,860. It will be seen, however, that California beats averaging for the past forty-five years about $30,000,000 per year. Surely there is money in mining. *—Denver Investor.*

The Prospector.

There is something in the individuality of the typical prospector of the mountain trail that cannot be found among the more thickly populated sections of the country. Those who are familiar with him and have seen him as he comes into camp will not soon forget that far-away look in his eyes, and fragments of fir boughs and dried huckleberries in his whiskers—sockless and happy. You may smile at him, perhaps ridicule him, or worse, pity him; but did you ever think, you who have studied upon the factors that go to make up this mysterious problem of human life—what part is played by the bewhiskered man?

Let us follow the crooked trail of this old prowler of the hills from the time when he first hails from the old farm down east, young and free, bubbling over with spirits and energy, and with an air about him that marks him as a tenderfoot He has just blown out of the home nest. His wings were a little stronger than his brothers', who chose to stay in the sunshine of the home and the fragrance of the orchards It has only been a few days, perhaps, since he bade them good-bye. The wholesome words of advice that his honest old father gave him ring in his ears, and the doughnuts, the caraway-seed cookies, the needles and thread and the variegated patches that his thoughtful old mother gave him are still in his grip. The bonny face of his sweetheart haunts his mind, her cabinet photograph is bursting his inside pocket and his coat is still damp where she cried her farewell on his shoulder. He intends to make a fortune in a few months and go back to her. He will write her every few days in his most graphic style, volumes of interesting matter. He tells her of the bright prospects in view, of the wonderful opportunities at hand. He tells her to be true to him, for a few short months and he will return to her laden with riches and honour that his own energies will surely bring him.

Let us follow him on his first trip as a gold hunter. The wilds of nature seem a paradise to him, for the hills and forests are new pictures, and what poetic fancies he may have are not yet blunted nor worn out of him by hardships. His camp equipment consists of a multitude of unnecessary things, and it takes him half a season to pack them into the hills and the other half to bring them out. His cooking is somewhat awful, yet he is particular about flies and bugs, and it would actually make him sick should he boil a mouse in his coffee pot or swallow a handful of ants in his tea. The old timers watch him with interest. He makes his first bannock, but words cannot describe it. With sublime courage he proceeds to eat. If he lives he is all right, for a tenderfoot that can eat his own cooking and survive, the trail to fortune is his. He does not find time to prospect much the first year; but has talked with some old veterans of '49, and in an amazing short time knows all about the business. To hear him talk "formation" you would imagine he had been present at the creation, and to hear him go over a lingo of ponderous geological words, he has committed from his little four-bit "Prospector's Guide," would simply make an old prospector homesick But he is initiated. He has played the first card in the greatest game of life. The wheel spins round. So far he has drawn a blank, but he writes to his sweetheart to defer his return another year. Her letters still come, but not with the same regularity as when he first left home. To be sure they are still crowded with affectionate epithets, but they seem more studied and less genuine than at first.

Another year rolls around. He goes out with the snow and returns with it, but with little to show but a luxurious growth of beard and a few choice specimens of "float" that he found "just where his grubstake played out." He is sure he can find the ledge the coming season. The snow comes and goes. The rivers fill and empty. Again Jack Frost, that breezy advance agent of Winter, hangs his yellow posters on the birch and tamarac. Our prospector comes in again to "hole up" like a Winter bear in his Winter cabin. He has drawn another blank. His wages against the game are heavy. The passion has enslaved him. He will prowl away his life in the hills or strike it. He may have a few prospects by this time. All he needs to do is to blow off the capping and the mountain will be full of the richest sort of ore. His means are meagre, but he has picked up some valuable pointers. He has learned that a mountaineer who would starve with a gun, a frying pan and fishline, would deserve the ridicule of his comrades. He has learned to play jokes on his stomach—promises it pie and slips in a "flap-jack." He will work this prospect if he has to go on half rations. So he hammers away a few years of his life in a dark tunnel. He crosses the contact and runs under the croppings. Ordinarily he would become discouraged, pack his cayuse and leave. But there are some characters who will keep driving away, feeling certain that the next shot will expose the longed-for treasure. He will have to go "off shift" for good some time, and he will leave a solitary tunnel with country rock in its face as a pathetic monument.

But we will imagine that our hero, if we may call him such, was wise enough to quit after a few years and start out once more for the hills, where, perhaps, there is a new excitement; where everyone is striking it rich. He will get in on the "ground floor" this time. When he arrives at the new camp he finds that the "good things" are all staked, so he prowls around the edges until Winter drives him in again. He begins to feel a little old; he has staked about all he had but his life, and he has risked that many times. He feels a twinge of rheumatism in his limbs and the demon, dyspepsia, has taken up its abode with him. He imagines he is getting queer, and perhaps he is. He knows he is "cranky." He wonders sometimes if he is not getting "sour dough" on his brain as well as on his overalls. He can't get along with a partner any more and not infrequently it is all he can do to get along with himself. So he goes out alone with dog and cayuse. He begins to hold interesting conversations with himself and grows to think he wants no better company. Sometimes by the camp fire, when in a retrospective mood, he reviews the past. How long it seems since he left the old home.

Several years have elapsed since he heard from his relatives and his sweetheart's letters have long ceased to come. He has surely played the game recklessly. There does not seem to be much left for him. Of course he has that old faded photograph, but it is broken and defaced, and there is an old soiled envelope that contains a tangled lock of hair and a few broken flowers. He imagines she is still true to him. He must "strike it" and return to his old life. So he climbs up with renewed energy. Sometimes he catches a glance of the gilded

wings of fortune as she beckons him from some distant peak, and he struggles to find: like the end of the rainbow it is still in the advance. When he comes in there is little diversion for him but the society of the bar-room. Here, by administering a few doses of the prospector's elixir, he can restore youth.

But "everything comes to him who waits." He "strikes it" at last; he has stumbled into it at last by accident. It is cropping before him in all its magnificence. His practiced eye tells him that it is a fortune; he is not excited; he takes it coolly. He has been thoroughly trained to take things as they come. He may even be careless in staking it properly. He goes out and proceeds to get drunk and spread the news. He sells out for a handsome sum; runs over the census and calls up the township to the bar. He buys the most stylish clothes that he knows anything about. The tall silk hat that crowns his wrinkled visage would hardly pass under the boughs that hung over his old trail and his cayuse would be frightened into a stampede should he catch a glimpse of his generous expanse of snowy linen. He alienates the affections of his faithful dog by taking a Turkish bath. He squares with his old companions as a good fellow and buys a palace car ticket to his old home. He anticipates a great ovation in his honor; he thinks of the happy smile with which his sweetheart will greet him.

When he arrives at the depot of his old town he is surprised that the mayor is not there to meet him. He wonders what has become of the old brass band that used to play on the public holidays. As no one meets him, he starts afoot to find the old town. He gets tangled in the suburbs of the town and the lanes and cross lanes are problems difficult to solve. He finds what he thinks is the old trail; he looks for the old blazes, but they are gone. When he finds the old homestead his brothers seem glad to see him, but they hardly take time to talk to him. They have hardly missed a day of hard nce he left. They have hoarded the pennies till they have collected a few dollars. His father and mother have long since taken up their abode in "the little quiet village on the hill." He calls on his sweetheart; she has been married many years. She has grown fat and plain. Her recepl tion of him is anything but flattering; she surveys him critically and curiously, and perhaps wonders how much he paid for the store clothes he is now wearing.

He is satisfied. He takes the shortest trail back to the old camp leaving the proverbial fatted calf still feeding at the manger. His wealth is a burden to him and he proceeds to dispose of it. After hiring a theatre for a few nights and trying to break up a brewery or two, we find him once more taking the trail with a smile and a grub. stake This man's trail through life may have been a crooked and lonesome one, and his unburied bones may lie at the end of it, but he cut it himself. What has he done for the world? What may have come to him of fortune was one of nature's hidden treasures. It was not stolen or wrung from the toils of others. He has added to the wealth of the world. He was the scout of progress—a solitary sentine, at the outposts of civilization. Cities will spring up where his camp fires once smouldered; steamboats will plough the streams where he once poled his rude dugout, and great railways follow his blazes. In the great play of life, where courage, fortitude and honest endeavor are the parts most commended, can it not be said that this man has played his part and played it well?—*The Helena Independent.*

NEW DETACHING HOOK.—Herman Balz, of Dortmund, Westphalia, has introduced a detaching hook for the prevention of overwinding, which appears to be of simple construction. It takes the form of a pair of pincers, the closed jaws constituting the hook, and the handles spread widely apart, the disengaging portion. The latter are kept apart so as to close the jaws by a pair of levers which are held in a horizontal position by a suitably formed part; but, on the cage being drawn up too high, the separating piece comes into contact with fixed stops when the pincers arrangement is no longer kept closed, so that the rope will be released.

On Safety Appliances and Precautions Necessary in Mines.

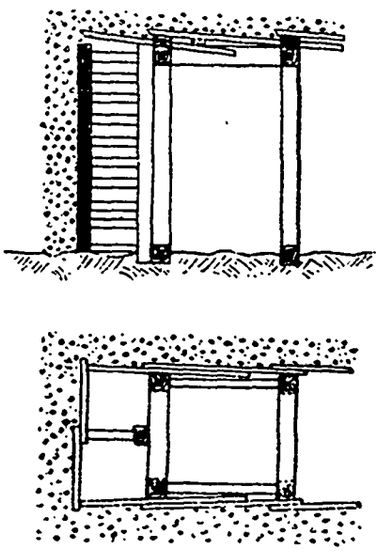
By J. R. GODFREY.

(*Continued from November Number.*)

Sometimes the ground settles down very heavily on the laths as soon as they are put in, in this case the false set should never be knocked out; if it cannot be knocked out with an ordinary six or eight pound hammer, leave it in, otherwise the laths may be dragged forward and collapse. In some cases a bridge is not used, the laths being "tailed in" under those preceding them This is safe enough so long as there is no overhead pressure, but if there is, the driving up of these laths will drag out the others, and a collapse must follow. Bridging is neater, better and safer, and in running ground should always be adopted.

Fig. 14 shows the method of timbering where the ground is running, either wet or dry, drift or sand. In this case it is necessary to secure the face as well as the sides and roof. Hence face or breasting boards are used, the back and side laths are put in as already described; false sets and studdles being used. The breasting boards are made in

FIG. 14



two sections to overlap about three inches in the middle, the ends are kept in position by driving the side laths butt up against them as shown at *d*, the middle is secured by tomming them back to a centreprop A, by short chocks of timber or toms *e*; and any interstices between the slabs are blocked by using stringy bark as packing. The face boards are then advanced one by one, the side laths driven up to hold them, and fresh toms put against the middle. In this manner the drive can be safely advanced even against very heavy and rapidly running ground.

The centre prop or leg A, must be secured top and bottom by placing it against the solepiece and cap of the set, or by burying it eighteen inches in the ground. No one but a thoroughly skilled miner should be employed in this class of ground, as a mistake may mean death, though if properly worked there is no more danger than in any other ground.

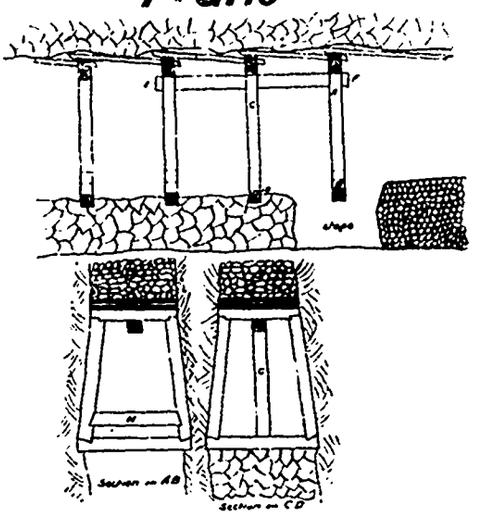
Where a reef or lode has been stoped out over a level, and other stopes are coming up under the level, and the floor of this level has to to be removed, it is imperative to secure the timber in the drive, so as to hold the filling in the stopes above in its place. Fig. 15 shows one method of doing this by means of a swinging tom or boom.

Suppose the ground is required to be stoped out under the set A B, a stringer E F, is placed under the cap of this set and the two follow-

ing ones, a leg or prop G, is placed under the stringer as shown in the section C D, and is tightly wedged up. All the sets are then further secured by "spreading" the legs with spreaders H, which are driven tightly down, jamming the legs against the sides of the drive, as shown in the section on A B. The set C D, has no spreader as it would interfere with the prop G.

Now the set A B cannot fall out, firstly, because the spreader holds the legs, and, secondly, because the boom E F holds the cap in place, being supported under the cap at E and over the prop G; the ground

FIG. 15



can then be safely removed. The soleplate at B will fall out, but is replaced as the depleted ground is refilled; the tom is then moved a set forward and the process repeated.

Sometimes a tom is also placed under the soleplate, as shown in Fig. 16 as an extra precaution.

EXPLOSIVES.

In spite of the quantity of explosives used in mining, in spite of the special instructions issued with every packet, in spite of the lessons taught by former accidents, it is a sad truth that injuries from dynamite and its kindred explosives continue to furnish about one-third of the total number of accidents for the year.

Nitro-glycerine and other high explosives are not dangerous so much by themselves and under nominal conditions, as from the fact that they have to be exploded by percussion, by means of a detonator containing fulminate of mercury, which is a very sensitive medium. We have, therefore, these rules:

Never keep dynamite in the same box as the detonators.

Never clean a detonator with a hard substance, such as a pin, or even a straw, merely shake the sawdust out.

Never bite the cap on to the fuse, put use a pair of pliers.

When using powder, it is necessary to tamp very tightly, hence copper bars are allowed; iron bars being prohibited as they emit sparks when struck on the side of the holes. Many miners still cling to the superstition that dynamite must be tamped like powder, and, therefore use a copper bar. This should be prohibited, it is not necessary, and is very dangerous, for if the bar slipped out of the man's hand when pushing the primer home, its falling weight is quite sufficient to explode the detonator. Hardwood sticks are all that are required and all that are permissible.

In all large mines, the dynamite stored underground should be placed in a specially constructed magazine, under the charge of one man. The detonators being in separate boxes,well apart; and a locked and cased lamp kept constantly burning; anyone taking a naked light into the magazine should be dismissed, for if dynamite catches fire and burns away instead of exploding, it generates excessive quantities of carbonic acid gas, and carbon monoxide—the one asphyxiates, the other is a deadly blood poison; and it may destroy every man in the level.

Proper cases should be supplied for carrying the dynamite from the magazine to the working places, and contractors' boxes should have a separate compartment for the explosive, the detonators, and the fuse, and be provided with a strong hinged lid.

