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TWENTY-FIRST YEAR OF PUBLICATION

CANADIAN MINING REVIEW

Established 1882

Vol. XXII—No. II.

OTTAWA, FEBRUARY 28th, 1903.

Vol. XXII—No. II.

 <p>AIR COMPRESSORS GAS</p>	<p>THE CANADIAN RAND DRILL CO SHERBROOKE, QUE. BRANCH OFFICES IN MONTREAL, QUE. TORONTO, ONT. HALIFAX, N.S. ROSSLAND, B.C. RAT PORTAGE, ONT. GREENWOOD, B.C. VANCOUVER, B.C.</p>	 <p>ROCK DRILLS</p>
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SPECIALLY BUILT TO MEET THE VARIOUS REQUIREMENTS
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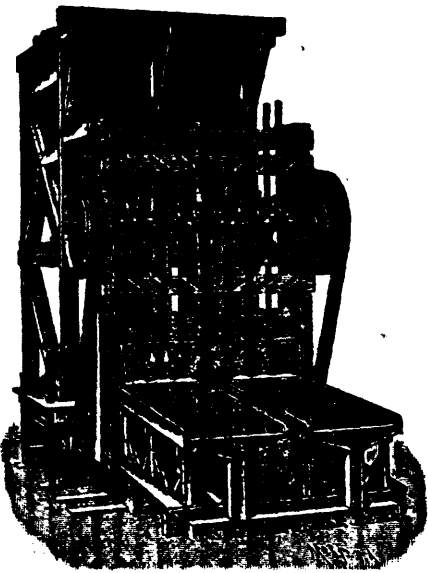
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Stone Breakers of specially strong construction, Roller Mills, Chilian Mills.

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for dry and wet crushing, more than 1,800 at work.

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Shoes and Dies of Krupp's Special Steel.

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Amalgamation Tables and Pans, Larslo's Gold Amalgamators, Settlers, etc.

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Complete Gold Ore Dressing Plant

- a. For treating by the Wet Method with Stamp Batteries, Amalgamation and Concentration.
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Large Testing Station for Crushing and Dressing Ores at the Works.

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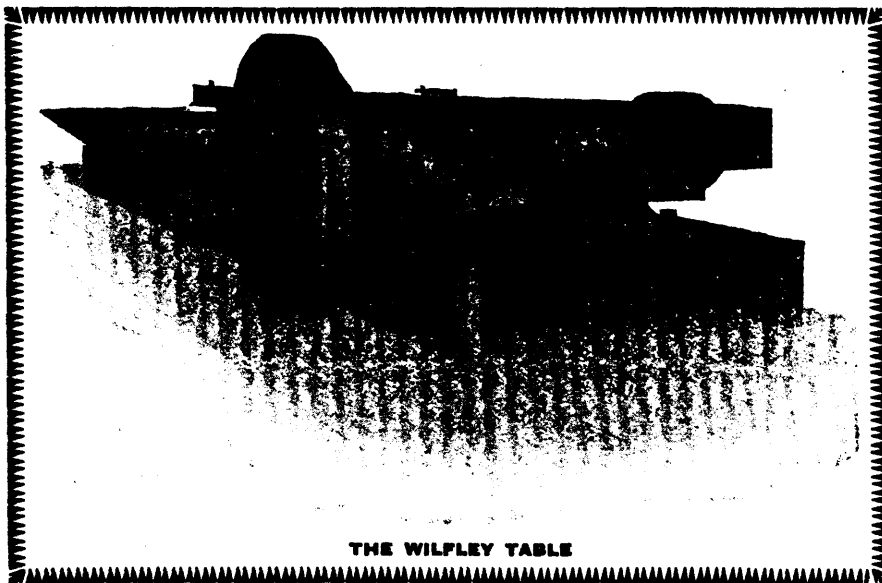
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We contract for the Design and Construction of Complete Stamp Mills, Concentration, Chlorination, Cyanide and Smelter Equipments.



CANADIAN MINING INSTITUTE

ANNUAL MEETINGS

The Annual General Meetings of the members of the Canadian Mining Institute for the transaction of business, the discussion of papers, etc., will be held in the

Club Room, Windsor Hotel, Montreal

ON

**WEDNESDAY, THURSDAY and FRIDAY,
.... 4th, 5th and 6th MARCH, 1903**

SINGLE FARE ON RAILWAYS.

BY special arrangement members will be carried to Montreal and returned for a SINGLE FARE on the Canadian Pacific, Grand Trunk, Intercolonial, Quebec Central and Canada Atlantic Railways. In order to secure this rate members and mining men who purpose being present at the meetings must obtain from their Ticket Agent the ordinary form of Convention Certificate provided by railways. They will purchase a one-way trip ticket to Montreal and on presentation of Certificate duly vized by the undersigned will be returned free of charge.

INSTITUTE GOLD MEDAL.

The Council of the Institute will award a Gold Medal for the best paper contributed by members to the Transactions of the Institute during the year 1903.

STUDENTS' PRIZES

In addition to the President's Gold Medal the Council offers three prizes of a cash value of twenty-five dollars each for the best papers contributed by Canadian mining students on the following subjects:—

- GROUP I.—ORE DEPOSITS AND MINING GEOLOGY—The subject may be treated generally, or some particular district or single deposit may be discussed or described.
- GROUP II.—MINING PRACTICE—Any and every branch of mining may be treated such as pumping, hoisting, ventilation, timbering, ore extraction, development, etc., etc., or some particular method of mining, or some individual mine or group of mines, may be described or discussed.
- GROUP III.—ORE DRESSING AND METALLURGY—Any branch of ore dressing or metallurgy may be treated as for example—crushing, jigging, milling, concentrating, smelting, roasting, cyaniding, etc., or some particular plant may be described or discussed.

Competitors must advise the titles of their subjects to the Secretary of the Institute not later than the 18th of February next and MSS. must be sent to him on or before the opening session of the meeting on 4th March.

SYLLABUS OF PAPERS.

Syllabus, embracing over forty papers, and detailed programme of arrangements for these meeting will be mailed to members in due course.

CHARLES FERGIE,
President.

B. T. A. BELL,
Secretary.

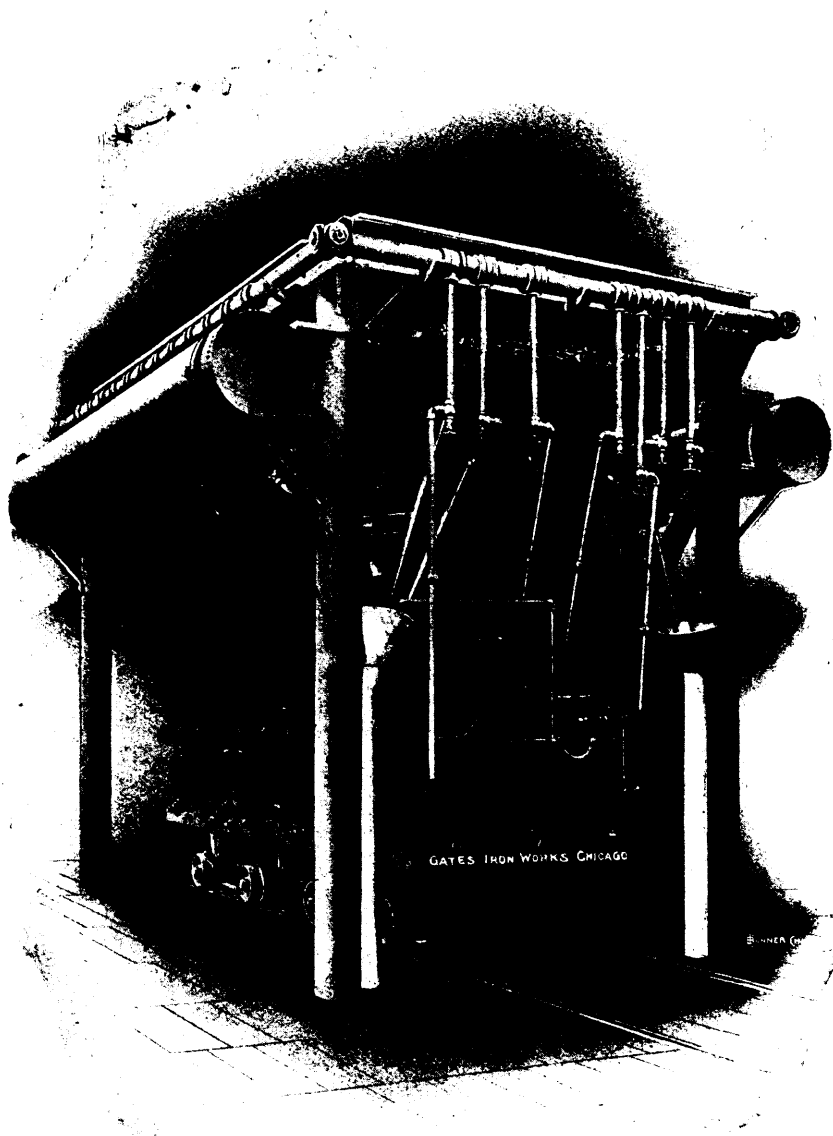
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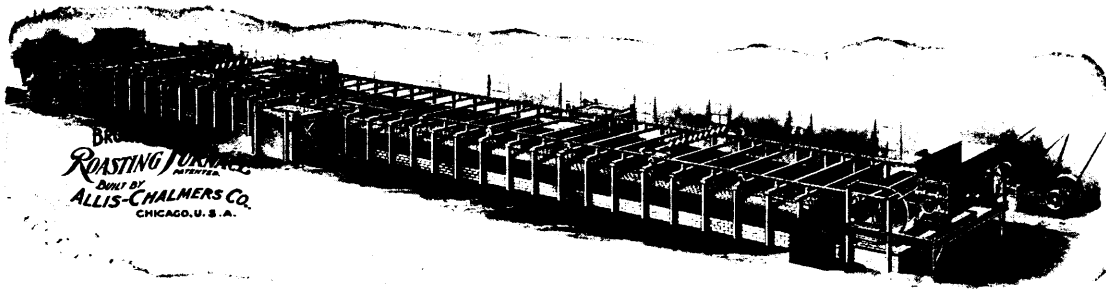
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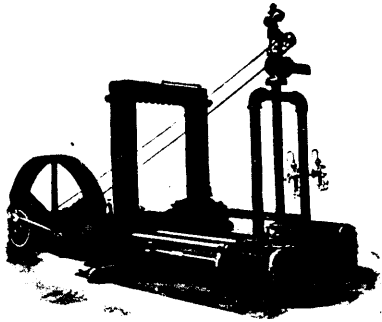
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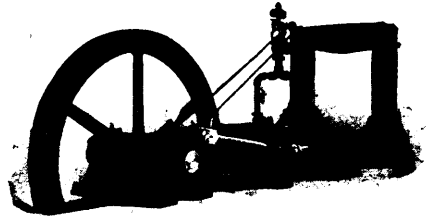
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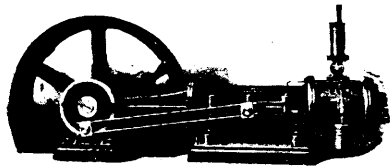
AIR COMPRESSORS



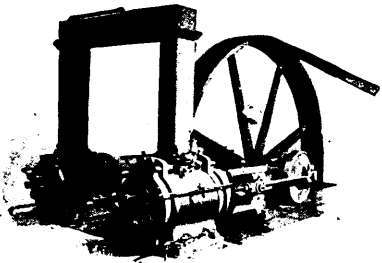
Class B-D Compressor
[Air Cylinders next to Frame]



Duplex (Meyer-Valve) Compressor



Straight Line Belt Driven Compressor



Compound Belt-Driven Compressor



Cross-Compound Corliiss Compressor

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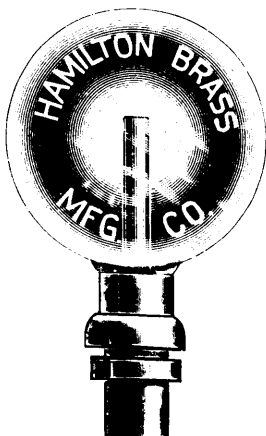
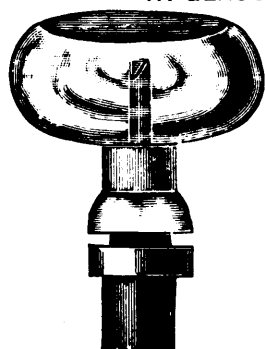
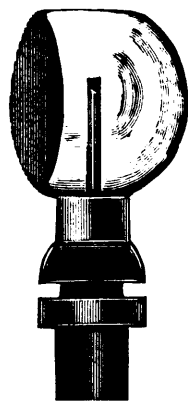
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On a PATENT PNEUMATIC and SELF-ACTING PRINCIPLE, IN GLASS



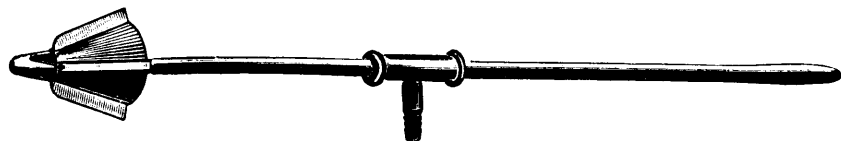
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The Lubricators being carefully fitted by enlarging the oil hole to fit the plug part of stopper, or otherwise by reducing the plugs to fit existing oil holes, the needle must be perfectly round, smooth and clean, so as to work freely in the tube, the flattened end reaching about half-way up the inside of Lubricator, while the other end rests on the shaft or axle, will produce the following results, viz. :—

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THE CLEANER THAT CLEANS CLEAN.