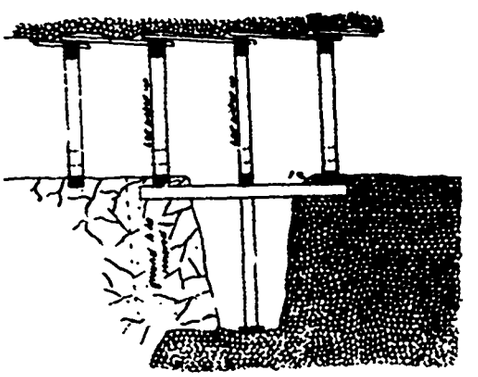
In charging holes underground, explosives should never be mixed; it is absolutely useless since the quicker explosive will do the work, and it may be dangerous by setting up chemical reactions and generating deadly gases, which would not be formed in excessive quantities by the one explosive Never drill out missed holes, never go back to missed charges until some time has elapsed and never drill into old sockets, as a plug may only partially explode, or may coat the hole with a layer of active explosive. Neglect of these simple and obvious rules has erected a city of tombstones over the bodies of the hapless and foolish victims.

When firing holes, all approaches to the place should be carefully guarded to prevent anyone from inadvertently approaching.

When firing charges there are three methods adopted—by snuffs, by matches, and by spitting the fuse. The most common and most dangerous is to spit the fuse; even the best fuses may have a bad coil; occasionally where the powder is unevenly laid, the fuse will then "run" and explode the charge prematurely. The usual speed of a fuse is two feet a minute, but the writer has known an individual coil by one of the most reliable makers, run through five feet in 25 seconds; hence spitting is dangerous, as a man has no time to escape should the fuse begin to crackle, a sure sign that it is running.

It is becoming very common to spit a fuse with dynamite. The end of the fuse is split with a knife, and a piece of dynamite the size of

FIG. 16



a pea placed in the slit; the dynamite is then lighted, and ignites the fuse. Some day the dynamite will explode, temporarily or permanently blind the man, and while he is groping about to find his way out, the charge will explode and he will pay the full penalty for his temerity.

Firing with a match is done by splitting the end of the fuse, inserting the head of the match and lighting the other end, this gives nearly three-quarters of a minute extra time.

The best plan is to use a candle snuff; each fuse has a snuff placed under it, the miner lights them, and can retire to some safe place and wait until the fuse burns through and spits. As soon as he sees they have all spitted he can go away and there is no danger; yet in spite of all this, and for the sake of saving two or three seconds, men will frequently juggle with their lives.

In firing in shafts it should be compulsory to fire with electric discharge A man never knows what may go wrong with the engine, windlass, or ladders—if he lights his fuses, and anything should go wrong, he is like a rat in a trap, with no escape. In firing by electri-

city the battery is never connected until all the men are out of the shaft, and there can be no danger: it is also far more efficient.

VENTILATION

Should be very carefully attended to: if men have to work in bad air they not only fail to do a good day's work, but may get blood poisoning.

The long continued breathing of slightly contaminated air is really worse than sudden asphyxiation from large quantities. In the latter case the man either dies at once or else recovers completely; in the former he may feel nothing for weeks, perhaps months, then he is attacked by fits of dizziness, his legs give way, and his occupation is gone, and it is often years before he recovers.

As far as possible two shafts should always be carried down, nothing gives such good ventilation or is so efficient.

When firing holes in the end of drives, with no second shaft or winze connection, especially with rock drills where 30 or 40 holes are fired representing over 300 plugs of dynamite, there should always be air pipes, (supplied by fans if required) carried down to bring in a current of air and sweep the fumes away, otherwise the broken stone will lock up the gases, which become occluded, and remain entangled in the interstices for hours, until the stone is shovelled, when they escape and poison the men—and water should never be allowed to remain stagnant in the bottom of a shaft near to where firing is being done, as it absorbs the gas and becomes horribly foul and poisonous.

SIGNALS

Should be installed at the brace, surface, and at every platt; they should be simple and distinct, so that the engine driver is never in doubt. Should he be uncertain, the cage should not be moved until the signal is repeated.

The signal code should be clearly painted on boards and hung up at every platt.

If an ordinary knocker line be used, the lever should be placed within reach of the men when in the cage.

Special knocks should be used to denote "man on" and ten or fifteen seconds elapse before the cage is moved.

Telephones or speaking tubes should be put in the shaft, they would cost very little and would repay the outlay in very short period by economising time: at present a man will spend half a shift knocking on the pipes to get the cage sent down to him.

MISCELLANEOUS.

When heavy accumulations of water are known or suspected underground, bore holes should be put ahead in the face of the drive or rise, fully four feet in advance, and flanking holes on either side if large vughs of water are suspected.

Passes, winzes, catchpits and well-holes must be kept covered when not actually in use: if in use the men passing near must be warned, and a lighted candle should be left near them; some men are always in a hurry and go rushing about with their eyes shut, hence the necessity for covering passes.

Many other precautions might be mentioned, but it would require too much space to go deeper into the subject. Enough has been said to show how the safety of the men may be studied—none of them are unnecessary, none of them carry the protection to the nursing stage, they merely safeguard the men against possible dangers, mistakes and proneness to personal error.

It is probable that many mine managers will say that everything embodied in this article was known fifty years ago. So it was! And so much the more credit to those managers who thought out and adopted the safeguards and rules—originality, except in a few things, is impossible. But as accidents have happened, do happen, and will continue to happen, owing to neglect of one thing or another, it is not superflous to reiterate them. And if this article either causes any necessary precautions mentioned here to be adopted, or leads to the invention of new ones, the writer is not only repaid in writing it, but justified in doing so.

If by the adoption of any safety appliances the lives of the men can be safeguarded, should we adopt them? I think so; for if they save the life of one man a year, if they keep a family from becoming fatherless, they have repaid their cost a hundredfold.

Miners are not always prone to gratitude, as inspectors of mines know too well. They often consider those above them in position as incompetent idiots who are where the miners ought to be, and sneer at the proposals for their protection as a piece of useless folly. Sooner or later, however, they will realize that their welfare is being studied, and the relation between employer and employee will become better and truer.

MIDLAND No. 1.

Canada Iron Furnace Co's New Furnace at Midland Blown in with Befitting Ceremony.

By invitation of the President and Directors a large and distinguished company visited Midland, Ont., on Tuesday, 18th instant, to be present at the official starting up of the furnace plant installed there by the Canada Iron Furnace Company, Limited.

The visitors were received at the Union Station, Toronto, by Mr. Geo. and Mr. Tom Drummond and Mr. J. T. McCall, representing the company, a special train of five handsome coaches having been chartered to take them over the Grand Trunk to Midland. Among those present we noticed:—Hon. G. W. Ross, Premier of Ontario; Hon. E. J. Davis, Commissioner of Crown Lands, Toronto; Hon. G. A. Cox, Mr. Robert Jaffrey, Mr. W. F. Maclean, M.P., and Mr. Aubrey White, Assistant Commissioner of Crown Lands, Toronto; Mr. T. W. Gibson, Director of Mines, Toronto; Mr. James Conmee, M.L.A., Port Arthur; Mr. A. J. Ward, M.P., Port Hope; Judge Ardagh, Barrie; Dr. J. Bonsall Porter, Professor of Mining Engineering, McGill University, Montreal; Mr. B. T. A. Bell, Secretary of the Canadian Mining Institute, Ottawa. *From Montreal.* Mr. George E. Drummond, Managing Director of the Canada Iron Furnace Co.; Mr. T. J. Drummond, J. T. McCall, B. Hal Brown, Alex. Pringle, R. R. Stevenson, C. Ed. Gudewill, J. Elmsley, Dr. W. H. Drummond, Major H. H. Lyman, Wm. Hanson, F. H. Pitcher, Andrew Elder, G. F. C Smith, A. W. Stevenson, C.A.; Watson Griffin. *From Quebec:* Mr. J. G Scott, General Manager Great Northern Railway. *From Toronto:* Messrs. J. Hedley, Arthur White, T. C. Irving, T. C. Irving, Jr., W. J. Hamilton, W. H. Carrick, H. C. Hocken, J. C. Kemp, Edward Gurney, W. C. Gurney, J. S. Playfair, John Waldie, Noel Marshall, John Northey C. A. C. Jennings, R. C. Dunbar, P. Freyseng, C. J. Agar, W. P. Colville, S. H. Chapman, Charles Caldwell, Wm. Walker, Melvin Jones, W. H. Cawthra, D. H. Macpherson, H. Patterson, Kelly Evans, Acton Burrows, F. D. L. Smith, F. G. Morley, T. P. Phelan, F. A. Nott, W. L. Edmonds, M. C. Dickson, District Passenger Agent, G.T.R. System. *From Hamilton:* Messrs. R. J. Mercur, W. J. Copp, A. G. Gartshore, O. G. Carscallen, G. Milne, C. S. Corchran, W. J. McNair; and Messrs. A. L. Davis, Peterborough; J. J. Long, Collingwood; Henry C. Hamilton, Sault Ste. Marie; G. D. Griffin, Parkdale; T. L. and F. W. Moffatt, Weston; T. H. Percival, Merrickville; W. F. Johnston, Ingersoil; Edward Goold, S. H Cockshutt, W. H. Whittaker, David J. Waterous, from Brantford; C. B. Frost, Smith's Falls; W. M. Gartshore, London, Ont; P. E. Shantz, Fred Clare; Preston; W. T. Brown, A. Stevens Brown and John Bertram, Galt, Ont.; and Mr. W. R. Tiffin Supt. Northern Division G.T.R., and Mr. W. A. Sheppard, Waubaushene, Ont.

Upon the arrival of the train at Midland, the visitors were received by the Mayor, Mr. S. A. Mil[illegible]n, and a large number of citizens, including Mr. W. H. Bennett, M.P. fo[illegible] East Simcoe, and at once proceeded to the furnace where the formal opening took place. At the entrance to the works the visitors passed between a guard of honor of the Boys' Brigade of the town and under a stringer with the word "Welcome" standing out in bold relief. A holiday had been proclaimed by the Mayor in honor of the occasion and everywhere were to be seen flags and bunting and other decorations and

appropriate mottos indicating the importance of the iron industry, such as, "Iron, the basis of industrial wealth," "Midland, Ontario's Western gateway," "Advance Midland," "Canadian Ore, Helen Mine, greatest known deposit," etc. Three lusty whistles announced the arrival of the visitors at the Furnace, where in the presence of the large gathering Hon. G. W Ross, Premier of Ontario, named the Furnace with these words: "Ladies and Gentlemen. this Furnace is to be known as Midland Furnace No. 1, and it is the first of what I hope will be a very large, prosperous and thrifty family, and I declare it to be so named." Then amidst ringing cheers the Premier broke a bottle of champagne on the base of the furnace. Mr. George E. Drummond, on behalf of the Directors, presented Mayor Milligan with a handsome silver-mounted ebony mallet, at the same time expressing the hope that the Town would always keep it in their Council Chamber for use as a gavel. The mallet was enclosed in a handsome oak case, the silver plate on the lid bearing the following inscription: "Presented the Town of Midland by the Canada Iron Furnace Co., Limited, as a souvenir of the official opening of their Midland Blast Furnace, December, 18th, 1900." Amid further cheering Mayor Milligan then tapped the furnace. The Reformatory Band, which played several selections during the afternoon, at once struck up a lively air. Under the guidance of Mr. John J. Drummond, M.E., the Superintendent of the works, the Premier and the company proceeded on a tour of inspection of the various buildings, the stock piles, shipping wharf, engine room, etc. Everyone was delighted with the excellent arrangement and get-up of the plant. A movement was thereafter made to the Company's office, where an open-air platform had been erected, and a few congratulatory speeches were made:—

of all industrial and national wealth, and a glance back over the history of the world will show any student of history that every nation of wealth—the most wealthy, the most powerful, the most civilized of nations have been the iron producers of the earth. (Applause.) Look at the history of the iron industry in the great eastern empire. Long before the Christian Era there were iron workers there—the Egyptians, the Medes, the Persians and the Chaldeans—and as soon as the iron industry was exhausted as history will prove, these empires began to decay, and then with the march of civilization westward, you all know the industry took root in Germany, France, Belgium and Sweden, until Great Britain began to become the great iron producing country of the world, and now, unfortunately, we Britishers think, in the last few years, that the United States has surpassed her. We believe, however, that this is only temporary, because the greater Britain is now going to help the mother country in the volume of her iron business—(Loud applause.) Canada, after a few years of apprenticeship, has but just stepped into the arena, but I think you will agree with me that she comes as a young giant, rich in resources, prepared to guarantee to the mother country to supply her with that most important commodity, great in peace and in war and that Great Britain will always have a plenteous supply of it on British soil. (Cheers.) You ask me what can be done. Well, God has given us a most bountiful supply of iron right here in this district. One of our own directors, Mr. Francis Hector Clergue, who is now in England, has discovered, within the past year, mines abundantly rich in iron that are supplying us today at Midland with Canadian ore. (Applause.) With the industry fully developed, we can supply the users of iron in Ontario and the world over, if necessary, with the product of Canadian labor on Cana-

MR. JOHN J. DRUMMOND, M.E.,
General Superintendent,
Canada Iron Furnace Co.

MR. GEORGE E. DRUMMOND,
Managing Director and Treasurer,
Canada Iron Furnace Co

MR. E. DOUD,
Superintendent,
Midland No. 1 Furnace.

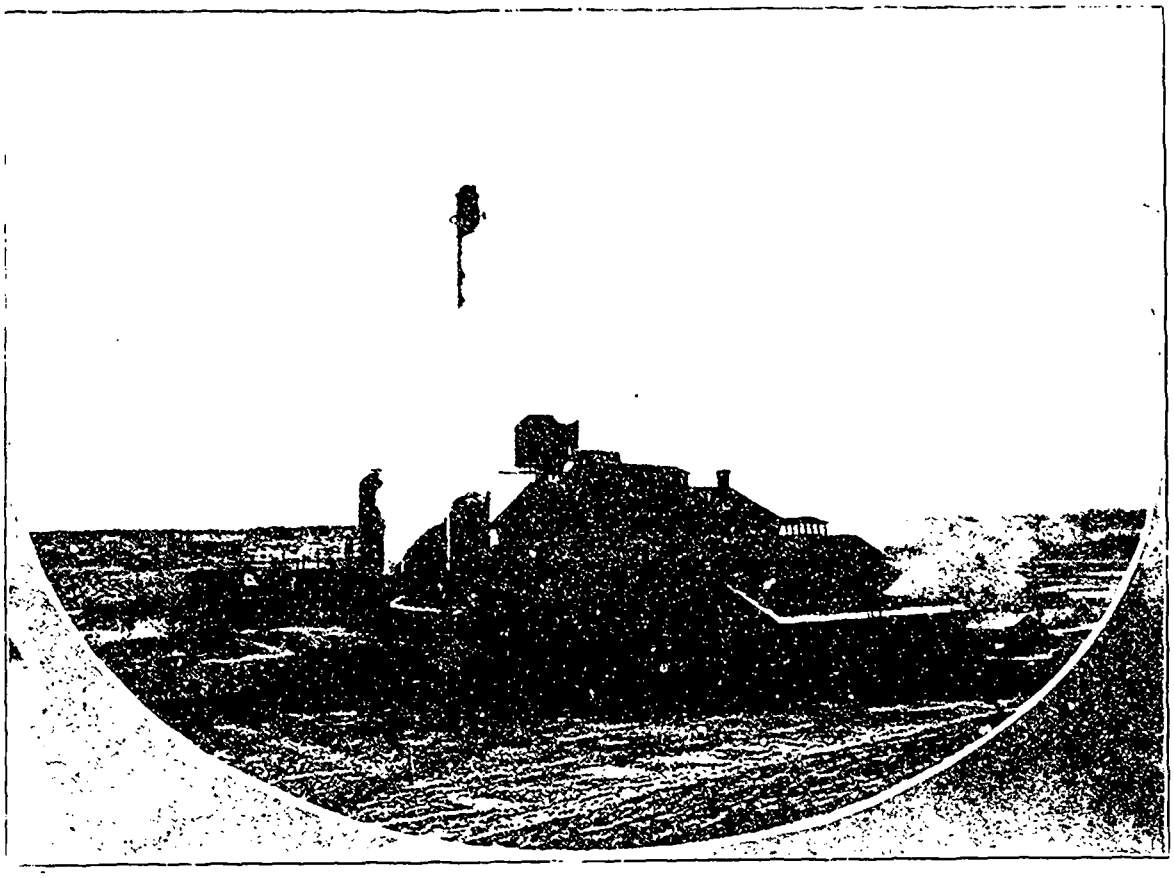
Mr. GEORGE E. DRUMMOND—I need hardly say on behalf of the Canada Iron Furnace Co. and of my brother, the general superintendent, that we appreciate very highly the honor that you have bestowed upon us today in coming here to attend the christening of our blast furnace, and to feel that we had a good, hearty, God-speed in the undertaking that we have in hand. To you, Mr. Premier, and to the Hon. Mr. Davis, I would like to tender the special thanks of the Company for this fresh evidence of your interest in the great natural resources of this Province. We are one in our desire to advance Midland, and she is going to advance with no uncertainty. (Applause.) I also desire to tender thanks to the mayor and to the people of Midland for turning out in such great numbers as they have today to assist in the official opening of Midland Furnace No. 1, for mark me it will be known as No. 1. We hope it will be but the unit of other furnaces to come. (Applause.) I also desire to thank the officials of the Grand Trunk Railway for past encouragements and for the very courteous way they have always treated us. This has been shown from Mr. Hays, the late general manager, down to the officers of this part of the country, who have so earnestly assisted us in our efforts to promote the development of Midland. It has often been said that iron is the basis, as well as the barometer

dian soil. (Applause.) I can tell you an interesting little story in this connection. In August, 1899, I had the pleasure of going up to Michipicoten with Mr. Clergue, because he thought I should go as an iron man and tell him what I thought of what at that time was a wilderness. We landed on the 4th of August, 1899, at the harbour of Michipicoten from the yacht *Siesta*. We went in by small boat and landed on the beach and we found there one of the engineers who afterwards built the Algoma Central road. He asked me what I thought and I said, you cannot build the road too fast; we will take your ore at Midland as we prefer Canadian ore every time. He took took us up at once and I came back. I went up again this present year and I found Michipicoten quite a populous place. With a splendid ore dock as good as anything on Lake Superior, and which will be still greatly improved this present year. They have 12 miles of the road in operation, locomotives of 100 tons, and an equipment of ore cars of 50 tons. I found them crushing 5,000 tons of ore a day, and I found ocean steamers at the dock, 600 ft. above the level of the sea. We had, as you know, four of them carrying ore to Midland, and next year we will have eight, and all this is the work of one man. (Applause.) I feel that every Midlander will be glad to know that Mr. Clergue is one of us. (Applause.) My one regret is that he is

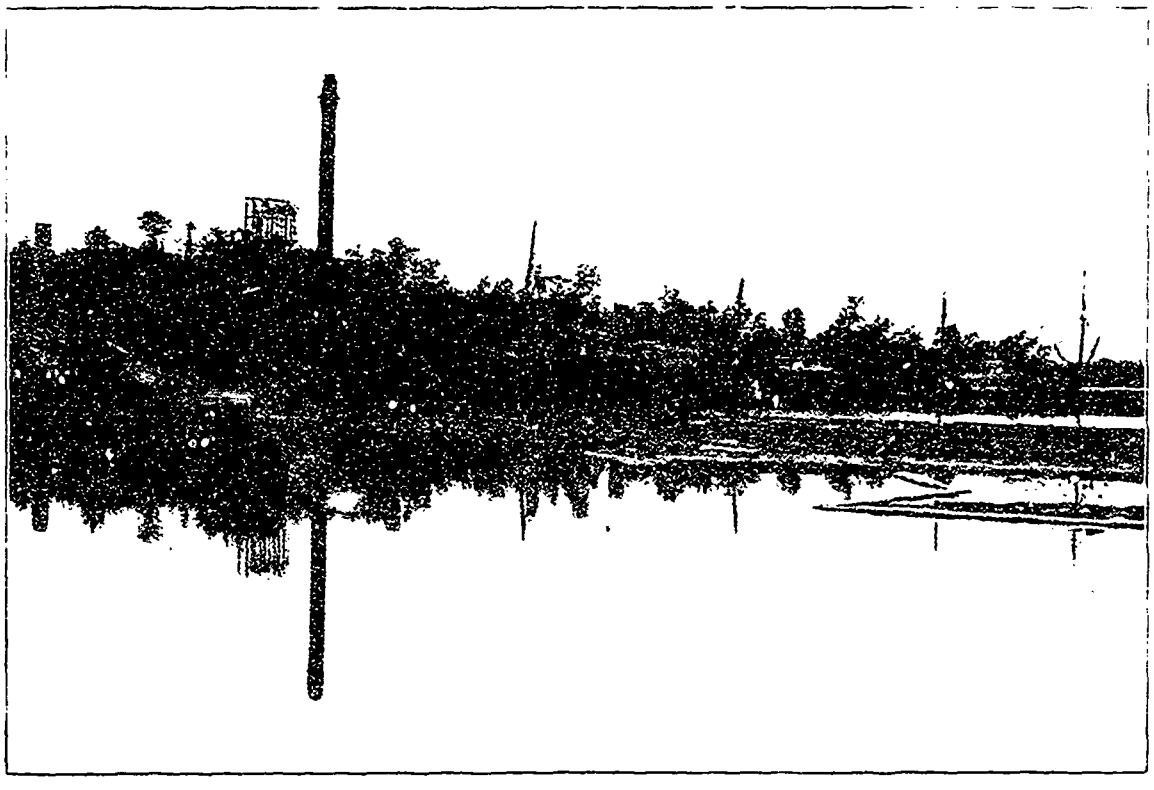
not with us today owing to his absence in England. That ore pile you see over there, which lay in the ground in the wilderness a year ago, perfectly worthless has been transformed here by Canadians in this rising town of Midland into something of very great value to this great country. You know that the iron industry in Canada is making a very rapid advance just now. Away down by the sea at Sydney, Cape Breton, they are putting up enormous works, and I feel certain that the product will find a market in Europe. Hamilton is developing, Deseronto is developing, and you ask me whether, with Midland and all, we are not overdoing it? I do not think we are overdoing it. They say of the Sydney plant that it is the biggest baby ever born. We cannot quite say that of Midland, but we think it is a proper kind of infant, normal perhaps, but a proper kind of infant that we think is going to grow and thrive and be a credit to its parents and the town of its nativity—Midland. (Loud cheers.)

Hon. G. W. ROSS—Mr. Drummond, ladies and gentlemen, I am very glad to be here today. I do not think this is the first baby that has been born in the family of the Canada Iron Furnace Co. It is the second baby. Well, I am glad that the family is growing and I am glad that this baby promises so well. Of course, it has been a pretty expensive baby so far, and it seems to live in a pretty hot place. (Laughter.) However, while I do not know much about blast furnaces I do know a good deal about babies, and I can guarantee the one I have seen today—I can guarantee that it promises to be a strong, useful baby, and promises, I believe, to be as well developed as any member of its family. (Applause.) I am glad to know that the iron industry is doing so well in the Province of Ontario. Mr. Drummond referred to the works at Hamilton. They are the largest works of the kind in the Province; they consumed about 70,000 tons of ore last year and produced iron to the value of nearly $800,000. Deseronto is still in its infancy but promises well But this undertaking seems to be the most promising that has yet been entered upon by any of those interested in the development of our iron industry in the Province of Ontario, and I congratulate the Town of Midland on having in its midst such a large enterprise which will give employment to so many citizens and I congratulate it on having in its midst a company of gentlemen who have since its inception so well carried out the business they set about. (Applause.) It is very desirable that such an industry should be handled by men of industry and experience, because we can then have the greatest confidence in the result. The directors of this company are experienced men, they have tested ore in other countries, they have employed skilled labor in other countries and have shown that they can make capital and labor productive, and with such men charged with the development of such an important industry, we need have no fear at all of its success (Applause.) There are one or two reasons why we should be exceedingly gratified at the establishment of this industry at Midland. First of all, the architect and engineer who planned these buildings and carried them to completion is a Canadian. (Cheers.) I am beginning to have a very high opinion of Canadians, although I am a Canadian myself. (Laughter.) In this connection I will tell you a little story about a Scotchman's prayer. Scotchmen, you know, will venture very near the truth sometimes even in prayer (laughter). This particular Scotchman once prayed, "Lord, gie us a gude conceit o' oursel's." Only a Scotchman could make such a prayer as that (laughter). Now, I have a good conceit of Canadians, and although I do not know much about iron works and iron enterprise, I have visited similar establishments in Bethlehem, Pa., and I can only say that the works which have been planted here have been planned in such a manner as to produce the best results, by men who have been successful in every enterprise they have undertaken. (Applause.) When I consider that this enterprise is for the use of Canadian ore, of Ontario ore, it adds very much to my interest in the enterprise. (Applause.) We have endeavored in the Legislative Assembly —I am speaking not as a politician, but of the Assembly as a whole—we have endeavored to give some encouragement to the development of the iron industries of the Province of Ontario, as we look upon that part of Canadian industry as the most valuable asset Canada has. (Hear, hear.) We have millions of acres of pine forests constantly receding towards the north, and what means all these mineral lands becoming bare? We have only to look into the Almighty's treasures we are now seeking to expose. The value of our iron mines and of our gold mines are far beyond our conception. (Hear, hear.) I cannot speak of the gold mines from personal experience, but I know that the iron ore to the north of Lake Superior, in the neighborhood of Michipicoton and perhaps west between Port Arthur and Rainy Lake, is one of the most valuable mineral regions in the world. I expect also to see some of the nickel of the Sudbury district brought down here and manufactured into nickel steel. I know that Mr. Drummond would not be behind hand in promoting such an enterprise. Senator Cox has put his hand to many a plow and has not turned his back yet. If you have more children christened—say two, three or four, or more, or until you exhaust the multiplication table, in fact—we are not particular so long as you develop all the mineral resources of the country. (Applause.) Then there is one other feature: It is part of a good Canadian policy to provide work for the people of this country. That is what lies at the foundation of national prosperity. As I said in Toronto the other day, at the beginning of this century the United States had only 5,000,000 of people, but to-day her population numbers 76,000,000, and why at the beginning of the next century should we not have forty or fifty millions of people in this country? (Hear, hear.) Think what a great country we shall have; but if you wish this to be done you must develop the natural resources of the country. (Hear, hear.) People cannot live on air, and I know of nothing that gives employment to a more hardy or useful class of our population than our mineral resources. (Applause.) You have therefore a sound argument, and with strong muscles to perform the work and with a strong hold on organized capital, it simply means an incentive to progress for all the other industries of the country. It means, perhaps, that as has been said, the commercial axes of the world may be changed, and that unless the iron is exhausted and the coal is exhausted Canada will have an opportunity to maintain a brilliancy in this respect. Look across to the Sudbury region, the Algoma region and the Muskoka region, and you will find there, watched over by her sons and developed by Canadian capital, that which will still maintain the British Empire in her dominant position among the nations of the world and give her the power which makes her to-day mistress of the seas (Loud applause.) I congratulate you upon your enterprise, and I congratulate myself upon being here, Premier of the Province of Ontario, just at this particular time, when we are beginning to have more confidence in ourselves, and to feel the throbbings of a new life and new possibilities in this country, and I hope our boys and our young men will push ahead and advance many leagues beyond a point where we have left it when we shall have passed away. (Cheers.) I also congratulate the Mayor of Midland; I hope he will use this industry well, and not charge them more taxes than they can conveniently pay. (Laughter.) I hope that he will give good schools for the children of the working men; I hope that he will give them good roads; I hope that eventually, with a better moral and political and literary education of the children, Midland will become a model city, and that this will be a model industry and that it will be copied by various other industries in different parts of the Province. (Loud cheers.)