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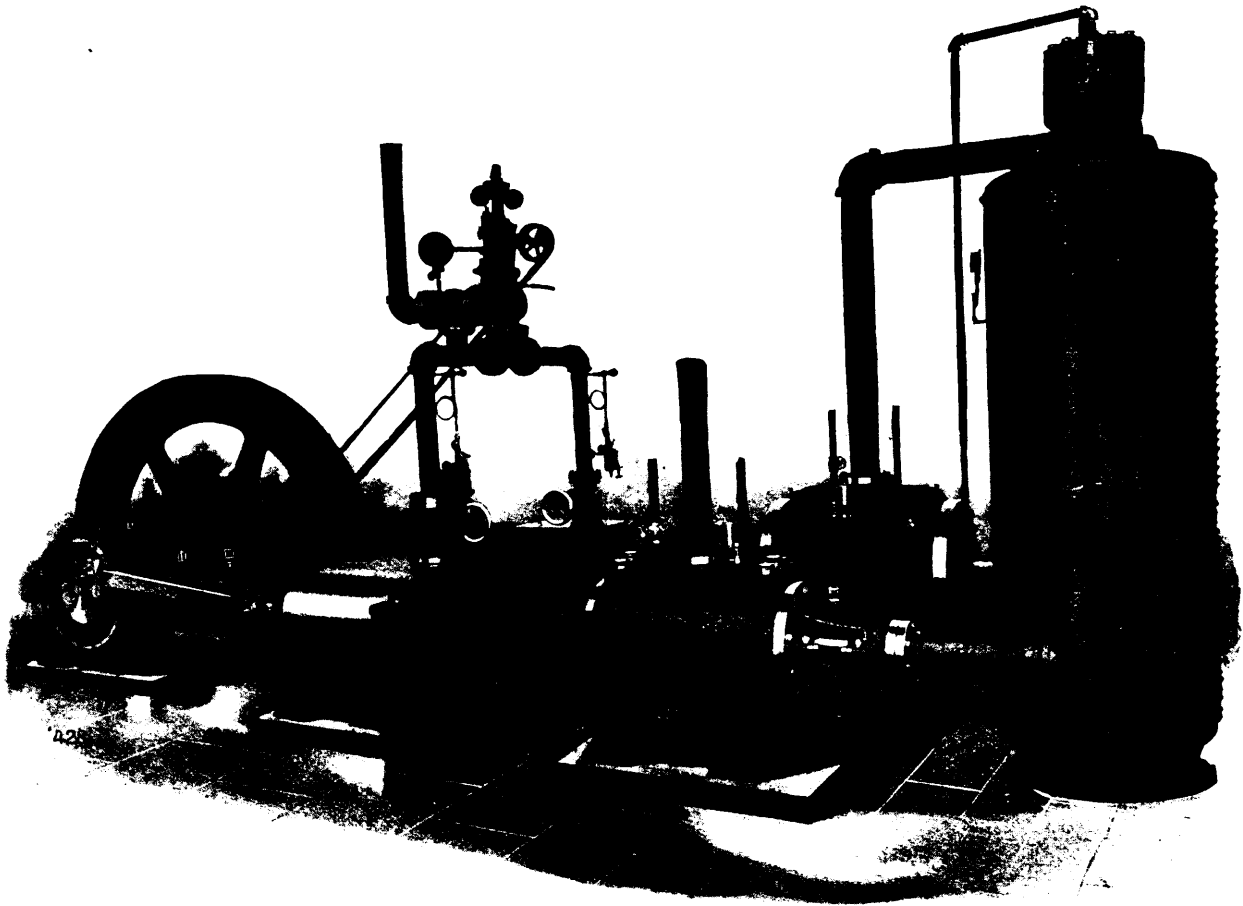
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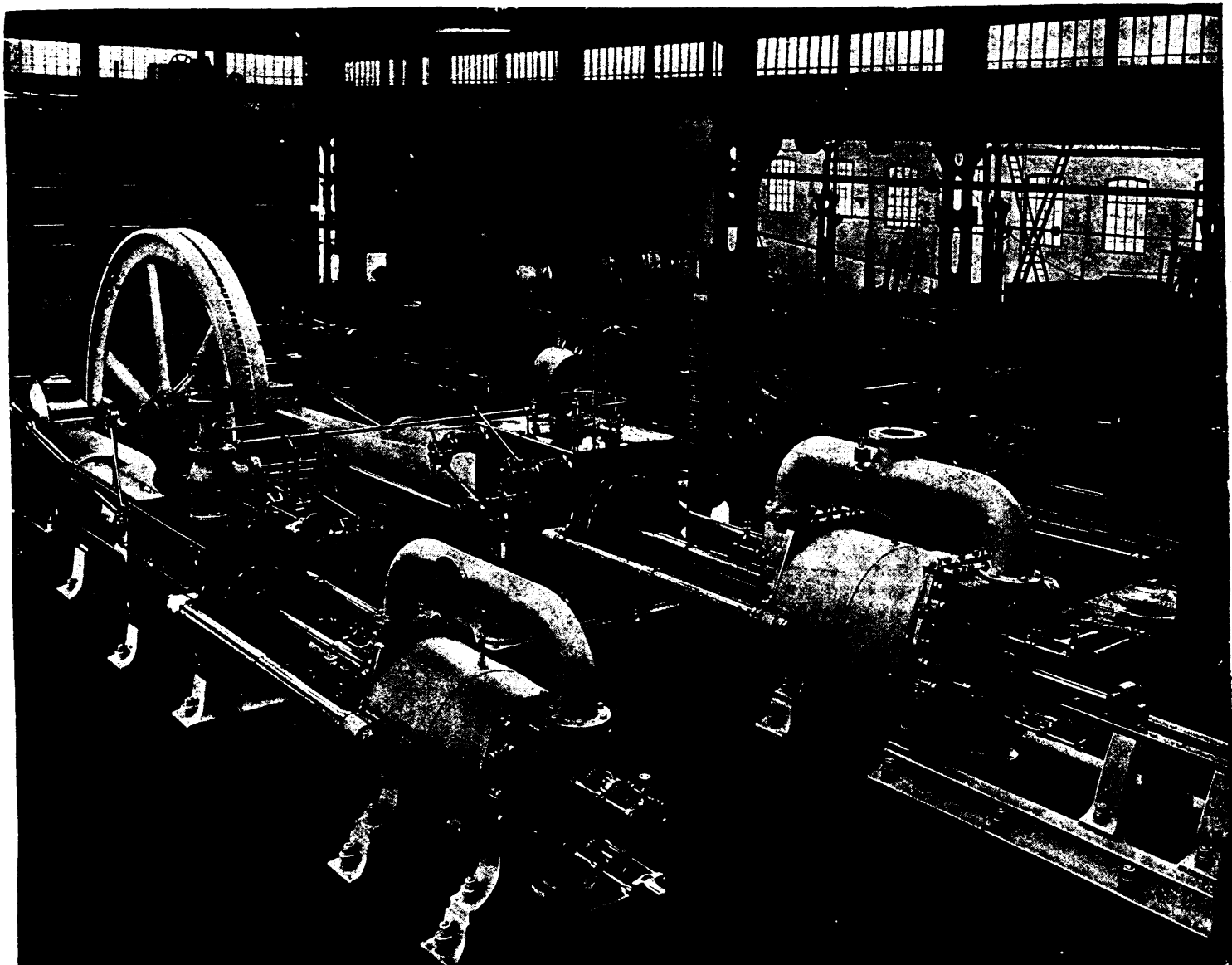
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AIR COMPRESSORS

AGGREGATE POWER AT WORK, ABOUT 550 IN NUMBER, EXCEEDS 250,000 H. P.



WALKER BROTHERS HAVE RE-MODELLED OVER 100 AIR COMPRESSORS
ORIGINALLY CONSTRUCTED BY OTHER MAKERS.

RIO TINTO COMPANY

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THE BLACKWALL TUNNEL

For the construction of the Tunnel, Six Air-Compressing Engines were erected. The largest Two Pairs of Compound Engines, were supplied by us. Messrs. S. PEARSON & SON, the Contractors for the construction of the Tunnel, have kindly written to us, as below, with reference to the quality and working of our Machinery:—

S. PEARSON & SON, CONTRACTORS.

MESSRS. WALKER BROTHERS, PAGEFIELD IRONWORKS, WIGAN.

DEAR SIRS,—We are pleased to confirm what we told you verbally the other day, viz: that we consider the Air Cylinders and Valves of your Compressors to be the best for such work as we have been carrying out on the above Contract.

One of your Engines ran for almost a year without stopping, and it gives us great pleasure to thus testify to the good qualities of the plant which we purchased from you.

We are, Dear Sirs, Yours faithfully. (Signed) pro S. PEARSON & SON, E. W. MOIR.

BLACKWALL TUNNEL WORKS, EAST GREENWICH, S.E.

May 10th, 1897.

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Pit Rails, Tee Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel $\frac{3}{8}$ to $\frac{1}{4}$ " Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting $\frac{5}{8}$ to 5" true to $\frac{2}{1000}$ part of One Inch.

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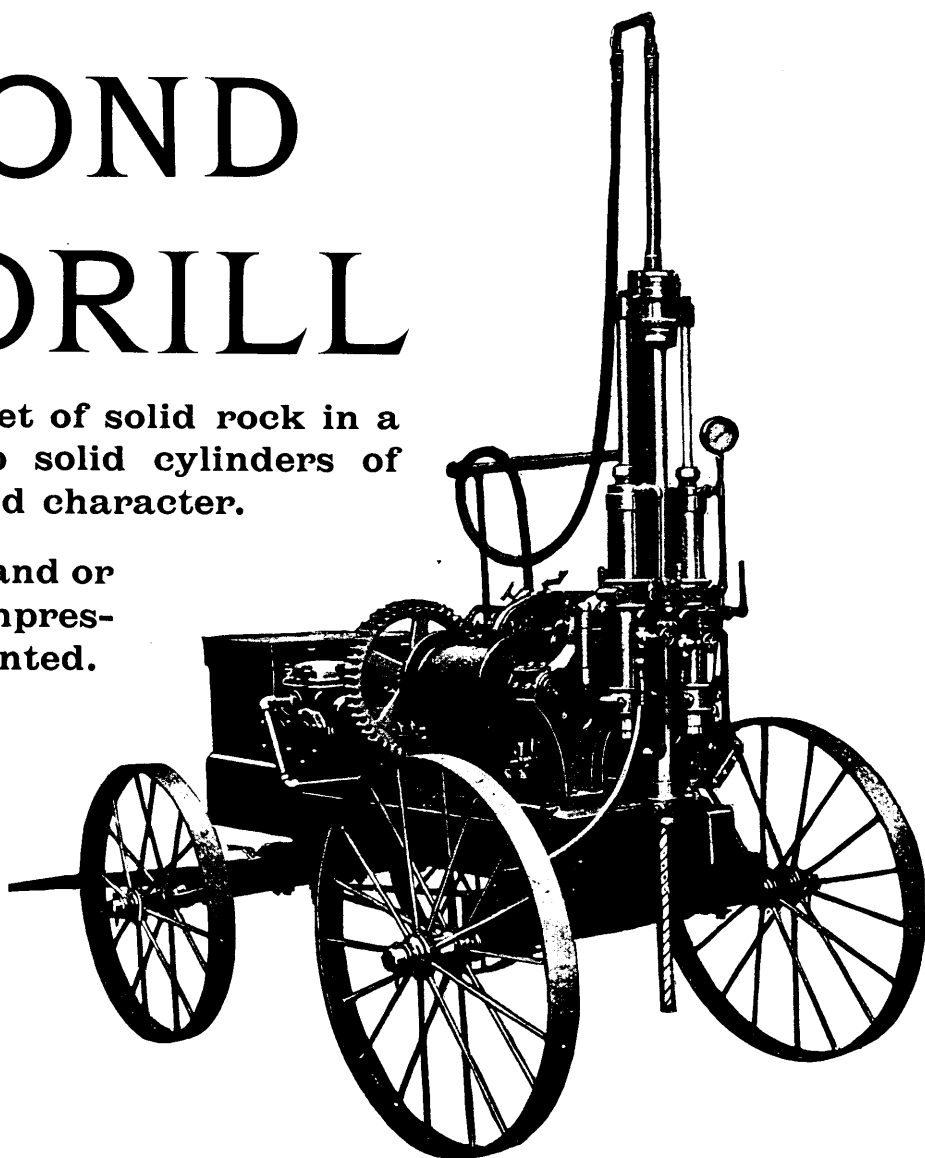
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It can cut through 2,500 feet of solid rock in a vertical line. It brings up solid cylinders of rock, showing formation and character.