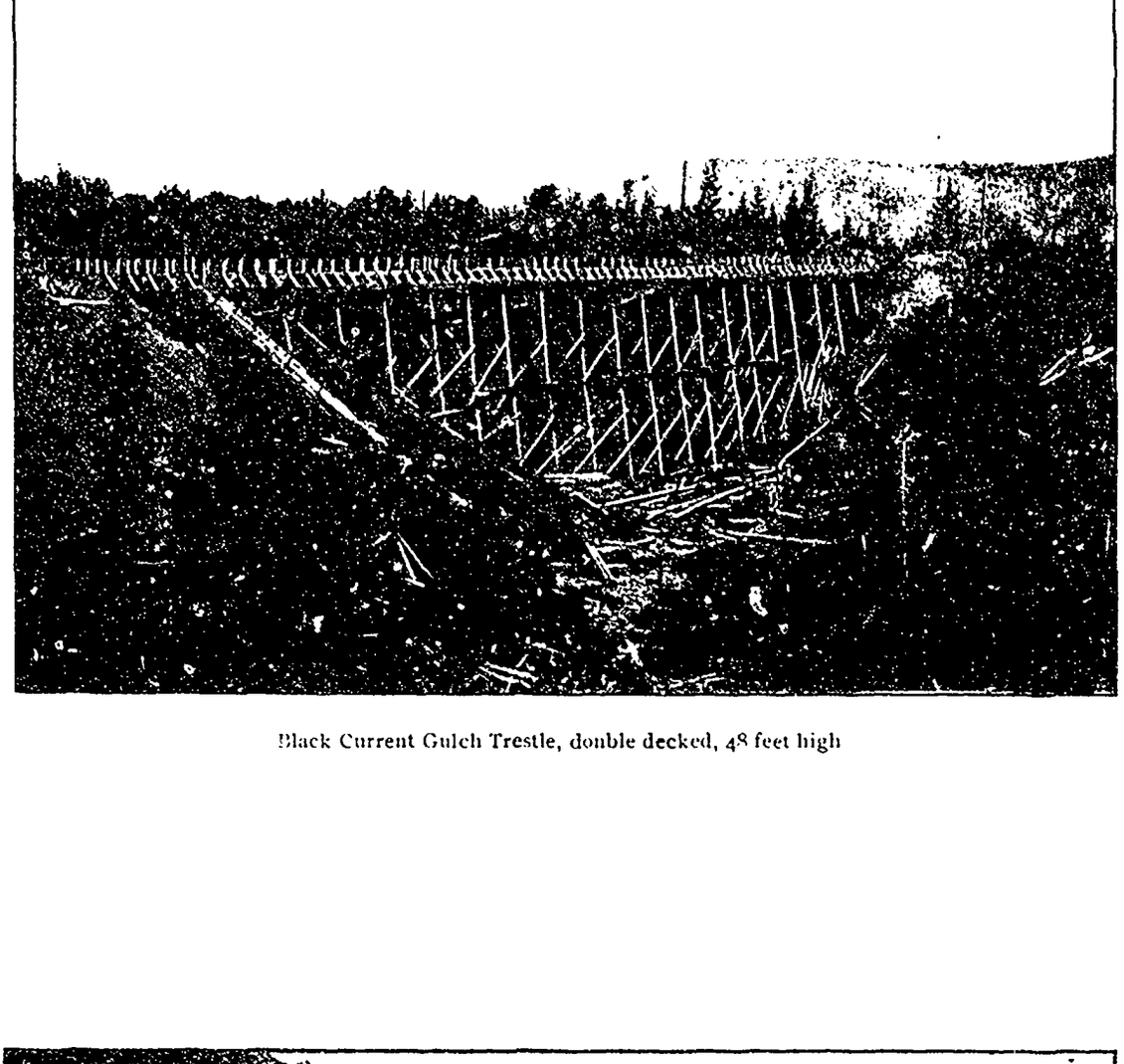
Hon. E. J. DAVIS, Commissioner of Crown Lands—Mr. Chairman, ladies, and gentlemen, I am very pleased indeed to be present on this occasion, and to speak here as a Canadian, from the fact that in all nations that there are certain days that are remembered and honored by the people. In our own land we have our Dominion Day which we all regard and love because of the great achievement consummated on that day, and I believe that in years to come, we will also look back with pride to the time of the opening of this Furnace No. 1, and when you shall have eight or ten furnaces or more employing hundreds of men and sending out your products to all parts of the globe (Applause.) This is not only an historic day in the town of Midland but also in the history of this Province as well, as it is the beginning of a new development of the natural retources of the Province of Ontario. What has called us here today is an indication of what is going on in this Province in various ways; but in order to have an institution such as we have seen today several things are required. We require men of skill and experience, and we require men of enterprise who are willing to invest their money. Well, you have these enterprising men here in connection with this organization, and as citizens of the Province of Ontario we are proud of them. (Applause.) Not only here but elsewhere, we have indications of their ability, their skill and their enterprise in various walks of life, Hamilton has been referred to in connection with such industries as this, as well as Deseronto, and we also have Mr. Clergue's work at Sault Ste. Marie, in connection with which this enterprise is closely connected. All these are indications of what has been going on during the past three or four years in the history of iron development in the Province of Ontario; but you not only require enterprising men to carry on these works,—in our own country as in others, you must have enterprising men in other walks of life who will take the products of establishments such as this and employ a great number of men in building up the country in which we live. In addition to all this you require skilled men, mechanics who have learned their trade, and the Canadian men are able to do the work as thoroughly



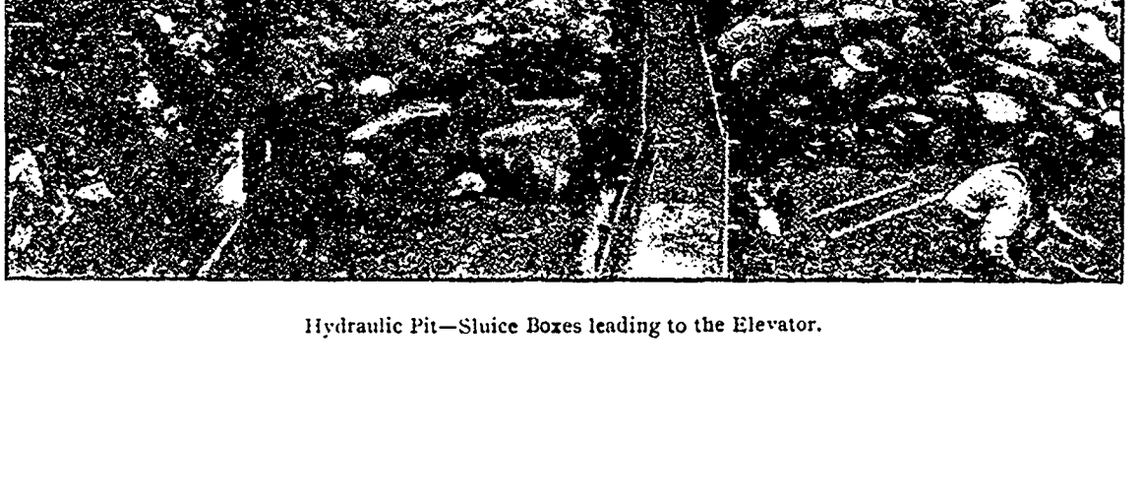
New Blast Furnace "Midland No. 1" at Midland, Ont., opened by the Premier of Ontario this month.



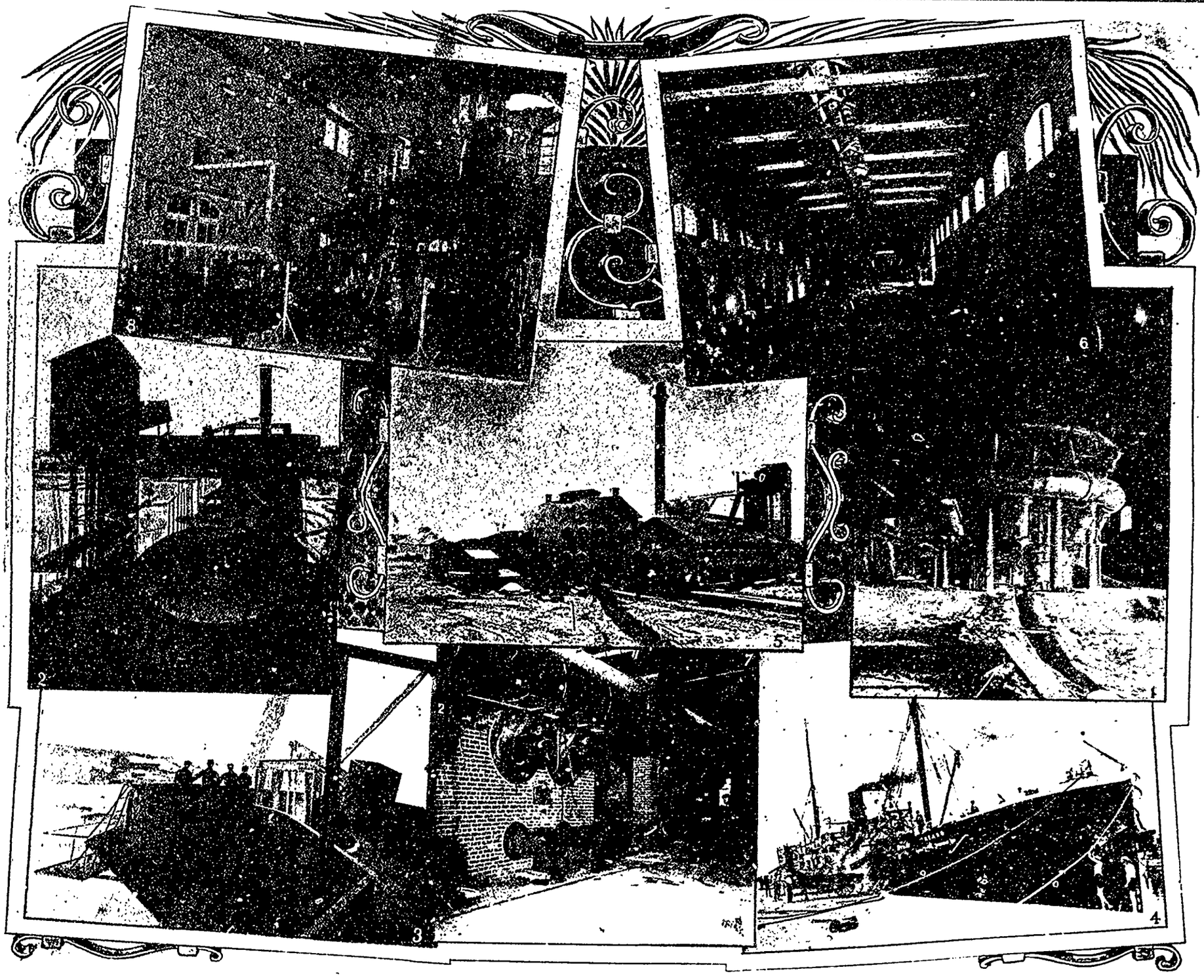
View of plant from waterfront, showing steamers unloading ore from Helen Mine.



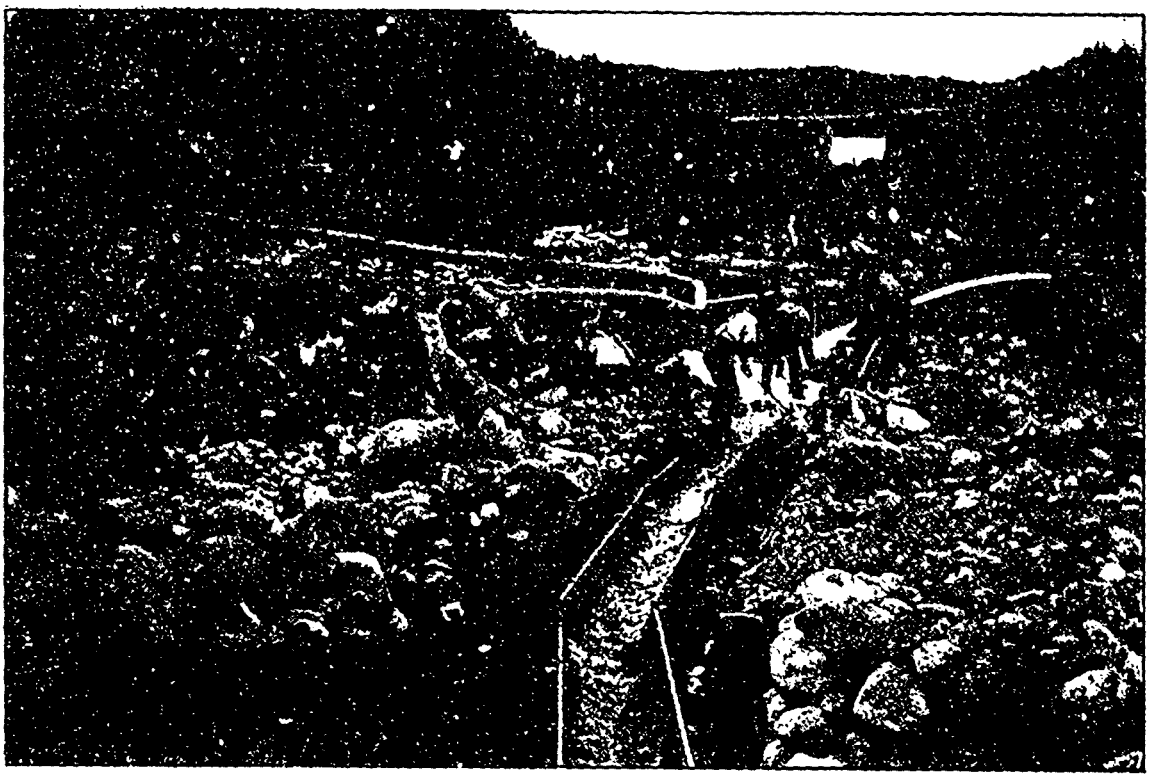
Black Current Gulch Trestle, double decked, 48 feet high



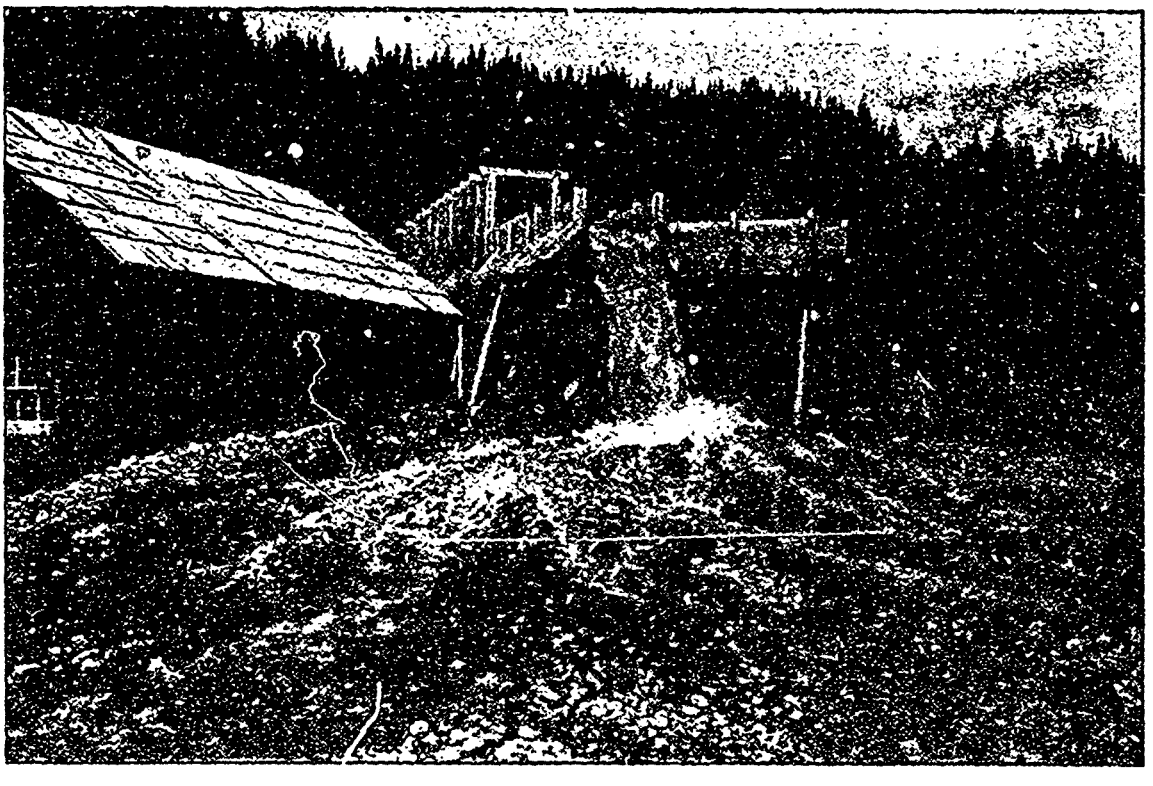
Hydraulic Pit—Sluice Boxes leading to the Elevator.