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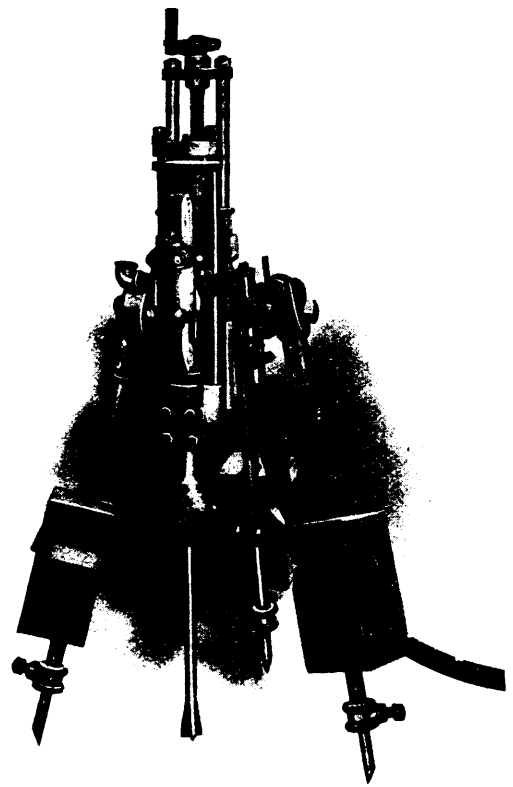
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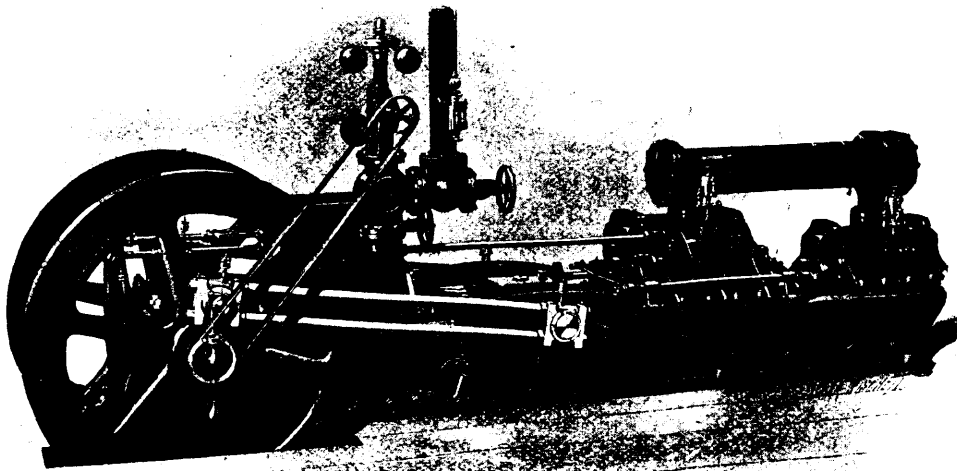
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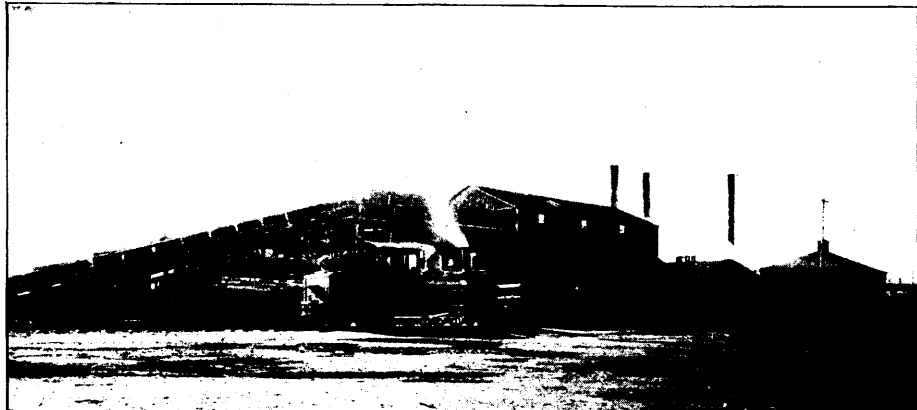
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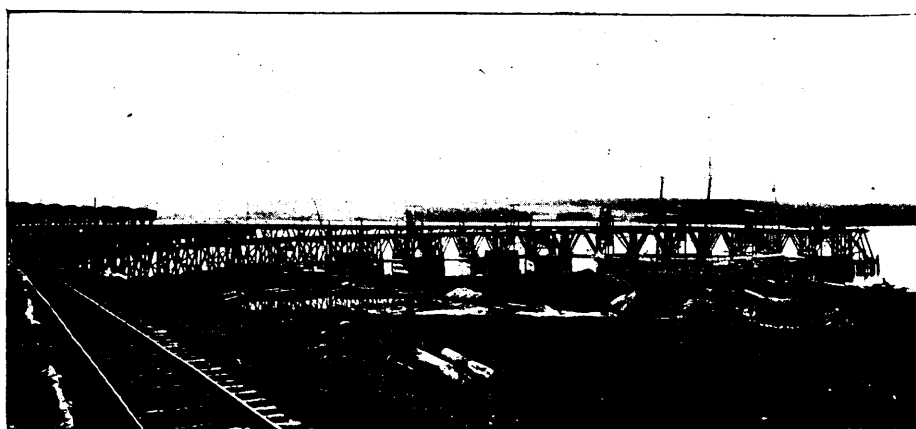
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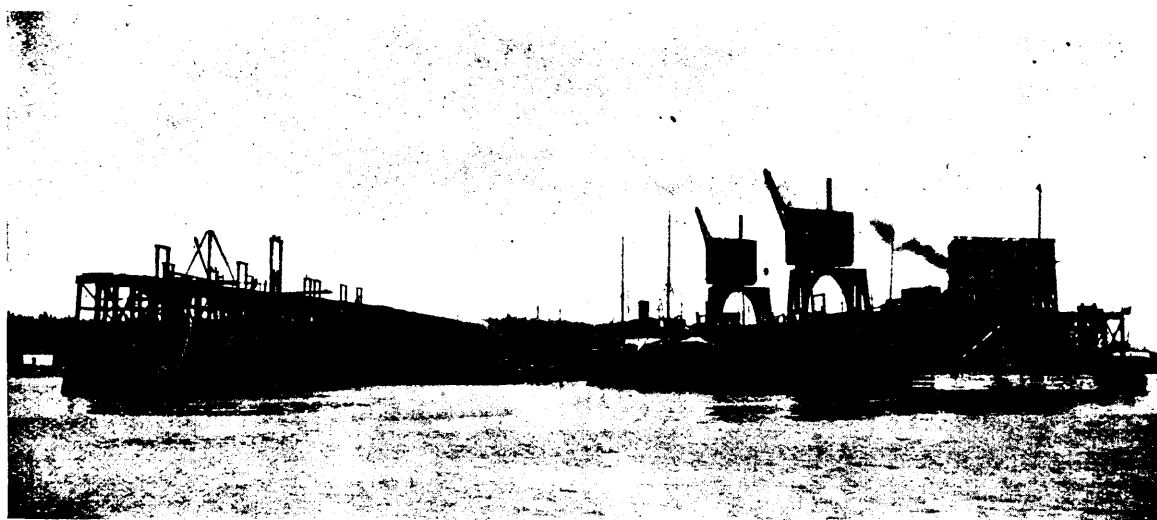
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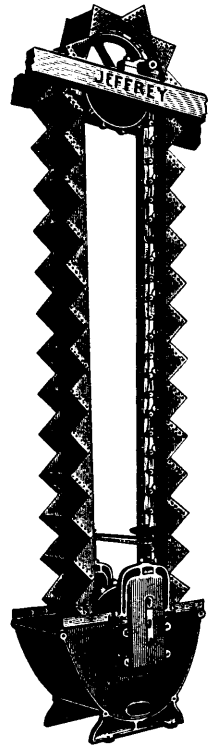
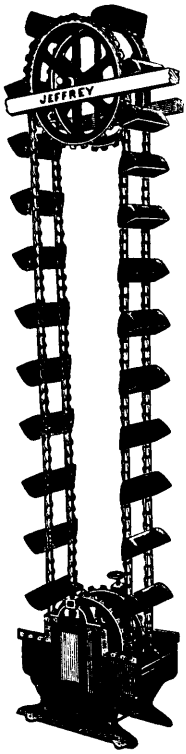
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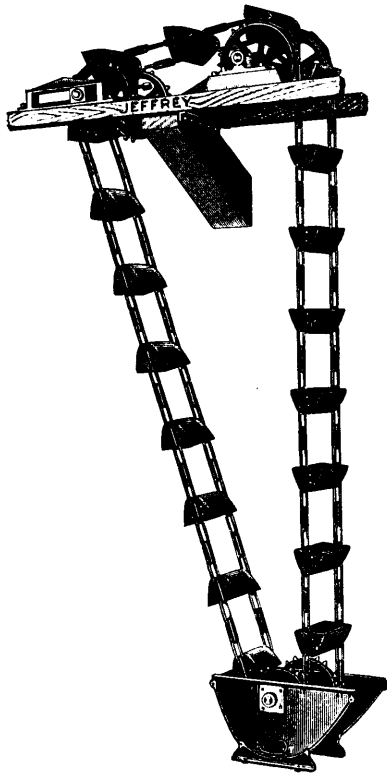
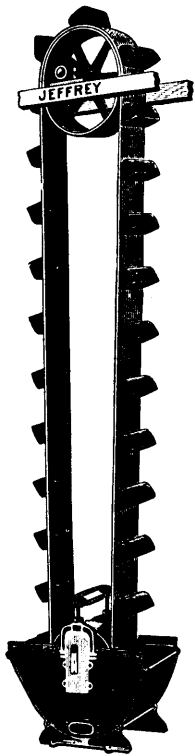
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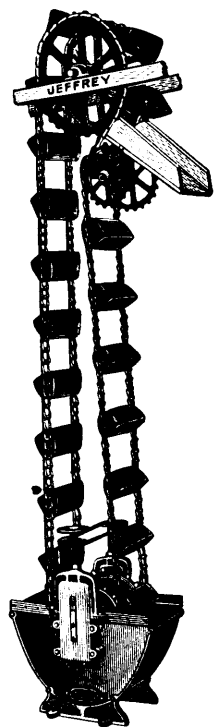
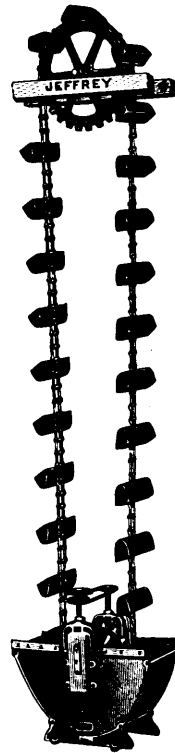


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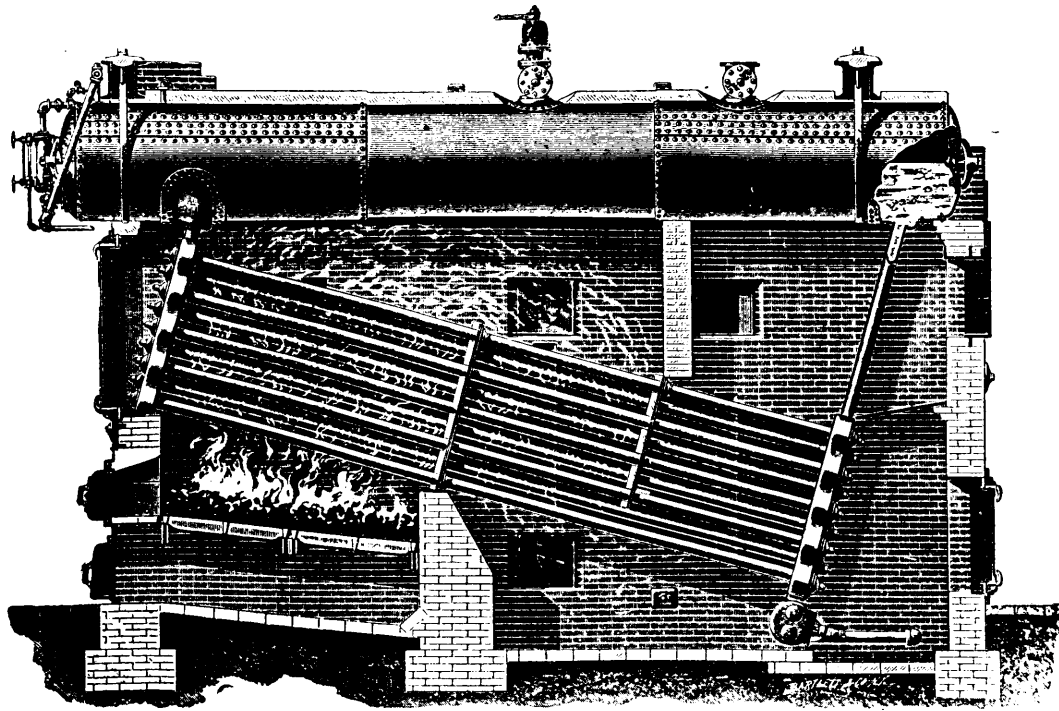
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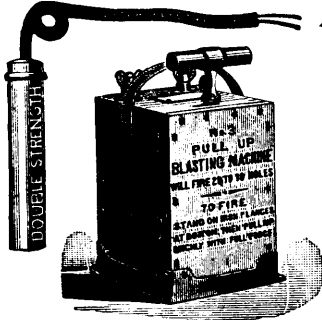
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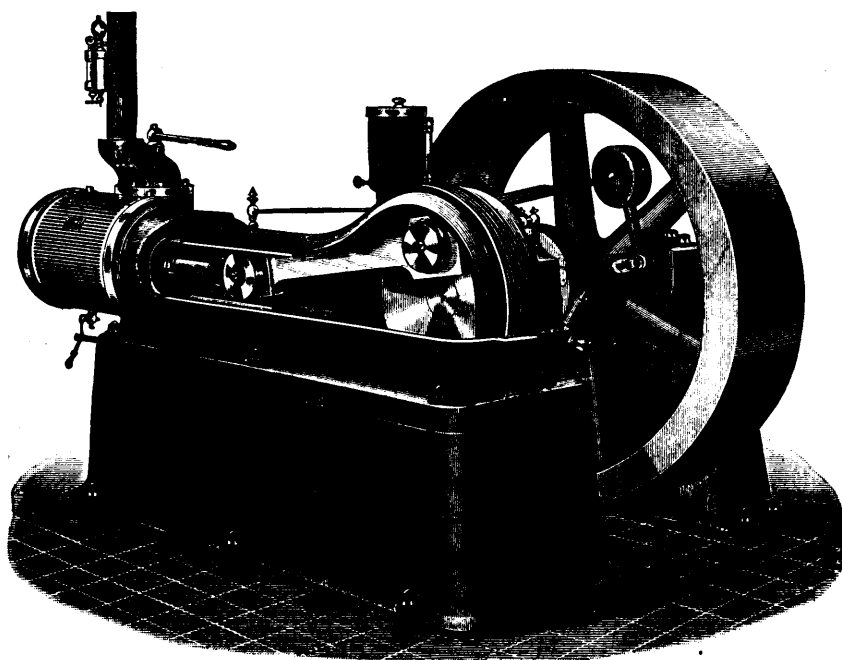
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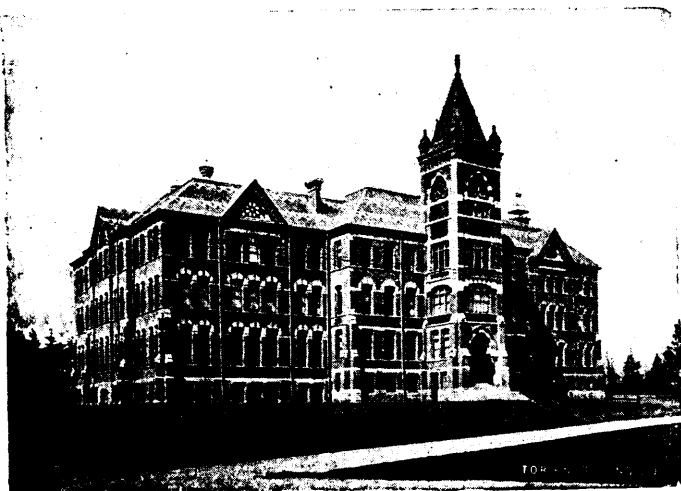
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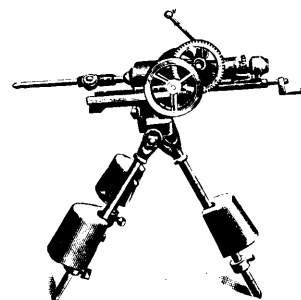
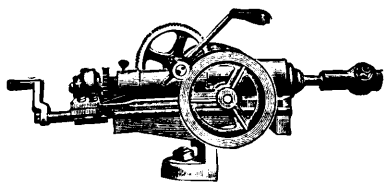
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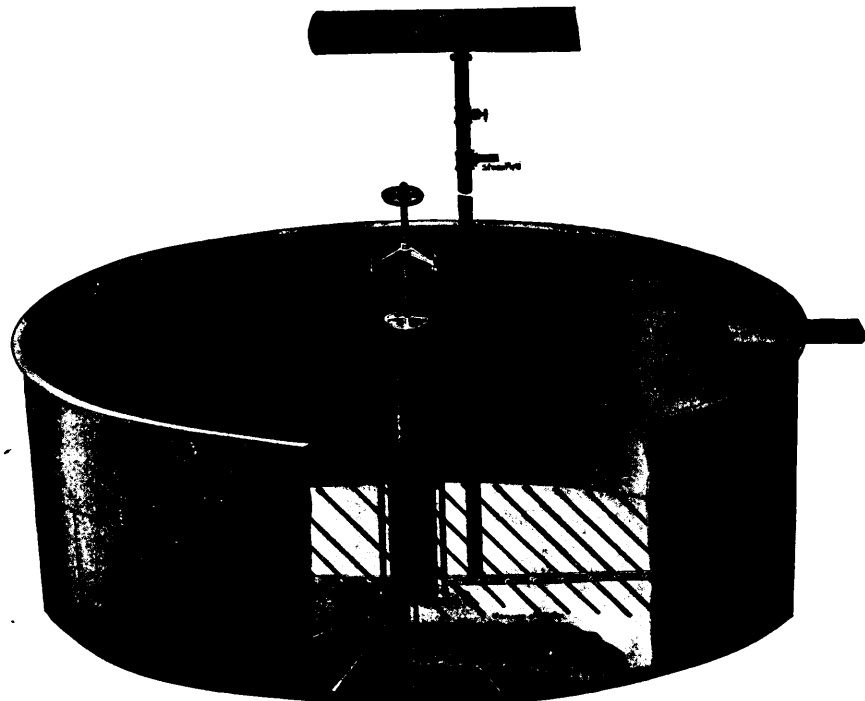
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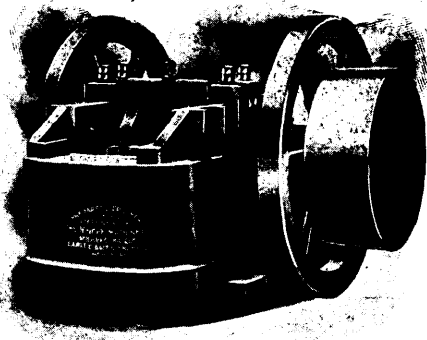
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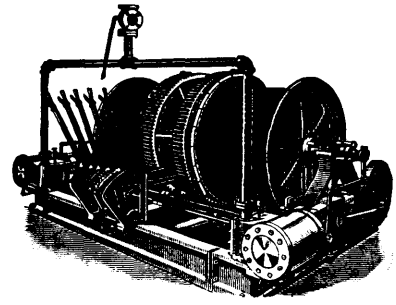
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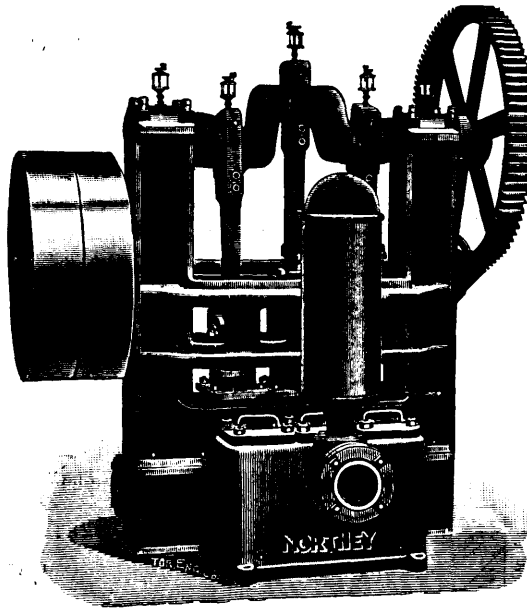
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VOL. XXII., No. 2.

FEBRUARY, 1903.

VOL. XXII., No. 2.

The Walker Graphite Deal.

In its last issue the REVIEW noted the re-incorporation of the Walker Mining Company under the laws of New Jersey, and intimated that there might be more to say concerning this promotion. As this property has earned a somewhat notorious reputation during the last twenty years, it is quite worth while to examine the prospectus of the new Company in order to ascertain what, if any, new uses or new markets have been found to justify the printed estimate of a 25 p. c. per annum dividend on a capital of \$1,125,000 with fixed charges amounting to \$64,000 a year. And in reciting some of the facts concerning the past history of this enterprise, it is not proposed to draw conclusions, but only to point out to our readers some of the facts which were obtained during an exhaustive examination of this property some years ago by two eminent Mining Engineers both of whom are well known to the Canadian public.

The new company which has been organized under the laws of New Jersey has a share capital of \$1,125,000.00 and a bond issue of \$400,000 bearing 5 p. c. interest, payable in ten years at 110.

The original Walker Mining Company acquired its property from the "Dominion of Canada Plumbago Company," prior to the year 1888. Difficulties, not alone due to concentration problems, caused this mine to remain idle until the early nineties, and closed it in 1896, and the prospectus now under consideration informs us that during these earlier years over \$400,000 were locked up in lands, works, and mining expenditures, and, we might add, in personal expenses.

As early as 1866 Sir Wm. Logan, in the reports of the Geological Survey of Canada, described the occurrence of graphite on the same lots and ranges that are now included in the property of the Walker Mining Co. Some of these occurrences are as lenses in crystalline limestone, others are reticulating small veins of columnar graphite, with widths averaging from 2 to 4 inches in thickness, but by far the larger part of the deposits occur as flakes of graphite disseminated in the country rock, which is usually gneiss. The graphite of the small veins is columnar, or fibrous, in structure, the veins vary from a fraction of an inch to six inches in width, and they generally occur in the same gneissic rock which contains the disseminated ore, although the veins rarely and occasionally cut into the granites and gabbros of the region. The graphite of these small veins is very pure, being almost free from impurity, but is of course exceedingly limited in quantity. The prominent feature, and the great reservoir, of graphite is the graphitic gneiss, or "Sillimanite" gneiss as it has been called. In these gneissic bodies the graphitic enrichment usually occurs in

streaks where an igneous rock has come into contact, or close proximity, with the gneiss and in many places the proximity of this eruptive is presumably responsible for the introduction of a quantity of pyrite which on weathering, gives the rusty coating by which these gneisses are discovered in prospecting the country.

The percentage of graphite contained in such gneissic bodies is very variable, ranging from 4 p. c. or 5 p. c. to as high as 30 p. c., but the average, as determined by one of the engineers above referred to, approximates 15 p. c.; it would be possible so to direct mining operations as to obtain an average of about 20 p. c. of graphite in the rock going to the mill, and this is the fundamental point in any consideration as to the market value of the property and as to the amount and quality of the material which can be put upon the market. As the former company suspended operations in the winter of 1896-1897 the \$400,000 which has been expended is represented at the present time only in the deposit itself, since the works, mills, etc., etc., which were condemned at that time can have little, if any, value seven years later. The principal mill building was three stories high and covered an area of between 8,000 and 9,000 square feet. The lower floor contained the crushing and washing apparatus, and the two upper stories carried a conglomeration of bolting screens, cleaners, accessories for finishing the product, some of which may be used in a rearrangement of the plant, but the lower floor was fitted with an antiquated stamp battery that at the most was only scrap iron, and the engine for operating the mill would not be commended for its pattern or its consumption of steam; the six dressing buddles on the floor were warped and out of repair, and by this time are probably of value only for the scrap heap; the rest of the plant which was made up of driers, small runs of stones for grinding, with blowers, mixers, etc., etc., will probably be estimated as of little or no value by a disinterested person. The saw mill is a thing of the past, as also the barrel shop, and most of the additional outlying plant and buildings.

The actual condition of affairs at the close down in 1896 was, that but a very small portion of the flake or amorphous graphite, recovered from the gneiss was in the form of good flake graphite suitable for pencils; lubricants, or stove polish. Fully 30 p. c. of the graphite recovered was so earthy and badly cleaned that it was available only for paints, or, the better grades for foundry facings and adulterants for rubber packing. The engineer's estimate of possible recovery (then made) was as follows:—

1 ton, containing 20 p. c. C. = 400 lbs. graphite recoverable as follows:
20 p. c., or 80 lbs., as No. 1 Flake Graphite.
20 p. c., or 80 lbs., as No. 2 Graphite.
50 p. c., or 200 lbs., as Grits, fit only for paints and adulterants at low prices.

10 p.c., or 40 lbs., lost as slimes, too gritty to be cleaned or saved.	
For the No. 1 Flake 1c. a pound might be realized, or 80 x .04c. = \$3 20	
For the No. 2 Flake 2c. a pound might be realized, or 80 x .02c. = 1 60	
For the Gritty stuff, 1c. a pound, or 200 x .01. = 2 00	
	\$6 60

The above figures show a total value in 1896, per average ton of ore, of \$6 60 from which must be deducted costs of management, mining, cleaning and *fixed charges*, which at present amount to \$44,000 a year for redemption and \$20,000 a year for interest, or a total of \$64,000.

No attempt is made to name the marketing charges, although this is the rock upon which previous attempts to work this property have foundered. In other words, any attempt to mine these Buckingham graphite deposits on a large scale *must* include a capital, and an organization, sufficient and competent to manufacture and *sell* all the products into which graphite enters as a primary factor; no concern which neglects to make its various grades into stove polish, lubricants, paints, etc., and which does not market them for itself, can expect to obtain any adequate return for its investment. It has been well established that to mine, make and sell only number 1 flake invites deliberate failure for the enterprise. It has also been well said that profitable results cannot be expected without such a large and extensive plant as is necessary for the manufacture of various products; and also without a capital sufficiently large to enable such working, manufacturing and selling to be carried on at a loss, *perhaps for several years*, until the difficulties of introducing the various products into markets which are now well supplied and strongly prejudiced in favor of other brands, are overcome.

If the new Walker Mining Company can call up one half of its capital and, above all, can command a staff which should comprise an *economical* general manager, a skilled concentrating engineer, and several energetic travelling business agents, it may have an even chance for life, but without these requisites in any one respect, it deliberately invites failure and equally deliberately announces its complete ignorance of the past business history of this well known deposit. The facts are open for its share holders to obtain, and the market is not essentially different in its demands to what it was ten years ago. The only new feature which the printed prospectus contains is the possibility of making a desirable product in the shape of a refractory brick, but we do not need to point out to our readers that the waste coming from graphitic gneiss, associated with fragments of gabbro, is not likely to form a suitable binding material for graphite, nor is such material to be designated as "refractory." Clean graphite, suitably mixed with pure silica, might make an excellent material, but graphite waste moulded into bricks will require considerable demonstration.

The Fernie Strike.

It must be a matter of great regret, as it is in every sense a serious one, that the coal miners at Fernie are once more on strike. What the effect may be to the mining and smelting industries of the Province it is impossible to say, and indeed this will entirely depend upon whether the disagreement is speedily settled or not. If it drags on until the very slender supplies of fuel in stock at the various smelters are consumed it is impossible to tell what the consequences may be as supplies cannot be obtained from any other source, and if the smelters are once put out there will be very little encouragement in the present depressed condition of the copper and lead markets to resume operations.

On the merits of the question in dispute we have nothing to say because obviously it would be imprudent to express an opinion on a fair wage or otherwise, without having all the data necessary to arrive

at a fair decision, but there are several aspects of the case to which we wish to refer and which are well worthy of consideration.

The first is that whatever the relative value of the wages paid may be when compared with others it is not denied that the men's earnings are large and in the present depressed state of trade in British Columbia they should at least hesitate before precipitating a struggle that may be both prolonged and disastrous.

In the next place, from a press despatch, dated "Fernie, February 18th," we learn that the actual number of men who voted in favour of a strike constituted a very small minority of the total number employed, as a matter of fact not more than one-fifth. It seems to us that to take so serious a step on such a vote is indefensible. There are occasions on which it is perfectly legitimate to strike and possibly this may have been one, but if so it cannot be denied that steps should have been taken to obtain a much larger vote, and that so serious a course should not have been decided upon by so small a minority. Probably the various unions which took the lead in the strike acted strictly in accordance with the rules of their organization and no doubt a majority of those present at each meeting actually voted in favour of the strike, but this only emphasizes our contention that the Union should improve its organization or it can never gain any public confidence or support; the least that should be done under such circumstances is to follow somewhat upon the lines of the referendum and insist that a majority of the workmen actually employed should vote in favour of a strike before that extreme course is resorted to.

The last consideration and possibly the most important of all is based upon what is alleged to be a fact, namely that the whole agitation has been brought about through the agency of American Representatives who settled at Fernie for the express purpose of fomenting strife. On this point we wish to say that in our judgment Trades Organizations are perfectly legitimate, we only take exception to some of their methods, but not to the principle of organization, which is legitimate in the case of workmen as of employers, but we have always believed that there are most potent economic and political reasons why Canadian Unions should not be controlled by United States organizations. It is not necessary here to recite these reasons, they will be perfectly obvious to the veriest tyro and no one who has considered the matter doubts that there are many points at which they clash. Some effort has recently been made to emancipate Canadian Unions from this control and we can only hope that the effort will be successful, for undoubtedly the Fernie strike is another illustration of the iniquity of the present system under which men who have no stake in the country are able at their will to paralyze an important industry and to plunge a whole district into commercial disaster.

A Minister of Mines.

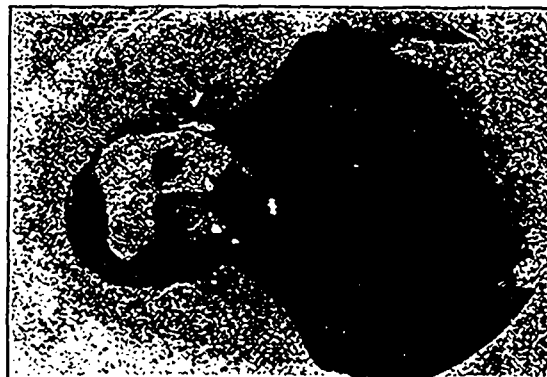
It will be within the recollection of our readers that at the last Annual Meeting of the Canadian Mining Institute the subject of a new department of mines was freely canvassed, and a resolution adopted urging the Dominion Government to take this matter into consideration. The appointment of Dr. Haanel as Superintendent of Mines raised great expectations amongst mining men in consequence of the well known capacity and acquirements of that gentleman; but it would appear as if there is little probability of such a department being organized unless there is a responsible Minister at the head. This does not reflect in any way upon the ability with which the affairs connected with mining matters have been conducted by the Minister of the Interior, but there is a general concensus of opinion that this work does not properly belong to his department, and that its increasing importance demands the undivided attention of a Minister who



MR. S. F. PARRISH, E.M.
Recently appointed General
Manager of Le Roi Mine,
Rossland, B.C.



MR. THOMAS CANTLEY, NEW GLASGOW.
General Manager Nova Scotia Steel and Coal Company.



MR. EUGENE COSTE, M.E., TORONTO
Nominated as President of the
Canadian Mining Institute for
the year 1903-1904.

alone would be able properly to urge and maintain its interests in the Cabinet. It is not necessary to prove that the mining industry is an important one but possibly it is not generally understood that the value of mineral products exported, greatly exceeds the value of the fisheries export, products of the forest, is almost equal to the agricultural products, and is not far below manufactures. Thus in 1902 the value of the

Mineral export was.....	34,942,403
Product of Fisheries.....	14,143,294
Product of Forest (Lumber included in manufactures) ..	4,469,489
Animals and products thereof was.....	59,161,209
Agricultural products	37,152,651
Manufactures	46,118,081

In consequence of the depression of the lead industry and the very considerable falling off the quantity of gold mined in the Yukon these figures do not compare as favourably as those of 1901, in which year the mineral exportation exceeded the value of every other classification except animals and products thereof. These figures are quoted to show the relative value to the country of the mineral industry. Without giving corresponding details for each classification we may point out that the total value of mineral production in Canada for 1902 will probably exceed \$80,000,000 and there is every indication that during the present year it will pass the \$100,000,000 mark. It can hardly be maintained that an industry of this value is not entitled to be represented in the Dominion Government by a Minister whose special duty it shall be to foster and encourage its development.

We are aware that many objections can be raised to this suggestion and that also the figures we have quoted would be misleading unless we pointed out that the bulk of the mineral property of the Dominion belongs to the several Provinces and is entirely subject to their control, but whilst admitting this we contend that the mineral lands belonging to the Dominion Government are considerable, consisting of the whole of this class of property in the North West Territories and the Yukon, together with an important and extremely valuable coal reserve in British Columbia. To administer these properties several officials are paid considerable salaries and it would be a distinct advantage that they should be responsible to a ministerial head. It may be objected that the Provincial Governments would resent any control from a federal minister and no doubt this is so but there are many things which could be done by such a minister to further the several interests of the Dominion, without in any way clashing with local and provincial susceptibilities. For instance, a department under the control of such a minister could undoubtedly obtain and classify most important information respecting the mineral resources and development of the country and these properly grouped and arranged would be of greater value than the fragmentary information which alone is now attainable. The minister would also be in a position to bring the claims of the Dominion before investors in a far more reliable manner than is at present done by men who are largely interested in the statements put forward. Undoubtedly there is too much Provincialism in Canadian affairs. It may not be so apparent to ourselves but it is very apparent to outsiders and is decidedly a disadvantage to the Dominion as a whole. English Capitalists for instance hear on one hand a great deal about Canada as a Nation, about our prosperity, our cohesion, and our patriotism. On the other hand they are confronted with the spectacle of provincial representatives, each endeavoring to outvie his competitor in some other Province in setting forth the attractions and advantages of the mineral property under his control. It would certainly be more dignified and more in accordance with the general policy upon which we are endeavoring to consolidate the Dominion if this aspect of the matter were minimized and a broader and more comprehensive view of our resources were taken. It is hopeless however to expect that this

desirable end will be achieved except under the direction of a Dominion Minister, whose sole purpose will be to set forth impartially the resources of the Dominion without any reference to local interests.