Exterior and interior views of Midland No. 1 Furnace at Midland, Ont.



Sluice Box Head—Middle or Up Stream Cut.



Tail Over from Elevator.

and as successfully, as soon as they have the opportunity, as the men of any other country in the world today. (Cheers.) And in addition to all this it must not be forgotten that transportation is a very important feature in connection with this industry, and I was pleased to hear the remarks of the chairman with reference to the view taken by the officials of the Grand Trunk Railway Co. Mr. White, who is here as a representative of that railway, and I have had interviews with reference to this particular industry, and I was pleased to hear Mr. Drummond say that arrangements had been made with that company for increased railway facilities (Applause.) Then you have good water communication in Midland and in this way you are able to place the raw material upon the spot in the cheapest possible manner. As Commissioner of Crown Lands I am particularly pleased to be with you today, because the mineral interests are under the control of the Department of Crown Lands, and I need not say to you that the Premier's Policy is one of progress and development and he wants his ministers to carry it out. (Applause.) If you will permit me I would just like to point out one or two things in this connection. During the last season assistance was given for the construction of the Algoma Central Railway, and as a result of the assistance given and the arrangement entered into with that railway you have been enabled to witness what has happened here today. (Applause.) Had it not been for the construction of that portion of the the road you could not have reached Michipicoten and you could not have had some of the rich ore deposits in Midland t day. That steamship line was also a part of the arrangement entered into at that time, and those steamships took it from Michipicoten, brought it down here for the use of the markets of our own land. This will show how great results will flow from a very simple thing. The mines from which these ores come are almost inexhaustible, and you not only have transportation by rail and water, but I notice from figures quoted here to-day that you are fortunately situated in being 700 miles nearer to the great markets of the world by way of Midland and Montreal, than by way of Buffalo and New York. Our country is thus favorably situated, and it is the duty of the Government of the Province of Ontario to develop these interests. We should march shoulder to shoulder, each adding his quota to the general development, and I think we are not too sanguine when we say that within the next five or ten years our population will be increased by several millions, that good wages will prevail and happiness and prssperity will be abroad in our land. (Cheers.)

In introducing Mr. Edw rd Gurney, of Toronto, to the audience, Mr. Georg . E. Drummond said, "A good many years ago Mr. Gurney gave me an order for Scotch iron. He it was who also gave us the very first order for the Canadian article, and I think you will all agree that he has shown a truly Canadian spirit in the matter, and we have to thank him very much for it." (Applause.)

Mr. GURNEY said Mr Drummond, ladies and gentlemen, I am not a speech-maker, but just a plain ordinary manufacturer, and I have been thinking to-day as I have looked back over the history of Canada in connection with manufactures for the last thirty years, the wonderful progress we have made. As I look back to the time I first attended a meeting of the Board of Trade, Toronto, I can remember that I was told to take a back seat, because, they said, we want no manufacturers in this country beyond the blacksmith. (Laughter.) Now, looking at that time, I can see one man looming up above every other man in Ontario—and I believe he is represented by his son on the ground here to-day. I refer to the late John McLean, who predicted just what has happened here today. I am glad to honor that name. (Applause.) He came to us and told us that this country must legislate for the people of this country; that if we were to preserve British institutions in this country we must have a tariff and must legislate in one particular direction to maintain our own people within the limits of this country, and he was looked upon as the humorist of the day. Everywhere he went he provoked a laugh, and he scarcely lived to see the Tory party of this country in the first instance adopt a protective policy. Where can you find a man to-day on this platform, or any other platform, who does not believe in the maintenance of that grand old flag. (This aroused the loyalty and enthusiasm of the large audience, all joining most heartily in singing "God Save the Queen") But, ladies and gentlemen, to maintain that which that flag represents in this country you must maintain the industries of this country. (Applause.) We must no longer look south for our inspiration (Loud appla) Hereafter we must and we mean do everything to support the mainten of a separate nationality on the northern half of this continent. (Applause.) We must say to every man, if you want to remain in this country you must be in favor of such legislation as will result in the maintenance of the Canadian laborer and in the maintenance of the Canadian man of enterprise. (Applause.) Ladies and gentlemen, this grows out of years of experience. I look back to the time when a great interrogation mark stood before every politician in this country. They scarcely knew whether to look across the Atlantic for inspiration or to the South, but happily to day in Canada we have but one sentiment, and that is a Canadian sentiment and a British sentiment (Cheers.) Mr Chairman, let me say to the politicians who are here to day that I am no politician, but I believe in this country accepting just such legislation as we have had in relation to lumber, in relation to transportation and in relation to iron and its products, and when they look to us for votes they must see that they have pursued a policy that means prosperity for Canada. (Applause.) We have nothing to do with that broad spirit which knows no nationality, we are Canadians, and we want to develop Canada for adians, and we want the help of the men to whom we entrust power. (Loud cheers.)

Mayor MILLIGAN of Midland was next called upon, and extended a cordial welcome to the representatives of both the Provinces of Ontario and Quebec. He was glad that the company had established a furnace in Midland, if for no other reason than that Mr. John Drummond had come to live amongst them. (Applause.) The Mayor also pointed out the favorable position in which Midland was placed in carrying the products of the country from the West to the East, and said that they had encouraged the lumbermen, they had encouraged the grain merchants, and they had also encouraged the iron industry. To-day they could congratulate themselves in having established a good trade for these three great staples—grain, iron and lumber—and he hoped the present gathering would be the means of bringing other industries to the town. (Applause.)

Mr. W. H. BENNETT, M P., said: Mr. Chairman, Hon. Mr. Ross, and ladies and gentlemen,—I am pleased to be present today as a citizen of the town and to see so many gentlemen who are not only known to me personally but who are known all over the Dominion of Canada I am sure that Senator Cox must be delighted to see this magnificent work on this side of the Bay. As the then President of the Midland Railway Co, Mr. Cox had in times past been a pioneer in the progress of this district, but very good men cannot live for ever. I can only say that there are times in men's lives when they have got cold feet (laughter)—and I do not propose to make any lengthy remarks. However, I may say that Midland has been termed in the past Midland City, and I hope in the future it will be that not only in name but in fact. With the concentration of the lumber interest at this point to a large extent, with the building up of the iron industry, with what I believe is the grandest and most natural harbor in the world and with our splendid means of intercommunication with the great West, I hope there are men here to-day who will live to see Midland, not a town of 3,000 but a city of 30,000. (Cheers.)

Hon. Senator COX Mr. Chairman, ladies and gentlemen, I shall only take up your time for a few moments, but I wish to extend to the people of Midland my most cordial congratulations at having such a large enterprise with such an enterprising man as Mr. Drummond connected with it. It is twenty-one years since I came to Midland on foot. Mr. Bennett has told you I had the honor to be President of the Midland Railway. I came out here with Mr. White, then Traffic Manager, on foot, and I felt then as I feel now that Midland is one of the most important points in Western Ontario. A few months ago I was a guest of Mr. F. H. Peavey, of Minneapolis, one of the largest grain merchants in the world, and I was shown his enormous elevator at Duluth. I was glad to remember then, as I remember now, that the grain of the Canadian and American North-West stored at Duluth and Port Arthur is 380 miles nearer Montreal by way of Midland than it is to New York by way of Buffalo and that Montreal is is 300 miles nearer Liverpool than New York is, and I hope to see the Grand Trunk Railway double tracked from the important harbor of Midland to the head of ocean navigation on the St. Lawrence. I believe that the enormous traffic that will pass through this harbor and over this road is beyond the conception of any of us. (Applause.) We do not realize the enormous resources of our country or the enormous possibilities of our country, and to me it is a great source of pride and satisfaction as having been here at the commencement of this important town to see such industries established here. I believe this No. 1 Furnace of the Canada Iron Furnace Co. will not only be followed by other furnaces but will be followed by other important manufacturing industries, and my best wishes go out to the Town of Midland. May it grow to be a very important city and a most important gateway in Western Ontario. (Cheers.)

Mr. ARTHUR WHITE, of the Grand Trunk Railway: Mr Chairman, ladies and gentlemen, I can assure you that the Grand Trunk Railway is

very much interested in Midland, and had our General Manager, Mr. Reeves, not been very busy in New York, he would have been glad to have been here today. What I want to say to you is this, that when Mr. Cox and I came up here and hunted you out you gave us assistance and we established No. 1 Elevator, or No. 2 as it is now Then I came along to you gentlemen again, talking the same old story of the beauty and magnificence of Midland's harbor and you gave me assistance again, and we built an elevator of 1,250,000 bushels capacity. I came along again with Mr. Geo. E. Drummond and you gave us assistance a third time, and now I feel that I am almost a Midlander myself. At any rate I can assure you that the Grand Trunk Railway looks upon Midland as its port, and it is the intention of the Company to cultivate this port. I may add that I would not be surprised if Mr. J. J. Long's—I who I see present)—line of boats are not plying here before long, with large docks and large wharves and everything to make Midland what it should be—a port of the world. This is what the Grand Trunk is aiming for, and what Midland is aiming for, and I think we will get it, and we have men around us who will live to see it one of the large cities of Ontario. (Applause.)

Mr. ROBERT JAFFRAY, Toronto: Mr. Drummond, ladies and gentlemen. I feel very grateful to you for having invited me to be present on this auspicious occasion. I was the first man to introduce the iron industry in Ontario, having been instrumental in introducing Mr. Moorehouse, of New York, who started the Hamilton furnaces. These have been a great success, and I can only wish Mr. Drummond and his Board may have equal success in Midland. It has been ably and well said by the gentlemen who have spoken before that Canada is but opening its eyes to the immense resources that are yet to be developed, and I am sure Midland will not be behind, and with the gentlemen you have behind you taking an interest in this enterprise there will be developed not only this No. 1 furnace, but the number will run even to the end of the multiplication table. I am pleased to be here to-day, having been one of the first directors of the Midland Railway, and I may say that you owe a great deal to Senator Cox and Mr. White. These are the men who brought the railway here under great difficulties. It was only the indomitable perseverance of Mr. Cox that accomplished it, and now you are very fortunate indeed in having the Grand Trunk to look after your interests. They will be well looked after, as Mr. Cox said; it is very much to their advantage that it should be so. (Applause.)

At this point Mr. J. T. McCall read the following letters of regret at inability to be present:—

From Sir Wilfrid Laurier.

HALIFAX, 15th December, 1900.

DEAR SIR,—I have the honor to acknowledge the receipt of your kind invitation to attend the convention to take place in Midland on the 18th inst. to celebrate great undertaking of the Canada Iron Furnace Co.

I am very sorry that engagements already accepted will not permit me to attend and do my share to honor all the enterprising and business men who are developing in this country an industry of such a vital importance.

With my sincere thanks for your courtesy please accept the renewed expression of my regret at my being unable to accept it.

Yours respectfully,

(Sgd) WILFRED LAURIER.

From the Lieutenant-Governor.

Sir Oliver Mowat extremely regrets that notwithstanding that he appreciates the public importance of the work and business of the Canada Iron Furnace Co., and notwithstanding the interest which he consequently feels in the Company, he is unable to accept the invitation of the President and Directors to the official opening of their new blast furnace at Midland on Tuesday, Dec. 18th.

Government House, Toronto, Dec. 11th, 1900.

From Mr. Chas. M. Hays, late General Manager of the Grand Trunk Railway.

MONTREAL, December 17th, 1900.

MY DEAR MR. DRUMMOND,—I have yours extending an invitation to the opening of your Midland plant to-morrow (Tuesday). I regret very much that a prior engagement will prevent my attendance.

Permit me to take this opportunity to express my congratulations on the establishment of this plant, not only on behalf of the Railway Company, but in the interests of the Dominion, the Province of Ontario, and Midland as well. I know of no character of industry that should be more welcome to all of us than one which promises to do so much in the promotion of the general welfare, by the manufacture of an article entering so widely into commercial uses in every direction, as is the case with coke iron at the present time.

With every wish for your future success, and again regretting that I am not able to be present to express these sentiments personally,

Believe me, very truly yours,

(Sgd.) CHARLES M. HAYS.

From Hon. J. M. Gibson, Attorney-General.

TORONTO, 14th December, 1900.

DEAR SIR,—I have received the invitation of the President and Directors of the Canada Iron Furnace Co to the official opening of the new blast furnace at Midland on Tuesday next, and regret very much indeed that I am not likely to find it possible to be present on the interesting occasion, and all the more because from the inception of the enterprise I have had more or less intimate knowledge of the intentions and views of the Directors thereof. It has been extremely satisfactory to learn from time to time of the progress being made towards completion of the work and of the certainty that in due course an industry would be in operation at Midland of great importance to that place and to the country at large. During the past summer, I believe, large shipments of iron ore to Midland have been made, and this trade no doubt will continue in increasing proportions in the future. This is the sort of enterprise and development which the people of this country are gratified to witness. We cannot have too much of it, and I am glad to observe from indications that we are likely to have very much more of it in the future. Northern Ontario is full of resources and all that is wanted is the necessary development.

I wish the Canada Iron Furnace Co. a prosperous career in its enterprise.

Believe me, yours very truly,

(Sgd.) JOHN M. GIBSON.

From Mr. Archibald Blue, late Director of Mines for Ontario.

OTTAWA, Dec. 12th, 1900.

DEAR MR. DRUMMOND,—I fear I shall not be able to accept your invitation to be present at the official opening of the Canada Iron Furnace Company's new blast furnace on Tuesday next. I have always kept a close watch on the enterprises of your Company, and I have viewed with special pleasure this last one at Midland. I certainly trust that it will prove to be a successful venture from the outset, and not only reflect credit on the skill of the engineer who planned the plant and directed it to completion, but also will satisfy in the quality and capacity of its work the ambition of the Company.

It should be a red letter day in the history of Midland that on the shore of a deep and spacious harbor a furnace of the first class is blown in to smelt hematite ores, the exclusive product of Ontario mines.

Trusting that you may have an auspicious opening day.

Believe me, yours very truly,

(Sgd.) A. BLUE.

From Mr. Walter H Laurie, of The Laurie Engine Co., Montreal.

MONTREAL, December 7th, 1900.

DEAR SIR,—I received the very kind invitation of the President and Directors of the Canada Iron Furnace Co., to the official opening of their new blast furnace at Midland. I certainly regret that, owing to business engagements, it will be impossible for me to accept, as it would have given me very much pleasure to be present on that occasion. I might say that I recently had the privilege of inspecting the entire plant and I can assure you that I have never seen a more complete plant anywhere. Not only is the plant complete in itself, but the installation is very much superior to the general run of blast furnaces, and reflects great credit on the engineer in charge.

Wishing you a very successful opening.

I am, yours very truly,

(Sgd.) WALTER H. LAURIE.

Rev. Father Laboureau, of Penetanguishene, who had been thirty years ago placed in charge of the old Mother Parish of Penetanguishene and Midland, in a brief speech, congratulated both Midland and the Canada Iron Furnace Co. on the establishment of a blast furnace in the town. Penetanguishene should not feel jealous of the success of Midland for after all they were all children of Canada. He had been a Canadian more than a Frenchman, and his best wishes were for the prosperity of all Canada and he hoped that they would all be one in spirit and in human nature.

Rev. Father Barcelo, of Midland, also added a word of congratulation to Midland and to Mr. Geo. E. Drummond, his brothers and all the directors, and remarked that these gentlemen came from his native province,

Quebec, to open these works. With such a great and wonderful industry in their midst, Midland must make rapid progress, and would some day grow to be a city. He thanked the Premier for gracing the gathering with his presence.

During the speeches of the last two gentlemen the assembly sang in excellent French, "En roulant, ma boule roulant" and "Allouette."

Mr. Geo. E. Drummond then presented Premier Ross with a handsome gold headed cane as a souvenir of his visit to Midland, and the assemblage sang heartily, "For he is a jolly good fellow."

Hon. Mr. ROSS, in replying, said :—I thank you Mr. Drummond very sincerely for your very kind recognition of the pleasant duty I discharged to-day. It is quite an unexpected recognition of the part I took in the christening of this furnace No. 1. I know you do not mean this as a sort of walking ticket—(laughter and cheers)—but I may say that ten years later I expect to see many more in the family of the Canada Iron Furnace Co.

Mr. B. T. A. BELL, Secretary of The Canadian Mining Institute :—After what has been said by the distinguished speakers who have preceded me, and bearing in mind Mr. Bennett's most appropriate consideration for your "cold feet," it is not my intention to inflict upon you any speech of mine—but inasmuch as you have heard from the representatives of the Government, of the Transportation Companies and of the consumers, perhaps I may be permitted to join with them in my congratulations to Mr. Drummond and his confreres on behalf of the ore producers, without whom that new stack would be impossible. We are all agreed upon the magnificent natural resources of our country, and particularly upon her great wealth in minerals, but what we want is men who *do* things—men like the Drummonds, who have not only faith in these resources, but who demonstrate their faith by accomplishing practical work towards their development. (Applause) The iron industry of Canada owes much to the pluck and enterprise and skill of George Drummond and his brothers, and I, in common with all their friends, wish them every possible success with this, the second furnace they have established in the country. Mr. Bell then called for three cheers for the Canada Iron Furnace Company and the Messrs. Drummond. The cheers having been very heartily given, this portion of the proceedings terminated with the singing of the National Anthem.

On the return journey a halt was again made at Annandale Station where another generous collation was served to the visitors in the station restaurant.

The Hon. Mr. Ross appropriately voiced the sentiments of the whole company in returning thanks for the exceedingly interesting and enjoyable day provided by the directors of the Canada Iron Furnace Company.

Mr. George and Mr. Tom Durummond each briefly acknowledged the compliment.

Dr. W. H. Drummond then recited one of his inimitable Habitant poems, "The Oyster Schooner."

The party arrived in Toronto about 9.45, in time to make connection with the Montreal train.

THE NEW PLANT DESCRIBED.

While a description of the new furnace was given our readers a few months ago, it will not be out of place to add the following details in connection with the group of photographs reproduced elsewhere in this number :—

The Canada Iron Furnace Company's new blast furnace plant at Midland, Ont., is situated on the shore of Midland Bay, immediately opposite the town, with a perfectly sheltered harbour, safe at all seasons of the year. The property upon which the furnace is built is about 100 acres in extent, with a splendid water front on the bay, the works being erected in immediate proximity to the water. The furnace water front will be available for vessels of large size, and will be about 450 feet long, with a depth of water alongside (when dredging operations now in progress are completed) of 21 feet 6 inches. The wood wharf in front of the charcoal kilns will have a length of from 800 to 1200 feet. The docks will be fitted with Brown elevators of modern tpye that will unload the ore and other necessary material from the vessels and deliver directly into the stockhouse.

FURNACE.—The furnace is 65 feet x 12 feet, and capable of producing from 100 to 150 gross tons of iron per day. The furnace, with hoist, water jackets, and all fittings, is modern in every respect.

HOT BLAST STOVES.—There are three stoves, 16 ft. diameter x 65 ft. high, known as two-pass stoves. They are first-class in every respect, including fittings, the whole resting upon a large and substantial stone foundation, laid in cement.

FURNACE CAST HOUSE.—40 ft. wide x 150 ft. long, the floor of which is 5 ft. above yard level. Walls entirely of brick (heavily built) 20 ft. high, with roof of steel.

STEAM HOIST.—The usual crane pattern elevator engine.

BOILERS.—Eight 50 h.p. flue boilers supply steam for all requirements.

BOILER HOUSE.—Consists of iron columns, with steel roof. Between columns is built in with brick work, and boiler house is erected immediately adjoining the engine room, so that the engineer on duty can at all times have two boilers under his eye.

ENGINE HOUSE.—Brick structure, with fireproof roofing. Building is provided with steel I beams for the purpose of handling any portion of the engines or machinery situated in the building.

BLOWING ENGINES.—Made by the Roger Machine Co , of Columbus, Ohio, are first-class in every respect, each one being capable of supplying in itself sufficient blast to the furnace. They are thoroughly well finished and fitted out with all requirements, including patent water heaters for boiler feed.

PUMPS.—There are two large duplex pumps for circulation and fire purposes. One duplex for boiler feed purposes. All pumps are more than ample for requirements.

CHIMNEY —Is built of steel 10 ft. diameter, 170 feet high. The foundation is built of stone 20 ft. high, and is exceptionally strong. Chimney is first-class in every way, and is lined with firebrick. Inside diameter, 8 ft. 6 in.

WORKSHOP.—A brick building 30 ft. x 60 ft. One end contains blacksmith's shop, separated from the machine and carpenter shops by an 8 inch brick partition wall. In the blacksmith shop is situated a locomotive-type boiler, with engine attached, for the purpose of providing power for the shops, also for heating same in winter if furnace should be shut down. The remainder of building will be used for machine shop and carpenter shop, and in the latter is situated necessary wood-working machines, such as saw table, jig saw, and buzz planer. Machine shop is also equipped with the usual tools required for furnace use, such as pipe cutting and screwing machines, lathe and drilling machines, iron sawing machines for cutting samples, etc.

OFFICE.—Is situated immediately above the works on the hill-top, where a complete view can be had of the total plant. In this building are situated all the offices, as well as chemical laboratory, etc.

WATER TANK.—Steel tank 12 ft. diameter, 40 ft. high, situated immediately above the office on the highest point of the adjacent hill and about 70 feet above the water level. The present intention is to pump all water for requirements to this tank, and supply furnace and buildings generally directly from the tank, the total water supply for plant being taken from the bay immediately in front of the works.

CHARCOAL KILNS.—Consist of 65 cord kilns, and are built in a double row, parrallel and in close proximity to the water front. Each kiln is built on a solid stone foundation. Between two rows of kilns will run a wooden trestle, with railway, for the purpose of delivering loaded cars to the kilns.

SCALES —The yard is provided with modern railway scales, of full capacity. Stock-house is equipped with the usual six beam scale.

STOCK SHED FOR ORE.—This building is about 80 ft. x 200 ft., and is provided with trestle work for railways cars, also an overhanging roof facing water front for the purpose of permitting the Brown elevator to deliver ore underneath the roof. The foundation is of stone, with suitable superstructure.

RAILWAY.—The company's railway, which connects with the line of the Grand Trunk Railway at the edge of the furnace property, extends from one end of same to the other, and is owned and controlled by the company.

Midland as a location for the furnace is unsurpassed, being in very close touch, by direct water route, with the iron mines of Lake Superior, and the furnace can draw its supplies with equal facility from either the Canadian or American mines. Vessels plying from Lake Superior to Midland can do almost double service, as compared with boats plying to Lake Erie and Lake Ontario ports. Midland is also splendidly situated for serving the Ontario and Eastern markets with iron products. The following table will show how well placed Midland is (in comparison with other Georgian Bay ports) with regard to serving Eastern points :—

	Miles.
Distance from Midland to Montreal, via Grand Trunk Railway	383
Distance from Owen Sound to Montreal by Canadian Pacific Railway	460

NOTES FROM ROSSLAND.

The situation in Rossland at the close of the year 1900 is one of distinct encouragement to all interested in its future. In spite of many drawbacks, of which the threatened labor troubles of last spring were not the least, the camp shows marked progress and improvement for the year as compared with the preceding one. The total shipments of ore in 1899 were approximately 175,000 ton. The total for this year will exceed 225,000 tons and this in spite of the fact that shipments were almost totally suspended for nearly three months. The weekly output now averages about 6,500 tons and promises to be doubled at an early date in the new year, consequent on the increased smelter facilities which will be then available and the lack of which is now alone to blame for the shipments at present being so much below the capacity of the mines.

There has also been a notable improvement in the methods and means of mining during the past year. Contract work has largely replaced day labor with the result of greatly reducing the cost of mining and at the same time enhancing the wages of the mine workers so employed. An enormous amount of money has been expended in development work, having for its object the more economical handling of the large ore bodies previously discovered, notably in the case of the Le Roi, Nickel Plate and Centre Star mines where shafts of five and three compartments have been sunk to depths of 1,000, 600 and 500 feet respectively. These mines and many others have also been equipped with new and complete machinery plants—the expenditure for surface improvements alone approximating upwards of $300,000 for the year. It would be no idle boast to say that there is no better developed, equipped and managed mine in the world to-day than the Le Roi, and the same may almost be said with truth of several other of the larger mines in Rossland.

One of the most encouraging signs of the times is the renewed interest taken in properties not controlled by the British America Corporation or by Messrs. Gooderham & Blackstock For the past two years these mines have been the mainstay of the camp and so they undoubtedly are to day, but they are now no longer its only resource. Recent developments in the Iron Mask insure its being a producer of the first rank, and the Evening Star, Homestake, St Elmo, I X L and Giant are all confidently expected to become large shippers at an early date Anyone at all familiar with the camp will know that this means that besides Red Mountain the camp will have mines on Monte Christo, Columbia, O. K. and Deer Park Mountains - an enormous extension of the productive mineral belt. The Spitzee and Commander are also expected to prove that the valley between the north and south belts contains payable bodies of ore.

Outside of the immediate environs of Rossland and within the district tributary to this city great strides have also been made during the year. The Velvet, on Sophie Mountain, is being given an adequate machinery equipment, and will from now on be a steady producer. To the north on St. Thomas Mountain the Bonanza is developing a good ledge of shipping ore and will in all likelihood be a shipper next summer. In other sections, such as Murphy and Sullivan Creeks and Sheep Lake, the work of the past season holds out excellent prospects for the next.

LE ROI MINE.

At the Le Roi the new machinery is nearly all installed. This consists —besides a new 40-drill compressor—of a mammoth hoist, sampling mill, ore sorting belts and aerial tramway The five-compartment shaft is completed to the 900 feet level. Stoping is being carried on on every level from 200 down to 800 feet. There are said to be over 125,000 tons of ore on the dumps and 20,000 tons lying broken in the stopes.

LE ROI NO. 2.

The three-compartment shaft on the Josie has been completed to the 600 foot level and it will be at once sunk 200 feet more. The crosscut into the Annie has developed a good ledge of $25 to $30 ore. Work is being steadily prosecuted on the No. 1, which has made several small shipments. When the improvements at the Northport smelter are completed this group will ship about 300 tons per day, this being well under the capacity of the property.

GREAT WESTERN.

The shaft on the Nickel Plate is now down some 650 feet and the ore bodies are being explored on the upper levels. The foundations for the new 40-drill compressor are being put in and it is expected the plant will be in operation by February. The mine will ship 250 tons per day as soon as the smelter is ready to handle its output.

KOOTENAY MINES.

Only development work is being done on the Columbia and Kootenay. The main shaft is now down 30 feet below the 1,000-foot level. It is not known when this property will begin to ship, but its capacity is variously rated now at from 250 to 750 tons per day.

WAR EAGLE.

So far as known by the Rossland public only development work is being done on the War Eagle. The shaft is below the eighth level and drifting is in progress on both the seventh and eighth. There have been repeated rumors about town that good large ore bodies have been encountered in the new deep levels.

CENTRE STAR.

The big surface improvements at this mine are nearing completion. though there is some talk recently of a big concentrator, on which, however, work has not yet been begun. The mine is shipping steadily over 2,000 tons a week and has upwards of 150,000 tons of shipping ore blocked out. The sinking of the main shaft and development on the lower levels is going forward steadily.

IRON MASK.

The Iron Mask is opened to a depth of over 500 feet by a shaft, and the ore bodies recently found on the 400, 450 and 500 foot levels indicate that next year the property will be a very large producer. In the deeper workings one ledge has over 30 feet of pay ore, and two smaller blind ledges of high grade ore have also been found. The shipments from this mine have always averaged much higher in values than from any of the other mines on Red Mountain and the ore in the lower levels is as good or better than any heretofore taken out of the mine. The company is in excellent shape financially since the expensive litigation with the Centre Star has come to an end, and the mine is now to be given an adequate equipment of machinery. It should be the next dividend payer in this camp.

I. X. L. AND O. K.

The I. X. L. has been developing very well of late. Its main ore body is opened by two drift tunnels and crosscuts are now being driven from the third level to open it 100 feet deeper. The last car of ore shipped (23 tons) went $7,840. Recently its president and principal owner has taken an option on the adjoining property, the O K., including the 10-stamp mill, air compressor, tramway, etc., all of which can be utilized to work the two properties together. There is undoubtedly some good ore exposed in the O K. of which the old management of that property was ignorant.