We notice that efforts are being made to secure the appointment of a Minister of Mines in Ontario. This may or may not be a necessity, at any rate it is entirely a matter for the Province to decide for itself, but it has no general bearing whatever upon the question we are discussing, and which will, if adequately dealt with, we believe raise the great mining industry to a position of dignity and importance which it has not hitherto attained in the eyes of the world but to which it is undoubtedly entitled, both by reason of its unlimited resource and its considerable development.

Imports of Mining Machinery.

The following are the official returns of the value of the mining and smelting machinery free and dutiable imported into Canada during the year ended 31st December last:—

MONTH.	UNITED STATES		GREAT BRITAIN		OTHER COUNTRIES		TOTAL.
	Free	Dutiable	Free	Dutiable	Free	Dutiable	
January.....	\$66,236	\$2,549	\$26,328	.....	\$420	.....	\$95,533
February....	42,486	2,389	637	.....	.....	.....	45,503
March.....	54,980	1,720	275	\$99	.....	.....	57,884
April.....	55,648	4,997	5,579	90	.....	.....	66,314
May.....	90,623	4,723	197	.....	.....	.....	95,607
June.....	76,409	5,293	811	.....	50	.....	\$2,563
July.....	47,441	2,177	.....	.....	67	.....	49,682
August.....	81,627	1,139	9,162	.....	9	.....	91,937
September..	81,608	8,535	180	371	302	.....	90,996
October....	54,883	4,040	2,128	345	.....	.....	61,396
November..	55,270	9,167	1,022	.....	.....	228	65,687
December...	34,257	1,677	9,893	206	1,209	.....	47,242
Total.....	\$741,471	\$48,450	\$56,212	\$1,921	\$2,057	\$228	\$850,339

Imports of Wire Rope.

The following figures from the Trade and Navigation monthly reports show the imports of wire rope into Canada during the year ended 31st December last.

It is worthy of the remark that 80,724 lbs. of a value of \$2,685 were imported from countries other than Great Britain and the United States.

MONTH	GREAT BRITAIN		UNITED STATES		TOTAL	
	Lbs.	Value	Lbs.	Value	Lbs.	Value
January.....	108,251	\$6,101	98,864	\$10,100	207,115	\$16,201
February....	58,552	3,981	34,239	3,257	92,791	7,238
March.....	58,439	2,856	33,346	3,245	71,785	6,101
April.....	96,158	5,447	17,566	2,169	114,024	7,616
May.....	166,573	12,835	30,050	2,889	199,547	15,814
June.....	170,990	12,058	50,703	5,115	221,693	17,173
July.....	37,922	2,953	42,221	6,217	80,143	9,170
August.....	61,009	5,391	43,124	4,011	104,133	9,602
September..	113,081	8,131	67,172	6,205	206,253	15,206
October....	68,752	5,304	29,587	3,320	150,339	10,349
November..	59,074	4,917	80,800	9,848	148,574	14,505
December...	54,516	3,782	26,847	2,816	81,363	6,598
Total.....	1,433,317	\$73,486	563,519	\$58,902	1,677,568	\$135,573

Le Roi.—Cable returns—Shipped to Northport during January, 16,377 tons of ore, containing 5,673 ozs gold, 10,695 ozs silver, 479,183 lbs copper. Estimated profit on this ore, \$15,000. (December profit, \$31,000.)

Anglo-Canadian Gold Estates.—Mr Allan Sullivan, the manager, cables as follows—"7th February—Started the machinery on the 5th February. Everything working well."



Interior of Furnace Plant Dominion Iron and Steel Company at Sydney, Cape Breton, showing Kettle discharging Molten Pig Iron into ingot cars for transmission to Converters.

Gold Mining in Nova Scotia.

By courtesy of Dr. Gilpin we are able to give below details of the gold returns of Nova Scotia reported to the Mines Office for royalty during the year ended 31st December last. These show a slight advance over previous years, the bulk of the yield coming, as in previous years, from the Brookfield, Richardson, and Blue Nose mines. These mines have been steadily and economically worked, and have yielded excellent profits from the low-grade material milled.

The following statement shows the gold returns reported to the Mines Department, Halifax, during the year ended 31st December, 1902:—

COMPANY OR MINE.	DISTRICT.	CRUSHED.		GOLD YIELD.		
		Tons.	Cwt.	Oz.	Dwt.	Gr.
Robert McKay	Cow Bay	17	13	33	3	14
Oldham	Oldham	772	10	614	17	12
Royal Oak	Sherbrooke	431	7	2394	16	..
Bluenose	"	11211	..	2391	..	..
Touquoy	Caribou	1836	..	801	20	12
Moose River Gold Mining Co.	"	1809	10	310	18	2
Baltimore—N. S. Mining Co.	"	7314	..	1562	7	..
West Lake Mining Co. (Donald Archibald and others)	Mt. Uniacke	691	..	1749	11	10
National Mining Co.	"	66	..	28	18	11
Modstock Mining Co.	Stormont	280	..	109	..	..
Richardson Gold Mining Co.	"	30455	..	3408	..	..
Goldfinch Mining Co. (Howard Richardson <i>et al.</i>)	"	1005	5	645	15	3
Strathcona Mine	"	3925	..	1558	2	..
George F. McNaughton	"	20	..	1	10	..
James A. Fraser <i>et al.</i>	"	1010	..	341	4	..
Tudor Gold Mining Co.	Waverley	156	..	13	3	16
Waverley Gold Mining Co.	"	8933	..	2835	15	..
Alfred C. Blair	Stormont	60	..	15	13	..
Argonaut Mining & Milling Co. (A. Walton <i>et al.</i>)	Kemptville	685	..	460	2	..
Brookfield Mining Co.	Brookfield	6475	..	4962	9	1
Pictou Development Co.	Renfrew	594	..	1649	5	..
Warwick Gold Mining Co.	"	426	3	23	10	13
John W. Lowe and others	Whiteburn	189	..	70	15	..
New Egerton Gold Mining Co.	Fifteen Mile St'm	2653	..	513	8	..
Old Province Mining Co.	Wine Harbor	146	..	24	12	..
J. J. Snook and others	"	710	..	117	18	..
Plough Lead Mining Co.	"	2783	..	877	2	..
Royal Mining Co.	Fifteen Mile Br'k	302	..	233	9	3
Wm. Crook and others	Lawrencetown	154	..	47	5	10
Micmac Mining Co.	Leipsigate	1665	5	786	10	14
Nova Scotia Gold Mg. & Dev. Co.	"	174	..	114	10	..
John H. Anderson <i>et al.</i>	Lake Catcha	181	11	273	14	11
F. W. Hanright <i>et al.</i>	"	610	..	279	17	12
Alex. McMillan <i>et al.</i>	Molega Barrens	119	11	224	19	..
M. McMann and others	Harrigan Cove	124	..	34	..	..
St. Anthony Gold Mining Co.	"	1133	..	493	9	..
Great Belt Mining Co.	Mt. Uniacke	2307	..	211	15	..
Miller's Lake M. Co., and others	Miller's Lake	108	..	59	..	..
A. K. Archibald <i>et al.</i>	Harrigan Cove	198	..	750	..	..
Geo E. Francklyn <i>et al.</i>	Montagu	100	10	39	17	11
Miscellaneous	Miscellaneous	170	..	77	6	18
Mortared	"	..	..	8	19	16
Total		95827	5	31149	1	..

We give below the returns of the three principal producing companies, for a number of years:—

BROOKFIELD MINING COMPANY, QUEEN'S COUNTY.

1895	2,975	ozs., 11 dwt., 15 grs., from 4,242 tons rock milled
1896	4,667	" 10 " 15 " " 5,315 " "
1897	3,906	" 18 " " " 9,712 " "
1898	2,659	" " " " 8,020 " "
1899	3,125	" 6 " " " 9,568 " "
1900	3,083	" 2 " 13 " " 8,989 " "
1901	2,836	" 18 " " " 7,515 " "
1902	4,962	" 9 " 1 " " 6,475 " "

BLUENOSE GOLD MINING CO., SHERBROOKE.

1896	432	ozs. (3 months' work) from 1,536 tons rock milled.
1897	1,939	" 13 dwt., " 7,983 " "
1898	3,631	" " " " 10,455 " "
1900	4,218	" " " " 12,588 " "
1901	4,201	" " " " 13,860 " "
1902	2,391	" " " " 11,211 " "

BOSTON-RICHARDSON GOLD MINING COMPANY, COUNTRY HARBOUR.

1893	2,237	ozs., 18 dwt., 10 grs., from 6,048 tons rock milled.
1894	1,674	" 10 " 10 " " 7,016 " "
1895	1,677	" 7 " " " 10,283 " "
1896	2,550	" (from 1st January to 31st Dec.)
1897	3,004	" .. from 25,450 " "
1898	2,478	" 5 dwt., " 24,121 " "
1899	2,949	" 10 " " " 21,583 " "
1900	4,779	" .. " " 23,785 " "
1901	3,279	" .. " " 24,610 " "
1902	3,408	" .. " " 30,455 " "

Mining in the North-West, 1902.

Mining in the North West Territories may be clearly divided into five districts, where mines are in operation, Canmore and Anthracite, Lethbridge, Souris, Edmonton and Blairmore.

Mining at Canmore is actively carried on all the year round, the output of coal being entirely consumed by the locomotives of the Canadian Pacific Railway. These mines have been in operation for over twelve (12) years principally by the one company the H. W. McNeill Co. with head offices at Anthracite, Alta.

No. 3 slope is sunk to a depth of 650 feet with workings mainly to the east over a mile in length. Within the past year a new underground slope has been sunk on No. 3 seam with cross-cut tunnels to No. 1 and 2 seams; the extra lift of coal thus gained will ensure a steady output from this mine for a number of years. Development work has also been pushed to the west of the slope, but troubled ground has materially hindered operations. About 2 miles to the east of No. 3 slope prospecting work is being done and the indications of a fairly large field are very hopeful.

At Anthracite, from which mine the hard coal consumers of the west depend entirely upon for their supply is at the present time crippled in its output, on account of the negotiations between the operating company and the owners of the adjoining property failing to agree on the point of royalty. The coal area owned by the present company operating is practically worked out but a favorable opportunity presents itself to bring the coal from the adjoining property out of the slope now in use. Should this slope be abandoned the cost of extracting the anthracite coal from the adjoining property, by driving a new tunnel to tap the seams, will be greatly increased to the operator or consumer. Lethbridge Mine which has supplied the wants of the North West Territories since the country first began to be settled, still holds the sway in the domestic coal market. The haulage roads extend for miles, radiating from the shaft in all directions to within 1000 feet of the working faces. This system of haulage is extended as the working faces advance and these extensions are in such a direction that the present shaft will be economically available for hoisting for many years to come. The mine although not tested to its full capacity last year, on account of a lack of cars, was producing in the height of the season over 900 tons per day.

Coal mining in south eastern Assiniboia has greatly benefitted by the coal famine in the Manitoba market, the output for the past year being more than double of any former year. There are three mines in operation, Roche Perce, Souris No. 1 and Souris No. 2 the latter producing the greatest tonnage with development work ahead capable of a production of 600 tons per day.

Edmonton coal mining like Edmonton real estate has taken an unprecedented boom, not unprecedented to the inhabitants of that city but certainly to the ears and eyes of the outside public. The whole surrounding country is underlaid by strata of coal varying from 2 feet to 12 feet in thickness. Altogether there are about thirty independent operators within a radius of twenty miles each of them producing from three to thirty tons per day. The coal is lignitic in nature, very suitable for domestic purposes and stationary boilers. The great stir in

railway circles is no doubt the cause of all this activity and as soon as a trans-continental road penetrates the country, these numerous small mines will be closed down and coal mining will be carried on more extensively by two or three companies operating large areas.

Blairmore coal mining district which has only been known as a coal producer for the past 18 months, has at the present time a larger output and more extended market than any other coal district in the Territories. The principal mine in operation is the Frank mine situated close to the town of Frank, Alta. Towards the end of 1900 this mine was opened and in less than two years the output has been increased to 75,000 tons. The peculiar conditions of this seam, (vertical) were conducive to the quick getting of coal and now that the development work is so far advanced the capacity of the mines is practically unlimited. The main tunnel has been driven over a mile in length straight into the mountain with rooms worked to the surface for nearly half that distance, over seventy per cent. of the coal still remaining in them. This coal can now be drawn at any time and the output is only curtailed by the means that the coal can be handled in the mine and at the tippie.

Another mine operated in this district is Gold Creek Colliery owned by the United Gold Fields Co. of British Columbia. A branch railroad seven miles in length has been completed to the mine but few shipments have been made. Many other prospects in this district are being developed and the quality of coal is similar in most cases. The only difficulty that exists in making this part of the country the largest producer in the Dominion is the means of transportation.

FRANK B. SMITH, B.Sc.,
Inspector of Mines.

MINING INSTITUTE

Report of Council — New Officers and Council — Arrangements for the Annual Meetings.

On Wednesday, Thursday and Friday of next week, 4th, 5th and 6th March, the Canadian Mining Institute will hold its annual meetings in the Club Room, Windsor Hotel, Montreal. Business sessions will be held on Wednesday and Friday mornings and sessions for the presentation and discussion of papers on the afternoon and evening of Wednesday and Thursday, the closing session taking place on Friday afternoon.

Thirty-four papers by members and twelve papers by mining students are on the programme. Special arrangements having been made to carry members and mining men to these meetings at a single fare on all railways, the attendance promises to be large and representative.

NEW OFFICERS AND COUNCIL.

If the slate recommended by the Nominating Committee meets with approval, as seems likely, the following gentlemen will comprise the Board of Management for 1903-1904:—

PAST PRESIDENTS

Mr. John E. Hardman, S.B., Mining Engineer, Montreal.
Mr. S. S. Fowler, S.B., Mining Engineer, Nelson, B.C.
Mr. Charles Fergie, Mining Engineer, Westville, N.S.

PRESIDENT

Mr. Eugene Coste, Mining Engineer, Toronto.

VICE-PRESIDENTS

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Dr. E. Gilpin, jr., Deputy Commissioner of Mines, Halifax.

REPORT OF COUNCIL.

The following report speaks for itself concerning the admirable work done on behalf of the profession and industry of mining in Canada by the Institute during 1902-3:—

The Council of the Canadian Mining Institute have pleasure in submitting the Fifth Annual Report on the proceedings of the Institute during the year 1902. It is with much satisfaction that they are able to state that the period under review has been one of increasing prosperity and progress in all the operations of the Institute.

MEMBERSHIP.