OTHER RED MOUNTAIN MINES.

The other properties on Red Mountain on which work is being prosecuted are the new St. Elmo, Northern Belle and Giant. The former company is now controlled in New York. Drifts are being run on two parallel veins at a depth of several hundred feet, and one of them, the north ledge, is said to show 4 feet of fair grade ore. The Northern Belle is being opened by a crosscut tunnel, now in 270 feet, which has for the last 20 feet been in ore of moderate value. No drifting has yet been done. Work on the Giant is confined to the upper vein, from which small shipments are made regularly each week. On a northern spur of Red Mountain the Anaconda-Green Mountain is being developed by Illinois people.

EVENING STAR.

The winze on the Evening Star is now down over 300 feet from the No 2 level, which at this point is 98 feet below the surface. There is good ore in the winze for the first 57 feet when the dip carried it into the wall. Other veins were cut by the winze below this point, and all these ledges will now be opened by a crosscut on the 400-foot level, after which drifts will be run on them in both directions. Great things are expected of the Evening Star in the next few months.

HOMESTAKE.

The only property working in the south belt proper is the Homestake. This is being opened by a tunnel from its lower adjoining neighbor, the Gopher. One crosscut to the vein has been made from this tunnel since it entered the Homestake ground and it is reported a nice body of ore was then cut. The tunnel has still several hundred feet to run to get under the main shaft, which also opened up some good ore.

SPITZEE AND TOWNSITE.

Work is being prosecuted on the Spitzee and Townsite claims covering part of the original townsite of Rossland a few hundred feet south of Columbia avenue. From the former some good ore is being taken out and shipments are made regularly. Work on the Townsite, which is on the same ledge, has just been begun. It is now known as the "Rossland Deep," money for its development having been contributed by some mining men from Butte, Mont. Another claim in what is practically the same belt, namely, the Commander, is likely to resume operations shortly. It is controlled by W. J. Harris, one of the former owners of the Le Roi.

SOPHIE MOUNTAIN.

The Velvet (Sir Charles Tupper's company) is the principal mine on Sophie Mountain six miles south-west of Rossland. A waggon road has been built to it this summer from the Red Mountain Railway at a point a few miles south of the International Boundary. So soon as sufficient snow falls to make good sleighing shipments will be begun, or rather resumed, as several hundred tons were packed out three years ago. An 18-drill compressor and other machinery has arrived from England and will be installed as soon as it can be hauled up to the mine. Work on the shaft and tunnel of the Portland, a sister property, continues with satisfactory results.

DOUGLAS-HUNTER.

The only other working property in that section is the Douglas-Hunter. This is opened by two tunnels, work on the lower of which continues. A good ore chute has been found and is being drifted on.

ST. THOMAS MOUNTAIN.

A comparatively new section, which is attracting a great deal of attention in Rossland and whose development is being closely watched by mining men, is the St. Thomas Mountain district. This camp is 23 miles from Rossland by a roundabout trail. but only 3 or 4 miles from the Columbia & Western Railway (C P.R.) at Gladstone. It is traversed by a great many parallel ledges of quartz varying all the way in width from an inch or two to 100 feet. The formation is diorite cut by dykes of porphyry which generally accompany the quartz ledges Some very high grade ore is found on some of these claims, most of the values being in gold.

THE BONANZA.

The only property which is working in that section this winter is that of the Rossland Bonanza Company, which is composed entirely of local mining men. Mr. S. W. Hall, superintendent of the Iron Mask, is president and managing director, and associated with him are Jack Fitzwilliams, foreman of the War Eagle and Centre Star, and others less well known. The company owns the Bonanza No. 3 and Our Hope claims and is modestly capitalized at $50,000, 60 per cent. of the stock having been put in the treasury. A tunnel has been driven on the main ledge 75 feet, showing a strong 6-foot vein between diorite and porphyry About half the width of the ledge shows

shipping values (over $35 per ton) and the remaining 3 feet is first-class concentrating ore averaging about $15 per ton. The tunnel starts on the north line of the company's property and has already a depth of 50 feet. Nearly this rate of gain in depth can be maintained by following the ledge to the south side line, over 1,400 feet away. The mine will probably be a steady shipper next summer.

The adjoining property on the north, the Canada, shows about the same width of vein and values of ore in its workings.

OUTSIDE INTERESTS.

A feature that promises well for Rossland in the coming season is the fact that so many of the properties situated at a distance but owned and controlled here are turning out well. From the Boundary country we get good reports of the Snowshoe, Winnipeg, Oro Senoro, Strawberry, and many others. From the Colville Reservation we hear that the Zala M. is a wonder. In the Ymir district the Black Cock, Dundee, Tamarac and others are doing well. In the Kootenay Lake country the London Consolidated, Richelieu and other properties on Crawford Creek and the Lavina-Butte in the Lardeau-Duncan country will be big shippers. From Nelson and East Kootenay and from the Lardeau country in the north we get similar reports. Rossland is the mining metropolis of the Province, and the successful development of mines in any section of Eastern British Columbia almost surely means good fortune to one or more Rossland operators.

LARDEAU NOTES.

Although, as has been previously mentioned, the Big Bend mining district (to which access is obtained through Revelstoke) will be, generally speaking, idle this winter, there will be a notable exception in the case of the Standard Basin property, (formerly owned by the Boston & B. C. Co.), where at length the ledge has been struck in the No. 3 tunnel. There were rumours to this effect some few weeks ago, but they were not confirmed till now, and it must be very gratifying to those who have so persistently stuck to the property through all its misfortunes to find their judgment completely vindicated. More men will be put on at once, and development actively carried on during the winter. No details are to hand at this date as to the width of the vein, but there can be no doubt from the indications already visible that it will be a large one. Your readers will remember it as a copper proposition carrying some values in gold and silver.

Much more attention than has been paid hitherto is now shown to the valuable mica deposits further north, at Yellowhead Pass in fact, and though transportation is as yet almost non-existent, so much capital has been interested in the deposits that work there also will be pushed on. In what way the needful transportation will be provided is so far unsettled—some talk of a branch line from the C. P. R. being extended in that direction, but on the whole the Columbia River seems the most feasible route, although it will require considerable expense to make it practicable. There is no doubt whatever as to the remarkable purity, size, and quantity of the deposits already opened up, and with mica in its present demand the time cannot be far off when this mineral will be placed on the market, and the same transportation that will help the mica will also help many other large and well known properties in the district

In the Fish River Division there will be a good deal of work carried on all this winter; many of the large bodies that were bonded or sold during the last 12 months having turned out so well with the comparatively little development already done that the owners intend to lose no more time in making them into shipping mines. It is a difficult matter to select the best, as that is a point at present undecided, everyone naturally thinking their own holdings to be unapproached by anything else; but on Lexington Creek a great deal of work is being mapped out on the Imperial and Eagle groups, which comprise some 15 or 16 claims. The veins are large and well situated for mining purposes, being well exposed on a very steep hillside and most convenient for tunnelling. The owners (Imperial Development Syndicate) are erecting ample bunk houses and other necessary cabins, and hope to keep 15 or 16 men busy all the winter.

The same company owns other properties in the neighbourhood, on all of which more or less work has been done, and on one at least of which a strong vein of free milling gold rock is proved to exist. There are many other smaller concerns in this district, some of which will probably be worked by a few men all through the season, while others—the majority, no doubt—will be left idle till the summer. It is, however, intended if possible to do development on the Trilby Group as early as possible, the effect of last summer's work being to make the owners (The Double Eagle Co) very well satisfied with their holdings, and next year any how should open the eyes of capitalists to the wonderfully rich propositions scattered through the locality.

In the Lardeau also, a great deal of work is being done now, and will be carried on continuously. The Silver Cup just at present is working a very few men, but that property is so well known, and so far developed that any partial cessation of work must not be attributed to any shortness of ore, but to some other reason best known to the owners; who very recently stated their intention of shipping 700 or 800 tons this winter, a thing they are certainly well able to accomplish

Next in importance to the Silver Cup is the Nettie L., so often mentioned in previous reports; and all preparations are being made there to ship fully 1000 tons while the snow lasts, and in this case again there should be no difficulty in finding the ore. New and much larger bunk houses have just been built, and from 20 to 30 men will probably find work there all the winter. Some of the Nettie L. ore yields enough silver in every pound to make into a dollar, but it is not claimed that all the ore is equal to that!

A good large deal has recently been made whereby certain groups known as the Metropolitan and Sunset, at the head of the Lardeau's North Fork, have changed hands. The amount is reported to equal $37,000, and with that amount at stake it is reasonable to suppose that work will be commenced and carried on with all speed; all of which seems to indicate that the Lardeau district will be busy this winter whether the promised railroad be built or not.

REVELSTOKE, B.C., Dec. 15, 1900.

LAKE OF THE WOODS.

The unseasonably mild weather, by delaying the formation of a safe thickness of ice on the lakes, and the freezing over of the swamps, is operating against miner and lumberman alike.

The inconvenience to the mines is, however, not so great as it might be, for the simple reason that work is closed down at so many of the mining camps—at more than 30 camps, according to one of the local papers South of the Sultana away down to Sturgeon Lake, and beyond to Denmark Lake there is no sound of hammer or pick. The next issue of THE REVIEW, however, will no doubt contain accounts of the resumption of work at several camps that are now idle One of the earliest to open will be the Nino, near Deer Lake, north-east of the Virginia. This camp will start up so soon as the ice is safe for teams. The material for a twenty or thirty stamp mill will be taken in during the winter, to be set up next summer.

Sultana.—The mill is running eighteen hours in the twenty-four. Stoping is proceeding on the Crown Reef vein, which now shows a width of eighteen feet, mostly good milling ore. Against one of the walls is a layer of galena eighteen inches thick.

Mikado.—The main shaft is now down 850 feet. The scheme of improvements inaugurated last spring is about completed, and one result will be a material lessening of the cost of obtaining the bullion.

Eagle Lake.—Mr. Higbee, of Rat Portage, is carrying on work on the Prendible property, where the vein is showing up well. Mr. Farneri, of Rat Portage, is developing his property, lying a little east of the Prendible.

The Tromso.—This is the property owned by Geo. Swanson, *et al*, and situate on the northeast shore of Eagle Lake. The Rossman Co. of Minneapolis took an option on it last summer, and have sunk a shaft 57 feet. They intend to make a cross-cut at 50 feet or so from the surface, to intercept a promising vein passing south of the shaft.

There is a growing interest in the Sturgeon Lake County, north of Ignace. Mr. Shore, of Port Arthur, inaugurated actual mining there last year, which is still going on. During the autumn Mr. Hare, who had already been operating on the Lake of the Woods, took an option on a property out there, and will, I understand, begin work as soon as he can get an outfit transported thither. A large force of teams is being put on the route from Ignace, on the C. P. Ry., out to the Sturgeon Lake mines, the only means of communication in summer being by canoes.

Black Bay, Lake Superior.—Captain Pritchard, of Port Arthur, with a small force, is prospecting a native copper deposit on the east shore of Black Bay, a few miles north-east of the Pritchard Harbour Copper Mining and Development Co.'s properties, and is much encouraged by the show of native copper in the amygdaloid He expects to have two carloads of good shipping ore on the dump by spring.

RAT PORTAGE, Dec. 19, 1900. J. M.

COMPANY NOTES.

Arctic Slope Hydraulic.—Annual Meeting, Dec. 10th, at Victoria. Results for the past season while not up to expectations were satisfactory in so far as they prove that with the plant now on the ground and that to be taken in next spring a recovery of perhaps $100,000 may be expected next season. Owing to the immense amount of Government freight going into the Omenica district for the building of the telegraph system to the Yukon, the plant for the company arrived so late that it could not be placed in position for work until Sept. 17th. Three days after frost cut off the water supply. As the financial result 74.92 oz. gold was brought down from 1,000 feet of gravel washed and cleaned up. Besides this there were 9,000 feet feet washed, but owing to formation of ice it was impossible to clean this up. Had this additional area been cleaned it is likely the financial result would have been about $10,000. The season's work has increased the known width of pay streak from 1½ feet to 10 feet and a channel that was supposed to be 35 feet wide proves to be about 1,200 feet in width, being the bed of an ancient river. The Black Jack mine now has a face of pay gravel 550 feet in length. Four monitors are on the ground and more will be taken in next spring. Four ditches with a capacity sufficient to supply 7 monitors

were under construction and two more are surveyed; these should be sufficient to supply 20 monitors. There are 90,000 feet of saw-logs at mill and 350,000 feet skidded at the lumber camp. Contracts have been let to have these latter hauled, sawed and piled at $16 per M.

Dominion Copper.—Controlling interest has been acquired by James Breen, the prominent smelter man, and his associates. The six properties owned by this company in Phœnix Camp, Boundary, B.C., have considerable development, the lowest working being at depth of 300 feet. The ore is said to average 3.75 per cent. copper and $2 gold per ton. The average width of the three parallel lodes is 145 feet on surface. The development consists of 400 feet of tunnel, 465 feet of crosscuts, 580 feet of drifts, and 605 feet of shaft. Work will be resumed under James Breen with J. L. Parker as superintendent. The new management intends building a smelter, but the site has not yet been selected. In this work Mr. Breen's long experience in building and operating smelters will serve him well. He was for some years superintendent of the Trail smelter and afterwards built and operated the Northport smelter. This new undertaking will give the Boundary its fourth smelter.

Minnesota Silver.—This company, owning the Ivanhoe and Sunset mines in the Slocan, has put the former on the shipping list, bringing Slocan's total to 35 shippers. The concentrator installed by the company at Sandon is one of the most complete and modern in the country and is turning out 20 tons per day, which is shipped to the Hall Mines smelter at Nelson and to the C. P. R. smelter at Trail. The ore is concentrated 4 to 1 very cheaply, the plant being operated entirely by water power. An aerial tramway 2,200 feet long connects the mine and concentrator. The management has very unostentatiously and very systematically opened their properties during the past two years and to-day they have a complete equipment, plenty of ore in sight, direct connection with the C. P. R. and K. & S. Railway, and a bright future.

Pacific Coal.—Application has been made for Dominion charter for capital of $1,000,000 in $50 shares to carry on business of colliery owners, coke manufacturers, iron masters, smelters, etc. The promoters are prominent Montreal and Toronto financiers, and the provisional directors are Sir W. C. Van Horne, R. B. Angus, C. R. Hosmer, E. B. Osler, M.P., and W. D Matthews. Operations will be carried on in the North-west.