The growth of the membership and its distribution will be seen from the following comparative statement:—

	1898	1899	1900	1901	1902
Nova Scotia.....	16	16	19	27	31
New Brunswick.....	2	1	2	2	1
Quebec.....	66	77	77	77	79
Ontario.....	44	68	91	83	107
British Columbia.....	42	65	72	67	72
Manitoba.....	..	..	..	..	2
Newfoundland.....	..	1	2	2	2
Alberta.....	5	5	5	6	6
Yukon.....	..	..	..	2	5
Great Britain.....	4	9	7	12	14
United States.....	11	17	26	30	36
China.....	..	1	1	1	..
Honolulu.....	..	1	..	..	1
Spain.....	..	1	2	2	1
Australia.....	..	..	..	..	1
South Africa.....	..	..	3	4	..
Alaska.....	..	..	1	..	..
Mexico.....	..	..	1	1	1
Labrador.....	..	..	..	1	..
East Africa.....	..	..	..	1	1
South America.....	..	..	..	1	1
Students.....	2	15	14	12	92
	192	277	323	331	453
Died during the year.....	2	4	4	4	2

During the twelve months over seventy names were added to the list of active members, and in consequence of the affiliation of the Mining Societies of McGill and Queen's Universities, the student membership was also considerably increased, the number of students on our roll at present numbering ninety-two.

The migratory character of certain branches of the mining profession is well known, and we have, in consequence of mem-

bers leaving the country, again to report a number of resignations. A few names have also been removed for arrears of subscriptions.

OBITUARY.

It is with profound sorrow that the Council places on record the deaths of Captain Robert C. Adams, of Montreal, and Dr. A. R. C. Selwyn, of Vancouver.

Captain Adams was very well known to many of you as one of the founders and first presidents of the General Mining Association of the Province of Quebec, and later as a member of the Executive of the Federated Canadian Mining Institute which preceded our present organization. He was of an extremely lovable disposition, a man of high character, and, possessing considerable ability as a speaker and a writer, he was for many years a conspicuous figure at the meetings and conventions which, since 1889, have been held annually at this time of year in this room. He will long be remembered by the mining fraternity in Quebec for the keen interest he took in promoting any effort having for its object the welfare of the profession and industry of mining, and particularly for the splendid services which he rendered to the mining industries of Quebec at a time when their existence was threatened by ill-considered and repressive legislation.

Dr. A. R. C. Selwyn, C.M.G., occupied the honoured position of Director of the Geological Survey of Canada from 1869 to 1895, and at the time of his death was one of our honorary members. Although not so well known to the present generation of mining men, Dr. Selwyn, when Director of the Survey, accomplished much for the advancement of geological science in Canada, and his numerous published reports of his explorations and investigations have greatly extended our knowledge of the resources of the Dominion. At our last Annual Meeting the Institute gave testimony of its appreciation of Dr. Selwyn's services to Canada by the presentation of his portrait in oil to the Museum of the Survey at Ottawa.

MEETINGS.

The Annual Meetings of the Institute were held in this place in March. All the sessions were well attended, and much interest was taken in the papers and discussions.

Pursuant to a Resolution to form sections of the Institute at various mining centres, meetings were held in Kingston, Ont., at Sturbrooke, Que., and at Nelson, B.C., and branches organized at these points. Of these meetings the British Columbia one was particularly successful. A number of interesting and valuable papers were read, and many new members elected.

PUBLICATIONS.

During the year no less than fifty-one papers were presented by members, and of these forty-one were published in Volume V of the Journal of the Institute. This large, handsomely bound and profusely illustrated volume was issued to members in August, and will, it is hoped, be found to be a work of considerable service and value, not only to the members, but to the mining profession. Numerous copies were donated to the libraries of the principal mining, engineering and technical societies in Canada, Great Britain, South Africa, Australia, New Zealand, New South Wales, India and the United States. Indeed the demand for copies has been so great that our supply is completely exhausted, and in the future it will be necessary to provide for a very much larger issue.

The papers read before the British Columbia meeting have also been printed, and will be included in Volume VI.

The publication and distribution of so large a volume of our Transactions, and the heavy cost entailed by the redrawing and engraving of the numerous maps, plans, sketches and photographs which accompany it, together with the expense of printing and mailing several thousand copies of the papers in pamphlet form, has been aided very considerably by an increase in our grant

from the Dominion Government, obtained, we are pleased to say, through the generous consideration of the Hon. the Minister of the Interior, Mr. Sifton.

As our expenses of publication must naturally increase from year to year with the growth and advancement of the mining industries in Canada, the Council hopes that the Hon. Mr. Sifton, who is keenly alive to the importance and necessities of our mineral development, may be induced not only to renew the grant for the ensuing year, but to make it an annual one.

STUDENTS' COMPETITION.

Seven papers, four from McGill and three from Queen's, were contributed by student members in competition for the President's gold medal and the prizes annually offered by the Institute. Every one of these welcome contributions to our Transactions possessed merit, but they covered subjects so widely diverse in character that the sub-committee appointed by the Council to make the award had the greatest difficulty in arriving at a decision. Mr. C. V. Corless, who sent in a highly meritorious review of the geology and ore deposits of South Eastern British Columbia, withdrew his paper from the competition, and the awards were finally made as follows: President's medal to O. N. Scott, Listowel, Ont., for his paper describing "The Ore Deposits of Copper Mountain, Similkameen District, B.C." Cash prizes of \$25 each to Mr. H. W. DePencier, McGill, for his paper describing "Mine Timbering in the Old Ironsides and Knob Hill Mines," and L. P. Silver, Queen's, for his review of "The Sulphide Ore Bodies of the Sudbury Region."

With the object of remedying the difficulty of making these awards in the future, the Council recommend that in addition to the President's medal three cash prizes of a value of \$25 each be offered annually by the Institute for papers contributed in the following divisions:—

GROUP I—*Ore Deposits and Mining Geology.* The subject may be treated generally, or some particular district or single deposit may be discussed or described.

GROUP II—*Mining Practice.* Any and every branch of mining may be treated, such as pumping, hoisting, ventilation, timbering, ore extraction, development, etc., etc., or some particular method of mining, or some individual mine or group of mines, may be described or discussed.

GROUP III—*Ore Dressing and Metallurgy.* Any branch of ore dressing or metallurgy may be treated, as for example: Crushing, jigging, milling, concentrating, smelting, roasting, cyaniding, etc., or some particular plant may be described or discussed.

VISIT OF THE LAKE SUPERIOR MINING INSTITUTE.

In accordance with a Resolution passed at the Annual Meeting, an invitation was extended to the Lake Superior Mining Institute to join us in a meeting at Sault Ste. Marie, Ont., to be held in the month of August. The secretary of that society, however, wrote that arrangements had already been made for their summer meeting in 1902, but that if the invitation was kept open for 1903 a joint meeting might be arranged. It is, therefore, proposed to hold a meeting of the two organizations at Sault Ste. Marie in August or September, thereafter visiting the copper and iron mines of the vicinity and the copper-nickel mines at Sudbury. The Hon. the Commissioner of Crown Lands for Ontario has promised a grant of one thousand dollars to aid in making these meetings and excursions a success.

LIBRARY AND READING ROOM.

The Library and Reading Room has been kept open daily during the year, and has been largely used by members and by visitors seeking information concerning the mineral resources and mining industries of the country. The collection of works on mining, milling and metallurgical practice, books of reference,

exchanges from kindred societies, magazines and papers, maps, plans and photographs, have been considerably extended, and it will be necessary to provide another book-case for the accommodation of this now very valuable collection.

FINANCES.

The audited statement of the Treasurer which will be submitted to you in detail at the annual meeting, shows our finances to be in an exceedingly satisfactory condition the cash balance on hand at 31st. January, the end of our financial year, amounting to \$1,632.49. As showing the growth of the Institute the following comparative statement of our receipts and disbursements will be of interest :—

	Receipts.	Disbursements.
1898.....	\$2,674.67	\$2,454.85
1899.....	3,421.10	3,156.05
1900.....	3,601.50	3,455.76
1901.....	4,076.50	3,749.71
1902 ..	6,330.89	5,655.80

Submitted on behalf of the Council.

CHARLES FERGIE,
President.

B. T. A. BELL,
Secretary.

Notes on the Gold Ores of Western Ontario.

By MR. CHARLES BRENT, Rat Portage.

The gold fields of Western Ontario are situated on what is regarded by geologists as the oldest portion of the earth's crust now exposed.

The formations are entirely Archean and are two in number viz. the Laurentian and the Huronian, the latter being subdivided into the Couchiching and Keewatin series. The term Laurentian is used by Canadian geologists to designate in a petrographical and structural sense the crystalline generally acidic granitic or gneissoid rocks underlying the Huronian.

The Huronian of Western Ontario in its lower series the Couchiching consists wholly of sedimentary shallow water deposits of clay and clayey sands now almost wholly converted into grey and brown gneisses and mica schists but in places being merely consolidated into sandstones showing little or no alteration.

The upper or Keewatin series is largely composed of eruptives and their products with important sedimentary deposits now occurring as conglomerates, quartzites grits, breccias, graywackes slates and limestones.

The lower Archean occurs in large isolated areas, more or less surrounded by the schists of the upper Archean the latter forming a rough net work around the Laurentian areas.

The Huronian series dip away at high angles in every direction from the Central Laurentian bosses forming synclinals between the granite areas and now showing sections by which the geological history of the region has been worked out.

The whole mass of the Western Huronian series was once floating on a viscous granitic magma which under the varying weights of the Huronian strata or from some deep seated internal force swelled up into great bubble-like domes allowing the floating strata to sink into the spaces between. As the domes pushed upward the surface strata were stretched, fissured, sheared and contorted according to their position with regard to the rising masses which by friction with the colder strata had their outer cooling surfaces drawn into a sort of rough parallelism with the shear planes of the outside rocks thus forming the gneissoid margins which almost invariably surround the granitic masses. At the same time the margins of the granite masses were affected by the contact with the basic schists becoming themselves more basic and darker in color. *Felsitic* dykes were at the same time injected into the fissures

of the Huronian formed by the stretching and fracturing of the colder rocks.

It must be supposed that these granitic magmas though possessing fluidity were only hydrothermally fused since all along the edges of the contact angular fragments and slabs of basic Huronian rock, readily fusible at the melting point of granite, at a dry heat; are found floated off into the granite with their edges not even rounded by the heat. Later bosses of finer grained granites break through both Laurentian and Huronian areas and throw out felsitic dykes into each formation. A still later eruption of very fluid felsitic matter which may have been formed by a sort of a liquation process from some of the older eruptions must be assumed to account for some of the fine grained felsitic dykes which occur occasionally along the lines of contact of the older formations and penetrate fissures of almost capillary fineness in these rocks.

From the great magnitude of these domes of granite and from the steep dip of their synclinal gneissoid margins which correspond to the dip of the Huronian formations lying on their sides, it may be inferred that these Archean mountains were comparable in height to the greatest elevations of the present day. Lawson estimates the thickness of the Huronian rocks at 50,000 ft. and it is thus probable that the summit of these oldest of earth's mountains rose many miles above the present level.

Dynamic disturbances of post Archean times have apparently been rare in this district and are confined to the injection of a few *diorite* dykes and the fissuring and faulting of the rocks in the immediate vicinity of these. It must not be assumed from this statement that there has been no movement in the rocks during post Archean times. The clastic character of the quartz in most of the ore deposits and the shattered pyrites, often of different ages, constantly occurring in the veins show that movements have taken place which however are probably rather of secular than of dynamic character.

By the process of denudation which culminated during the glacial epoch, these great elevations have been reduced to an approximately level plane lying about 1200 feet above sea level which presents at the present day a most interesting section through the base of this group of ancient mountains. This plane is diversified by numerous basins scooped out of the softer rocks, which are now occupied by the complicated lake system of the district.

It may be noticed that the chains of lakes conform generally to the strike of the Huronian rocks which is approximately that of the direction of the glacial flow.

Post glacial changes have been very slight over the entire region as is evidenced everywhere by the freshness of the glacial strata and by the existence all over the district of brightly polished surfaces of rock which are just as smooth today as they were when the retreating ice sheet left them bare to the sky. This brief review of the geological history of the district will serve to make plain many peculiarities of the ore deposits and ores of this oldest of all the Gold fields.

The disturbances of the Archean period alone are responsible for the general geological arrangements we find at the present day and also for the folding, shearing and formation of the fissures which by subsequent circulation of hot and cold waters have been filled with the quartz and other minerals which form the ore deposits of Western Ontario.

The levelling of the Archean mountains which took place through the long ages preceding the glacial epoch was completed during that period and the whole mass of decomposed material swept away to the south and west to be distributed over half a continent, leaving only the solid unaltered bases of the mountain group.

This sweeping away of the debris of ages has rendered the ore deposits of Western Ontario unique in many respects among which may be noted the following :—

1st. The general levelling has left no great elevations. There is consequently practically no post glacial drift and the ore deposits are in plain sight. What is practically a deep level section of the ore body is laid bare with all its characteristics and since it is axiomatic in mining that "as the length is so is the depth," the underground behaviour of these ore bodies can be predicted with almost absolute certainty.

2nd. The contacts between the granites and traps, as the Laurentian and Huronian formations are commonly called, are always in plain sight, and since it has been established by actual work that these contacts are in some way connected with the presence of gold in the ore-bodies in the vicinity a useful guide is always at hand in exploring new areas.

3rd. There is practically no surface decomposition or surface enrichment to be met with in the entire district. A few feet of sinking as a rule reveals the character of the ore and that character is maintained in depth.

4th. There is no "water level" such as is commonly met with in other mining districts below which decomposition ceases and the ore changes in character. If an ore is found to be "free milling" on the surface it will retain that character to an indefinite depth.

5th. The solidity of the rock in this district is such that very little timber is required and although shafts are commonly sunk for hundreds of feet within a few feet of the shores of great bodies of surface water no trouble has been encountered from an excess of underground water.

6th. The rocks of this district are the hardest known to the mining world and more steel is used both in mining and crushing than in any other part of the world.

7th. The absence of any considerable elevations and the consequent lack of rapid streams, coupled with the facts that there is no loose material except glacial drift, would seem to preclude the probability of any areas of placer ground being found unless the streams which must have flowed to the south from the retreating southern edge of the ice sheet during the close of the glacial period have concentrated the gold contents of some of the terminal moraines.

As have been mentioned above the most promising auriferous deposits occur on or near the contact of the Laurentian and Huronian formations but gold has been found as well in veins in granite areas far removed from any contact and benches and segregations of gold bearing quartz are found everywhere in the Huronian schists with no apparent connection with any later eruptive.

A number of interesting occurrences may be cited to show the wide spread diffusion of the precious metal in this district and the varying character of the auriferous deposits.

On Gold Brook, near the Mattawan River, a number of locations have been taken up on a band of fine grained gneiss with sparsely disseminated grains of iron pyrites which carries gold throughout from a trace to 50c per ton. This deposit is nearly half a mile wide and several miles long, and although the gold content is too low for profitable working the occurrence must be regarded as highly interesting from a theoretical standpoint.

At the Hammond Reef, a band of shattered granite with quartz filled seams has been found to carry a workable amount of gold over a width of 300 feet and a length of some miles.

On Shebandowan Lake a number of very coarsely crystalline dykes of porphyry carry from a trace to \$20.00 per ton.

On Eagle Lake a band of schistose granite thirty feet in width is being actively worked with satisfactory results.

A large number of locations have been taken up on felsite dykes, many of which carry gold *per se* as well as in the fissures now filled with quartz which were produced by the shrinkage of the dyke rock in cooling or by subsequent movements along the line of weakness which

caused the primary dyke fissure. Among these may be mentioned the Bully Boy on Camp Bay. The Champion, near Rat Portage, No. 2 vein at the Big Master, on the Manitou, and the Sakoose in the New Klondyke, all of which have proved to contain workable amounts of gold.