Payne.—Under its new management is progressing favorably in its development. Mr. Lawre, formerly of Colorado, is superintendent; W. E. Zwicke, manager; and C. H. Hand, consulting engineer. Development has proceeded steadily for the past six years and it is said there is more ore in sight at present than ever before. The net monthly returns from ore sales average about $20,000, while operating expenses total about $11,000. Tunnel No. 8 will tap the ledge at the 800 foot level, Three shifts working air-drills make 5 feet per day. When the ledge is reached an upraise will be driven to connect with tunnel No. 5, from which the bulk of ore shipped is now being stoped. Tunnels No. 4, in 1,750 feet, and No. 5, in 1,900 feet, have followed the vein the entire distance, the pay-streak averaging 3 feet in width Tunnel No. 5 has been equipped with new track, enabling an enlarged tonnage to be handled; at present about 40 tons of $65 ore are being shipped per day.

Reco. This Slocan property, after having lain idle for some time, has resumed shipping, the rich lead supposed to have been definitely lost having been recovered with values as high as ever. Although shipping can proceed only during the raw hiding season, the ore is so high-grade it counterbalances the drawback —one carload of ore shipped during the mine's former activity is said to have yielded 24,500 ozs. silver.

St. Eugene.—This mine is now acknowledged to take front rank among America's silver-lead producers, having shipped during the past three months $275,000 worth of ore to Guggenheim & Sons' smelter at Antofagasta, Chile, and having entered into a further contract with them for the delivery of ore to the value of $1,000,000 per year. This ore is shipped such a distance because being "wet" ore it commands a premium as flux for the "dry" ores of Chile. At the first annual meeting in Toronto, Nov. 13th, a dividend at the rate of 3 per cent. for the quarter ending Dec. 31st was declared, and it is expected that this will be the regular rate for the present.

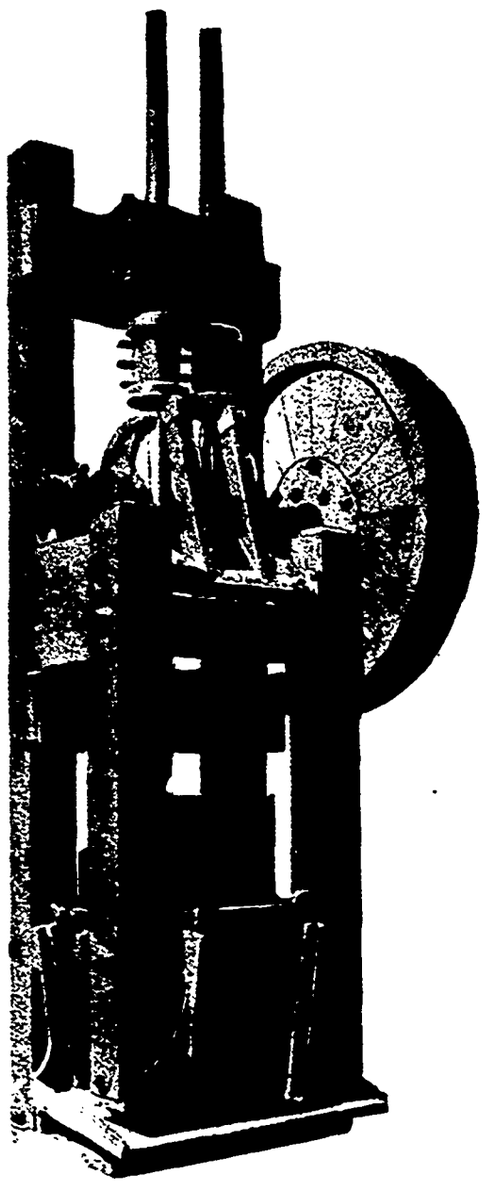
Vermilion.—This Ontario Company, owning certain valuable mineral lands in the District of Algoma, Ontario, will offer the whole of the property (details of which are given in our advertising columns) at public sale on 14th May next.

Forty-Third Mining and Milling.—Illustrations of some of the work done on this company's property at Manson Creek, B.C., are given in this issue. The six miles of flume and ditch are now completed as far as planned and will deliver 3000 miners inches of water at a minimum head of 150 feet over a large area. The elevator plant was started at Kildare Gulch and a small quantity of gravel washed, giving an average of 30c. per cubic yard. During the final two weeks $1.20 per cubic yard was recovered. There is now exposed a good channel containing coarse gold with values increasing as the cuts are advanced. The capacity of the elevator, working on the large wash encountered, was limited, and a new throat that will double the output has been ordered Until the channel was located, the bed rock was very uneven and difficult to work On the lower claims which are to be worked, commencing May next, there is a good natural dump in the creek bed.

The Hendy Two-Stamp Mill.

The Hendy triple-discharge two-stamp mill is a machine which deserves the consideration of owners of small mines who contemplate the installation of mills of this description. This mill has been designed and perfected by the Joshua Hendy Machine Works of San Francisco, Cal., for crushing ore economically. The form of construction is based upon the only true principle which governs the proper method of crushing ores—that is, the battery-stamping process. The special improvements which have been introduced and combined in the construction of the mill are easily indicated, as compared with the advantages of the five-stamp battery.

The mortars are cast with triple-discharge openings, or in other words, there are three discharge outlets, one in front and one at each of the sides or ends, all at the same height above the bottom of the mortars. The area of discharge is 465 square inches, which very closely approximates that of the best style of mortars used in five-stamp batteries, which is usually 480 inches. Herein lies an important advantage, which will be readily appreciated by most mining and mill men. The stamps weigh from 850 to 1,000 pounds each, and drop 110 times a minute through a mean space of six inches. By this combination of heavy stamps, quick drop and large discharge area, a maximum of crushing capacity must necessarily be attained. The proper apportionment of the strength of the several parts of the mill necessary to withstand the natural crushing effect and wear due to the heavy stamps and the quick drop, has been closely observed, and in order to assure durability, the mortars are cast to weigh cleared 2,800 pounds, this weight of iron being proportionately distributed on the bottom and sides As the



A TRIPLE-DISCHARGE TWO-STAMP MILL.

crushing capacity of all stamp mills is measurably governed by the character of the ore, and as it is usually the fact that the ores commonly encountered in prospecting and the early stages of opening and developing gold-bearing quartz mines are easily disintegrated by the stamping process, it follows that the combination of heavy stamps with the quick drop and a large area of screen discharge should assure the maximum crushing capacity.

It will further be found that this end is attained by the even distribution of the ore on the dies, which naturally results from the alternating drop of the two stamps, there being no intermediate stamps to interfere with such distribution. This also permits of an even flow or wave of the pulp in the mortars, and consequently a maximum discharge through the screen. The large screen area also gives assurance that the pulp will be discharged as soon as reduced to its proper fineness. It is also held that this combination ensures the crushing of the ore to a pulp of uniform fineness, and consequently that the concentrators operated in conjunction with these mills will do more effective work. The makers know from the actual operation of their mills which they have placed in use that the crushing capacity of the mill on ores ordinarily extracted in the development of gold mines is from eight to twelve tons in twenty-four hours. The force required to drive a mill

having 850-pound stamp is 5 h.p.; a mill with 1,000-pound stamps requires 7 h.p These mills are carried regularly in stock by the Joshua Hendy Machine Works at their San Francisco offices, and are furnished by them in sections for mule-back transportation when desired.

Advice to Shareholders.

Shareholders in Mining Companies should be made aware that it is not safe to hold stock certificates for any length of time in any other than their own names. Many shareholders are under the impression that when stock certificates stand in the name of some person as "Trustee" or as "Agent" that the stock represented by such certificate can safely be held This is a great mistake, and holders of such stock certificates are warned that the Courts in both Canada and the United States have decided many times that the word "Trustee" or "Agent" following the name on the face of a stock certificate is meaningless, or in the words of a recent decision, are "words of description only," and that the stock represented by such certificate belongs in fact to the person whose name appears upon the face of the certificate. For instance, a stock certificate stands in the name of "John Smith, Trustee." According to recent decisions the shares represented by this certificate can be attached on the company's books and sold for "John Smith's" debts. The certificate may have passed through many hands after the shares have been attached and sold for "John Smith's" debts, but the fact that the certificate is valueless will not appear until it is sent to the secretary of the company for transfer, when the innocent holder will be rudely awakened to the fact that he has come into possession, perhaps by purchase at a high figure, of a stock certificate that is absolutely valueless. What is his recourse? Perhaps a lengthy and costly law suit—the more lengthy and costly the more hands the certificate has passed through in the interval between the attachment and sale for "John Smith's" debts and the application for transfer by the new holder on the company's books.

Of course, if the holder of the certificate in "John Smith's" name should be made aware of the attachment in time he can, by showing conclusive proofs of ownership, forestall the sale of the shares. But how is he to be made aware of the impending attachment? Who is to notify him? Surely not "John Smith"—his interest in the certificate ceased when he had sold the shares. Surely not the secretary of the company, for the stock book does not show that the certificate has been transferred. In almost every case the attachment and sale would have been concluded before the rightful holder (the new owner) would have any knowledge of the matter.

Some people prefer, for obvious reasons, to have their shares stand in some one else's name as "Trustee." The only way to do this effectually and preclude the possibility of the sale of such shares for the trustee's debts, is to have the certificate stand in the name of "John Smith, Trustee for Thomas Brown." This, of course, defeats the purpose of the said Brown for his object in having the stock stand in a trustee's name is that he may not be known as the real owner of the shares.

By all means have your shares stand on your company's books in your own name.

ANNUAL GENERAL MEETINGS

—OF—

The Canadian Mining Institute

WILL BE HELD IN THE

CLUB ROOM, WINDSOR HOTEL, MONTREAL,

—ON—

Wednesday, Thursday and Friday, 6th, 7th and 8th March, 1901.

ANNUAL DINNER, FRIDAY EVENING, 8th MARCH.

During the Meetings a Syllabus of Papers contributed by eminent Canadian Mining Engineers and Mine Managers will be presented for discussion.

By special arrangement with the Canadian Pacific, Grand Trunk, Intercolonial, Canada Atlantic and Quebec Central Railways members and mining men attending these meetings will be carried to Montreal and returned for a SINGLE FARE on obtaining certificates from their ticket agents.

Programmes of papers, business, &c., will be issued to members in due time, or on application to the Secretary.

S. S. FOWLER,
PRESIDENT.

B. T. A. BELL,
SECRETARY.

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 anuually 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 acquired 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.

SCHOOL OF MINING,

KINGSTON, ONTARIO.

AFFILIATED TO QUEEN'S UNIVERSITY.

The Following Courses are offered

1—Three Years' Course for a Diploma in

(A) Mining Engineering.
(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.

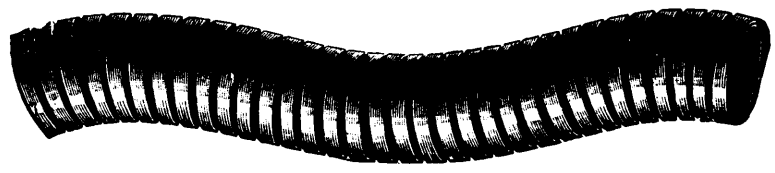
FOR CALENDAR OF THE SCHOOL AND FURTHER INFORMATION APPLY TO

Dr. W. L. GOODWIN,

DIRECTOR

SCHOOL OF MINING, KINGSTON, ONTARIO.

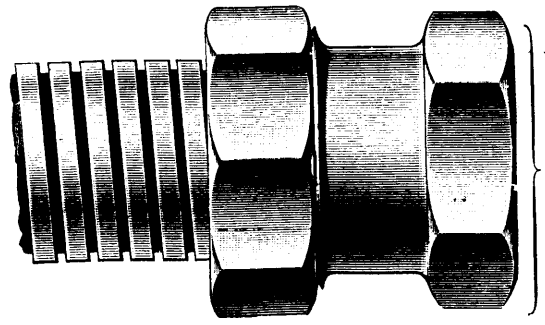
FLEXIBLE METALIC HOSE



THIS Hose is made entirely of metal; there is NO rubber in connection with it. It will therefore stand ANY pressure of steam. It is at the same time as flexible as rubber steam hose, and with proper care it will last many years.

This Hose is made in sizes from ¼ inch to 8 inches inclusive, and can be made to stand 2,000 (two thousand) pounds pressure to the square inch.

This Hose can be readily connected to Iron Pipe.



Screwed for Standard Iron Pipe Thread.

We supply for this Hose the usual Rock Drill Hose Connections, or any other special connections which may be required.

We have just introduced this Hose in this conntry, and miners who have seen it are taking to it like a mouse to cheese.

Write to us for catalogue and particulars.

We carry stock to 2½ inches diameter, and can import larger sizes.

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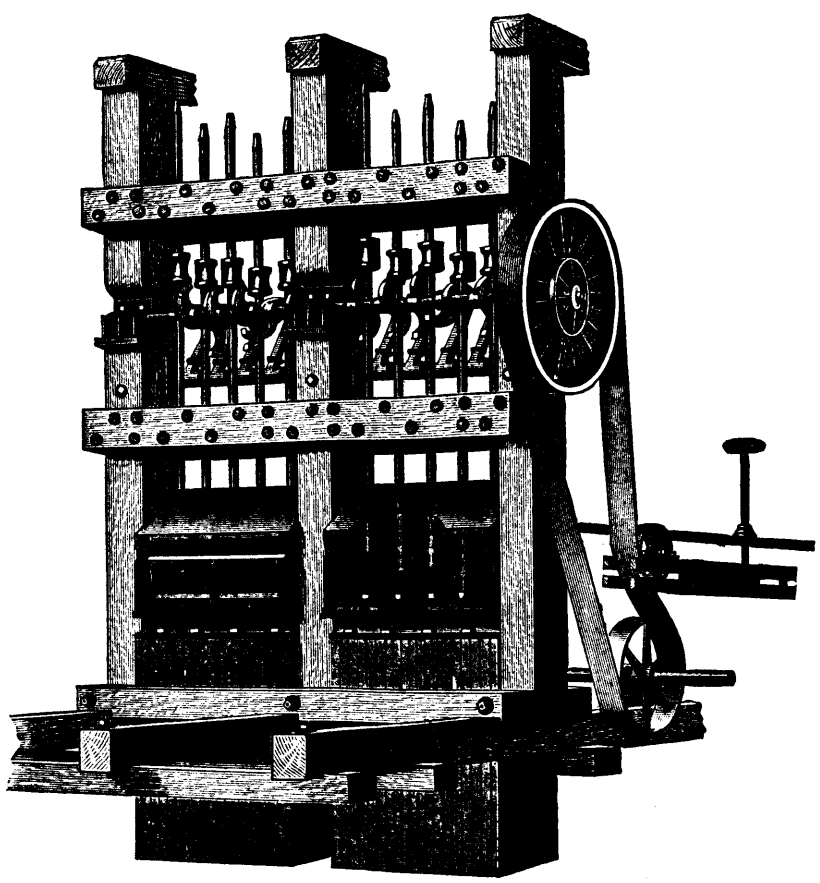

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