True Fahl bands or belts of schist impregnated with pyrite and other sulphides are unknown in the district but numerous bands of pyritous schist with intercalated seams of quartz are to be found in the country. These generally contain lenticular bodies and stringers of quartz and are rather to be regarded as bedded deposits although generally claimed as Fahl bands. Among this class may be cited the Scramble near Rat Portage, the Flint Lake on Flint Lake and the Little Bobs on Denmark Lake. Bedded or lenticular or segregated veins are the usual form of ore deposits in schistose rocks, and these occur in great variety in Western Ontario.

At the Sultana, a series of great lenses in sheared porphyritic gneiss have produced a large amount of gold. At the El Dorado, on Eagle Lake, a bedded deposit in sheared granite is being developed with satisfactory results. At the Big Master, a bedded vein in chloritic schist has produced a large amount of gold. The Gold Hill veins, the Black Jack and Golden Gate veins in Hornblende schist have been worked with satisfactory returns.

The Olive, in the Seine River District, lying in a bed of schistose diorite is also auriferous, has produced a good deal of gold.

The Golden Horn, on the Lake of the Woods, in chloritic schist, is being actively developed with satisfactory results. The Wendigo, on the Lake of the Woods, is working a bedded vein in a band of pyritous Hornblende schist which carries a workable amount of gold.

The Triggs, Reliance, Gold Panner, Virginia, Cameron Island, are among many others worked on bedded veins in schistose formations with more or less success.

So called true fissure veins are numerous in the granite areas, but as might be expected, are comparatively rare in the schist. The Ferguson, Foley and Lucky Coon on the Seine River, the Golden Eagle on Eagle Lake, and the Nino in the Deer Lake country may be cited as notable examples of this class of deposit in granite, and the pebble vein at Gold Hill Mine, and the Jubilee vein on the Manitou may be cited as examples of true fissures in schistose formations.

Of contact veins no typical examples have been worked, although many such are known. The Mikado vein and the Black Eagle each cross a contact between diabase and granite, and since by longitudinal faulting in each case, one wall of the vein is granite and the other diabase for a short distance, these veins are in part true contact deposits.

It may be noted as a curious feature that the richest ore in the Mikado vein lies in this zone of contact, while the leanest ore in the Black Eagle's lies in the corresponding position.

As to the primary source of the gold in these deposits, not enough data are at hand to enable one to generalize with any degree of certainty, but from the fact that many of the felsite dykes carry gold *per se*, and that no gold has been found in the Couchiching series and but rarely in the sedimentary members of the Keewatin, and that eruptive contacts have been proven to be favorable to the presence of gold, it would seem that the gold came up from deep seated sources both with the Huronian eruptions and the later Laurentian granites to be distributed in its present situations with the quartz and accompanying minerals by the circulation of water under unknown conditions as to time, temperature and pressure.

As to the character of the ore, it may be noted that in all classes of deposits the gold, whenever found in workable amounts, is invariably associated with quartz in some form, and with the sulphides of iron, copper, lead and zinc, and that no complex minerals, and but few rare minerals are present.

Gold, if present in workable amounts, is, to a great extent, "free milling" and it may be taken as an axiom in this district that if an ore does not show gold in the pan it is economically valueless.

As to associated minerals, it may be noted that *Iron Pyrites* occurs in every gold ore in the district, and that as an indicative mineral, it is valueless.

The same is true of *Pyrrhotite*, which is commonly abundant in the pyritous schists. When an ore contains "free" gold the iron pyrite invariably contains gold, the pyrrhotite almost never.

Copper Pyrites in the ores of the Black Jack, Wendigo, Mikado and Black Eagle is invariably associated with high values in gold, while in the ores of most of the other veins of the district its presence means nothing favorable or otherwise.

Galena is invariably associated with high values in gold in the Sultana, Mikado, Golden Horn, Golden Star, Olive, Foley, Champion, Treasure and Big Master mines.

Zinc Blende is of the highest value as an indicative mineral in the veins of this district and wherever quartz is found with disseminated zinc blende, it is safe to say it is rich in gold. The richest ore in the Foley, Golden Star, Olive, Sultana, Champion, Golden Horn, Sakoose and Big Master, as well as in the veins in Eagle Lake, is invariably associated with the sulphides of zinc and lead, although these minerals in most cases carry little or no gold *per se*.

The rare sulphide of Bismuth, Bismuthinite is abundant in the ore from the Mikado vein and is sparingly found in the other veins of the vicinity. It is invariably associated with high gold values in the Mikado vein, and possesses no significance in any of the other veins in which it occurs.

Mispickel, and Arsenical and Antimonial sulphides are rare, and traces only of tellurides are met with, the only exceptions being the Huronian vein in Moss Township which produced very fine specimens of sylvanite, and in the Gold Creek vein on the Lake of the Woods, which, in a narrow pay shoot, carries the rare silver telluride aessite.

Leaves of native copper are comparatively common in the gold ores of the district and particles of native silver and of native platinum have been found associated with gold in several veins on the Lake of the Woods. Molybdenite is commonly found in gold bearing veins but possesses no significance as an indicative mineral.

As indicative minerals, the sulphides range in value as follows: 1. Zinc Blende. 2. Galena. 3. Copper Pyrites. 4. Iron Pyrites.

As may be gathered from the foregoing notes, the gold ores of the district may be regarded as "free milling," and experience has shown that from 70 to 90 per cent. of the total gold contents of the ores may be obtained by simple battery amalgamation, and that a satisfactory percentage of the remaining values may be obtained by subsequent concentration and chlorination, or cyaniding, or by direct cyaniding without previous concentration.

The "free milling" character of the ore has been retained in depth, and from the considerations presented in these notes, it is to be expected that these characteristics will be permanent to any depth, and since from a geological standpoint there is no reason why the deposits themselves may not run to as great depths as are practicable to mine, it would seem that in spite of many disastrous failures up to date that as soon as the era of "wild cutting" and stock jobbing schemes passes over that money and common sense will ultimately make a profitable, permanent mining industry in Western Ontario.

There is no district in the world where so many classes of gold bearing deposits may be met with as in this, and nowhere else is there such a wide spread diffusion of the precious metal, and although it is not to be expected that all of these gold deposits can be made to pay, it is to be expected that some of the best of them under the favorable conditions as to accessibility, climate, water, fuel and water power, may be made profitable mines when ample capital and experienced management are brought to bear upon them.

The Development of Gold-Dredging in the United States.

By RALPH L. MONTAGUR, A. I., M. E.*

Although gold-dredging had been carried on successfully on a moderate scale in New Zealand for a number of years, the efforts of American engineers were invariably met with failure when they tried to handle placer deposits by this method, and it was not until 1895 that the first successful dredge was built. Previous to this date various machines had been installed in different parts of the country, but from one cause or another they all failed. One fault common to nearly all these earlier types was that the machinery used was not powerful enough. In some localities, notably the Snake River, in Idaho, the gold was too fine to save in the appliances used; but the most common fault was that the final disposition of the tailings had not been taken into consideration, and consequently it was only a matter of time when the tailings crowded in on the dredge and work had to cease.

The first successful dredge in America was installed at Bannack, Montana, and commenced operations on the 19th June, 1895. In its earlier stages the management of this undertaking was in very inefficient hands, and this dredge would undoubtedly have been a failure if the management had been changed; but by judicious changes and additions to the machinery it became, as it is to-day, the most efficient dredge in the United States.

The most important points to be considered when selecting or designing gold-dredging machinery are:—First, the ability to handle a large amount of gravel economically, e.g., to excavate; secondly, to dispose of the tailings with the least expenditure of power; thirdly, to save the gold. I have put the gold saving problem last, because the most perfect arrangements for saving gold will be useless if a large yardage is not handled; and, furthermore, if a machine is capable of handling several hundred cubic yards in twenty-four hours some sort of device can be adopted that will save the gold.

The type of dredge that is so successful in America is, in its main features, totally different from the New Zealand type of machine. The gravel in place is excavated by an endless chain of buckets; in some instances the buckets are connected by links, in others the buckets are continuous. The upper tumbler which drives this chain of buckets is set about 14 ft. above water-level. The excavated gravel is dumped into a shoot that leads into a revolving screen or grizzly. This grizzly is placed with its lower end and projecting over the side of the boat, and the large boulders drop overboard, and are thus easily disposed of. The finer material that passes through the openings in the screen (these openings average $4\frac{1}{2}$ in. square) falls into a sump, and a centrifugal pump picks up this gravel, together with the water necessary to sluice it, and elevates it into a sluice-box, which is supported on an auxiliary flat boat at the stern of the dredge. It is not necessary to have the upper end of the sluice box over 20 ft. above water-level; the average height taken from a number of dredges operating in various localities is 15 feet.

This type of dredge, instead of being held in position by a series of wire cables, is held by means of a "spud" or anchor, which consists of a timber shod with a steel shoe, or, as is the case in some places, the spud is made up of sheets of steel and channels, I beams, &c. The digging is performed by starting the bucket chain on one side of the face of the cut and moving slowly across the face. As the dredge is pivoted on a spud at the stern, only one line is needed to swing the dredge. When the other side of the face is reached the ladder supporting the bucket-chain is lowered and the dredge swung slowly back, thus taking off another cut. This process is kept up until the bed-rock is reached; then the dredge is moved up towards the face, and the process is repeated. There are several advantages in this method of

*London Mining Journal.

digging that appeal to a practical man. One point is that the cut is dug out clean, it being impossible to leave any gravel behind. Then, again, the dredge being held steady by the spud, there is practically no surging backwards and forwards of the dredge, as is the case with dredges that are only held by cables. This side-feed makes it easier to keep the buckets full continuously, and, furthermore, cleans bed-rock better than any other method of digging. The only parts of this dredge that are brought in contact with the gravel are the bucket-chain, the revolving screen, and the centrifugal pump.

The upper end of the sluice-box rests on a turn-table, the base of which is supported on the dredge; and a short length of special hose connects the end of the discharge-pipe from the centrifugal pump with the sluice. By this means a flexible connection is formed between the dredge and the sluice-box. The lower end of the sluice can be swung into any position, and thus the accumulation of tailings can be regulated and spread evenly across the pit.

A further advantage of this method of dredging is, that the coarse material being on the bottom and the fine material running on to it, it fills up all the spaces between the boulders and thus packs the tailings well down. The actual space occupied by tailings from a cut the average depth of which was 35 ft. was 38 ft.

A properly designed sluice-box boat will have 50 ft. clearance between the dumping end of the sluice and the stern of the auxiliary flat boat which supports it. This insures against the tailings crowding in and grounding the sluice-box boat.

COMPARISON OF TYPES.

I now propose to draw a comparison between the new American type of gold dredge and the New Zealand type.

As before stated, the New Zealand type is held in position by a series of cables. A headline extends out in front, and is supposed to keep the dredge up against the face of the cut. There are, furthermore, two sets of lines on each side—a pair of bow lines and a pair of stern lines, which serve the purpose of swinging the dredge across the face of the cut. The advocates of the New Zealand type admit that the American type is the best dredge for digging purposes; and any practical engineer can see for himself that it is easier to dig from a steady platform (the American type) than from a swinging platform (the New Zealand type). The upper tumbler of the New Zealand dredge is set about 22 ft. above water-level. The excavated material is dumped into a revolving screen with very fine openings. The screened material is carried over a set of gold-saving tables, extremely limited as to size, and then elevated by means of a centrifugal pump. The coarse material that comes out of the lower end of the grizzly is elevated by means of a secondary chain of buckets to a point about 24 ft. above water-level. While it is true that it is not necessary as a rule to run the centrifugal pump that lifts the fine material from the gold-saving tables continuously, we can safely say that this pump is run half the time.

I will now compare the work done by the two different types of machines.

The American type lifts 100 per cent. of the material 14 ft. above water-level, and after screening lifts, say, 60 per cent. 15 ft. above water-level. The New Zealand type lifts 100 per cent. of the material 22 ft., and after screening lifts 60 per cent. 24 ft. and 40 per cent. 24 ft. for half the time. The ratio of power expended in lifts alone is 23:42.2.

In the American type I have put the screened gravel at 60 per cent. of the whole, and as the openings in the screen of the New Zealand type are so much smaller I have put this dredge's screened material at 40 per cent. of the whole. (Note,—The smaller this percentage is the more unfavorably does the ratio work out).

From actual appearance I find that an American type dredge with a chain of buckets of 5 cubic feet capacity will excavate and sluice on

an average 2,300 cubic yards per day of twenty-four hours. The indicated horse-power of this dredge was 120. This dredge was driven by electric motors, and the instruments used to measure the power were made by a first-class firm, viz., the Weston Instrument Company, Newark, N. J. This works out at about 19 yards per horse-power per day. The work done by the New Zealand type I cannot state from actual experience, but taking the figures that have been given me by the advocates of this type, viz., 50 horse-power for a 3 ft. bucket dredge—the capacity is 600 cubic yards per day on an average. This works out at 12 cubic yards per horse-power per day. In buying electric power by meter rate we will presume that a unit of horse-power costs £1 (\$5) per month. The wages we will put at 10s. per day unskilled, and 14s. and 16s. per day for skilled labour.

The American type will need per shift of eight hours one operator at 16s., one machine-tender at 14s., and one deck-hand 15s. The New Zealand dredge will need one operator at 16s., and one deck-hand at 10s. The total wages and power bill per day will be: American type, wages, £6; power, £4 per day; total, £10 per day. The New Zealand dredge wages, £3 18s.; power, £1 13s. 4d.; total, £5 11s. 4d.

Type.	Wages.			Power.			Total.			Capacity Cu. Yds.	Cost per Yard.
	£	s.	d.	£	s.	d.	£	s.	d.		
American.....	6	0	0	4	0	0	10	0	0	2,300	1.04
New Zealand...3	18	0	0	1	13	4	5	11	4	600	2.03

Obviously, the American type of dredge can handle ground more economically than the New Zealand type. When we go into the cost of repairs the comparison is still more unfavorable for the New Zealand type.

In drawing these comparisons I have had, on one hand, my own experience as the source of my figures; but, on the other hand, I have had to take figures of those who were interested in the New Zealand type of dredge.

In regard to the gold-saving efficiency of the American type of dredge, in localities where the gold is coarse no difficulty is experienced, and in other places where finer gold is met with the introduction of under currents in the sluice, and other devices has successfully accomplished that end.

DREDGING IN THE UNITED STATES OF AMERICA.

I will now give a brief history of some of the undertakings in the United States.

The first dredge was owned by the Gold Dredging Company. Another Company, the Bannack Dredging Company, built a dredge on the claims adjoining and were very successful. Further down the stream an English company, the Bon Accord Company, built a very large dredge, and failed through bad management. Below this dredge another company built a dredge and was successful. All these dredges were the American type. In 1897, the Bed-rock Dredging Company commenced operations in the Boise Basin, Idaho; the Basic Company and the Bullion Company likewise commenced, but one and all failed, solely owing to bad management. One of these companies, viz., the Basic Company, has been reconstructed, and is successful. The Pacific Dredging Company, at Moose Creek, Idaho, was started in 1898, and is a successful enterprise. At Breckenbridge, Colorado, three New Zealand type dredges were built, but were failures, owing to the nature of the ground. An American type has since been installed, and is in successful operation.

In California there are a number of New Zealand dredges working successfully. At Oroville, in 1900, an American type dredge was installed. This dredge had a continuous chain of 5 cubic feet buckets and was capable and has averaged 3,200 cubic yards per day; but owing to very poor management the machinery was allowed to wear out and the undertaking became a failure. This dredge has been remodelled, and the capacity has been cut in half; but as the dredge

has been broken down almost continuously since it was restarted it has, for dividend paying ability, practically no value.

The reason why there are so many failures of dredging undertakings is because it is a new method of placer mining, and it seems so simple at first that after a man has seen one dredge for a few minutes he imagines he knows all about it. American mining companies are, as a rule, close corporations, and frequently family affairs too. The wish to put some relative in the position of manager is frequently gratified, but at the cost of the success of the undertaking.

Then, again, a mining engineer who has been successful in some other branch of mining is engaged to manage a dredging plant. Sometimes he is willing to admit that he has a lot to learn, but as a rule he imagines he can teach others who have spent more years dredging than he has weeks. The writer can remember one case in particular, where a young graduate from college became filled with the idea, after having seen a few dredges, that he could design the most up-to-date dredge in existence. He designed a dredge that was a combination of the American and New Zealand types. Instead of elevating his screened gravel into a sluice he used tables. He held his dredge with a spud, which was all right for digging, but as he endeavored to dump his fine material back into about one-fourth the space it occupied originally he had trouble. Another mistake he had made was to dump his excavated material on to grizzly bars placed about 6 inches apart. As long as nothing but fine gravel was dumped on the bars they did not choke up, but as soon as stones fell on the bars they would not pass through, they stuck, and more gravel and stones falling on top simply wedged them in all the firmer. He had put on a chain of close connected buckets of 3 cubic feet capacity. In digging ground that has any large sized stones it is impossible to keep such buckets full, as the pitch is only 24 in. If a large amount of gravel must be handled, put on 5 ft., 7½ ft., or 10 ft. close connected, but not 3 ft., 5 ft. close connected buckets is the smallest practical size. Of course, an open connected chain with 3 ft. buckets can be kept full, because the pitch then between the buckets is 48 in. Another mistake made in this design was in the horse-power of the motors. I was asked to give an opinion on the design, and did so; but every change I suggested was met with the statement that it had been all figured out, and the dredge would work well. However, a company was formed by the young man's father, and the dredge was built. It worked exactly as had been foretold, it will excavate just about twice as much gravel as can be washed and disposed of, so that the buckets have to be run as slowly as possible in order to allow the tables to be kept from packing with sand, and to give the stacker and centrifugal pump time to get away with the tailings.

There is one other type of dredge that deserves a certain amount of notice. It is a shovel dredge. This type is to be avoided for placer mining, because it is the most costly to work and the most inefficient all round. A comparison of the different types mentioned in this article in a handy form is as follows:—

Type.	Size Buckets.	Horse Power.	Average Capacity.	Yds. per Horse power
Am.....	5 cubic feet o. c.	120	2,300	19
N. Z.....	3 cubic feet o. c.	50	600	12
Am.....	5 cubic feet c. c.	170	3,200	18.8
Am.....	3 cubic feet c. c.	140	500	5.7
Shovel....	1½ yards	160	500	3.1

There is one dredge that should not be missed, viz., a 7½ ft. close connected Am. type. This dredge is at Folsom, California, and has not, as far as I can learn, met with brilliant success, although it does not come under the head of failure. This dredge achieved the distinction of handling, in one day of 24 hours, over 7,000 cubic yards; but owing to the nature of the ground, which has a layer of large boulders just above bed-rock, there was a bad breakdown in the machinery, and the machine was idle for six months after making this record

The Sultana Ophir.

The Crown Lands Department has at last finally disposed of the contest as to the Ophir Mine on Sultana Island. This property has been in dispute and litigation since 1886.

The Ontario Mining Company was formed under a Dominion Charter to acquire the property and Dominion mining regulations were passed for the purpose of enabling the Dominion Government to deal with the matter. Under these regulations three patents were issued by the Dominion Government to H. G. McMicken, A. C. McMicken and George Heenan, who assigned to the Ontario Mining Company, as also did the applicants to the Dominion Government for the balance of the Island excepting the Caldwell Mine.

A Timber license had, however, been previously issued giving exclusive possession of Sultana, among other Islands, to the Timber Licensees.

When the Ontario Mining Company gave a working option upon the property the proposed purchasers were at the instance of the Timber Licensees restrained by injunction from working the property. This litigation was, however, ultimately settled.

Meantime applications had been put into the Ontario Government, it being claimed that the Dominion Government had no jurisdiction over the property and the contest was transferred to Ontario where it was carried on with increased bitterness for a number of years. At one of the hearings 13 Counsel appeared on behalf of various applicants. At the conclusion of protracted hearings the Ontario Government ruled that a one-third interest in the property should go to the Ontario Mining Company provided they abandoned all further claim and that the remaining two-thirds interest should go to Mr. E. Seybold and the other adverse applicants. The Ontario Mining Company refused to comply with this condition and attacked the patents by the Ontario Government of the two-thirds interest to the Ontario Patentees. This litigation went to the Judicial Committee of the Privy Council, the highest Court in the Empire, who decided against the contentions of the Ontario Mining Company and upheld the Ontario Patents. The fight was then renewed as to the remaining one-third interest but the patent has now been issued for this third interest to the Sultana Ophir Mining Company, Limited, a company organized under an Ontario charter by Mr. Seybold and to which he transferred his interest in the property. The result is that the Ontario Mining Company have no interest in the property and have been adjudged liable for the costs of the litigation and of the various appeals.

In the contest in the Crown Lands Department the Hon. S. H. Blake, K.C., appeared for the Ontario Mining Company, and Mr. J. M. Clark, K.C., as leading Counsel for Mr. Seybold, who succeeded.

The Granby smelter in one week recently treated 10,115 tons of ore, which is so far the record for Canada.

Cariboo-McKinney.—At the annual meeting of the shareholders of this company held at Toronto on 3rd instant the Directors reported that during the past year they had been able to declare dividends aggregating 4 per cent. while maintaining a reserve of \$50,000 for future contingencies. There was mined and milled during the year 11,414 tons of ore from the Caribou claim, 4,100 tons of ore from the Okanagan claim, 100 tons of ore from the Saw Tooth claim, a total of 15,614 tons. The average value of the ore mined and milled was \$9.96 per ton, 69.8 per cent. of this value or \$6.95 per ton was extracted as free gold by amalgamation, 17.4 per cent of the value, or \$1.74 was extracted and obtained in the concentrates, and the remaining 12.8 per cent. of the value, or \$1.27 per ton was lost in the tailings. While no unusual development work was done during the year, yet sufficient was done to keep ore reserves opened up well in advance of the stopes; during the year 1,040 feet of drifts were run, and 190 feet of upraises made.

FAKE MINING MEETING.

Standard Mining Exchange Hold a Convention of Alleged Ontario Mining Men and Railroads a Number of Resolutions Affecting Mining.—A Lively Session.

What purported to be a meeting of the mining men of Ontario was held in the Board of Trade, Toronto, on Tuesday and Wednesday, 17th and 18th instant. The meeting was convened and held under the aegis of the Standard Mining Exchange and the bulk of the attendance consisted of people whose interest in mining was rather of the speculative than industrial character. Out of the forty persons present there were brokers, vendors of cheap mining stocks, company promoters, one or two lawyers, the legal fraternity as usual doing most of the talking, and a representation of three members from the staff of the Ontario Bureau of Mines, present, doubtless out of curiosity, for they took no active part in the proceedings. The only real mining men present comprised a couple of prospectors and Messrs. A. P. Turner and Major Leckie of the Canadian Copper Co., Mr. Joseph Errington of the Massey Station Mining Co., Mr. Eugene Coste, President-elect of the Canadian Mining Institute, and Mr. B. T. A. Bell, Secretary of the same organization. The copper and nickel people, we suspect, were present to safeguard the interests of their companies and to block any attempt to put through resolutions favoring a resurrection of the proposal to put an export duty on nickel.

Mr. James Conmee, M.L.A., was moved into the Chair and the meeting proceeded to find out "where they were at." Figuratively speaking, everyone present resolved himself into a point of interrogation and desired to know first, why the meeting had been called, secondly, who had called it, and thirdly, what was it all about. Mr. W. J. Elliott a barrister of Toronto pleaded guilty to the offence of calling the meeting but he did not venture to explain why it had been called or what it hoped to accomplish.

Mr. CONMEE stated it had been called in the name of the Standard Stock and Mining Exchange, the objects generally being to consider the present condition of the mining industry and to suggest any means for furthering its interests. He then nominated a committee on Credentials comprising: Messrs. D. F. Burke, Port Arthur, D. O'Connor, Sudbury, G. F. Marks, Port Arthur and D. G. Lorsch, Toronto. As nobody appeared to have any credentials the committee reported amid some amusement that everything was just and regular.

Mr. B. T. A. Bell, Secretary of the Canadian Mining Institute took occasion to point out that the persons present were not in any sense representative of the mining industries of the Province and anything done by the meeting could not be seriously regarded as being the opinion of the mining men. The condition of the mining industries was eminently satisfactory, the value of the mineral production in 1902 being about two millions of dollars better than in 1901, and much work was being done in the opening of new mines and mineral-bearing territory. So far as he knew there was absolutely no complaint about the mining laws which were in the main fair and equitable.

Mr. JAMES CONMEE, M.P.P., resented Mr. Bell's imputation that the meeting was not a representative one. He claimed that, in his experience, it was the best meeting ever held in Ontario. He then nominated the following as a committee on Resolutions: Messrs. B. T. A. Bell, Ottawa, D. M. Brodie, Massey, J. Errington, Massey, R. McKay, barrister, Sault Ste. Marie. This committee met with approval and having withdrawn to consider what business should be brought before the convention the meeting adjourned until ten o'clock next morning.

WANT FREE COAL.

When ten o'clock came next morning only a corporal's guard was present and it was nearly an hour later before there was a sufficient attendance to warrant going on with the business. About thirty persons, including the representatives of the Toronto press, were present. The first resolution presented asked that the Ontario Government should memorialize the Dominion Government to take the duty off coal. It was as follows:

Whereas the Province of Ontario is almost entirely dependent upon foreign coal as a source of power, and the mining and other industrial interests of the Province are unable by reason of our distance from the mines to purchase Canadian coal at any but prohibitive prices, and the present duty on foreign coal is a direct burden upon the mining, metallurgical and indus-

trial interests, and in no way extends the use of Canadian coal in Ontario; resolved, that the present duty on bituminous coal should be repealed, and that this convention use every means in its power to procure from the Dominion Government the repeal of the same, so long as the United States withholds its import duty."

Mr. B. T. A. BELL opposed the resolution on the ground that free coal would injure the Upper Canada market for Nova Scotia coal. That Province had produced in 1902 about five millions of tons of bituminous coal the great bulk of it having been disposed of in Canada as far west as Ottawa. He was strongly in favor of a policy which would build up and develop a national mining industry and if the duty was removed American collieries, owing to their extremely low mining costs, would be in a position to oust Nova Scotia coal from the St. Lawrence trade. He was in favor of a resolution asking the Dominion Government to lengthen and deepen our canals, so that Nova Scotia coal could be carried into Ontario as far west as Port Arthur, thus opening up the possibility of return cargoes of Ontario's iron ores to Nova Scotia steel works. If these locks were extended a large and valuable interprovincial trade in coal and iron could be built up.

Mr. D. F. BURKE, (Port Arthur) supported Mr. Bell. The Dominion Government he said should be asked to deepen the canals to sixteen feet and lengthen the locks to admit large vessels. The development of an interprovincial trade in coal and iron would be of immense benefit to Ontario.

Major LECKIE said he could not support the resolution as free coal would necessarily affect very seriously the coal mining industries of Nova Scotia and New Brunswick.

Mr. A. P. TURNER was in favor of the resolution which meant much for not only the mining and smelting industries of Ontario but for the great manufacturing interests of the Province. It would mean to his company, the Canadian Copper Company, a saving of many thousands of dollars annually.

Messrs. Conmee, McKay (Sault Ste. Marie), Saw and others having spoken in support of the motion it was put to the meeting and carried.

Resolutions affecting the location of mines upon timber limits and asking for the division of the Province into properly constituted mining divisions were adopted.

WANT A MINISTER OF MINES.

Then came the *piece de resistance*, a resolution asking for the appointment of a Minister of Mines. The resolution read:—

Whereas, there has been a large increase and steady development of the mining industry in the province, and at the present time the Department of Crown Lands has the entire control thereof and the numerous duties incumbent upon the said Crown Lands Department have now grown to be of such magnitude that the establishment of a department dealing exclusively with mining and mining interests would greatly relieve the present pressure upon the Crown Lands Department, tending to relieve the congestion of business there, and thus largely facilitate the progress of development of the mining industry of the province; resolved, therefore, that a separate department in the Government should be established and a Minister of Mines appointed.

Major LECKIE said that the Mining Laws of the Province were, taken as a whole, all right but the administration of them, in his experience of the Department of Crown Lands, was far from satisfactory. He was not in favor of a new portfolio—it would be much better to expend the money upon increasing the efficiency of the Bureau of Mines. A competent mining engineer should be appointed at a good salary in a manner similar to that adopted in Nova Scotia and British Columbia.

Mr. B. T. A. BELL paid a high tribute to Professor Miller who had been appointed Provincial Mineralogist to the Bureau. Mr. Gibson, the present director of the Bureau, was also a most able and efficient officer. The question of the appointment of a new department was a rather large order and while, to some extent, he might be said to be in favor of it, the meeting was not a representative one and it would be most advisable to have it discussed by a larger and more representative meeting of the mining men of the Province.

Mr. JAMES CONMEE, having left the Chair, addressed the meeting strongly in favor of the appointment of a Minister of Mines. He maintained that the business of the Bureau of Mines was increasing so rapidly and the mining industries of the Province were attaining such value and importance that a new Department was an urgent necessity.

Mr. J. ERRINGTON complained of the loose methods of registering mining claims and he thought the Bureau of Mines should properly equip

its Provincial offices so that an applicant for a claim should know at once whether the claim was open and not already taken up.

Mr. JOHN MCKAY (Sault Ste. Marie) said that the Director of the Bureau of Mines was a capable, energetic officer, most upright in the discharge of his duties. The growth of mining in the Province fully warranted a department of mines separate and distinct from the Crown Lands Department.

Major LECKIE—"I have not been half so emphatic in my condemnation of the Crown Lands Department as some who have just spoken."

Cries—"No, No!"

"Why not take the office of Mining Minister yourself?" asked Mr. Elliott.

Major LECKIE—"I am no politician. You have been active in bringing supporters of the Government here."

"Order, Order!" from the chair.

Major LECKIE—"This isn't a representative meeting. Where is the East? I do not see anyone from Hastings County or the other active mining districts."

Mr. CONMEE again spoke of the resolution and denied that in anything he had said he had condemned the present Commissioner of Crown Lands.

Mr. EUGENE COSTE—"The question implies a change in the administration. This meeting is a farce. We are not representative."

Mr. B. T. A. BELL—"I quite agree with Mr. Coste—this meeting is anything but a representative one and I am in favor of postponing further discussion until a better meeting can be got together. As it is near the lunch hour I move therefore that this meeting do now adjourn."

Major LECKIE seconded the motion. "I submit that Ontario, Northern Ontario, at least, is not represented. As for the West, I am not qualified to speak. Many representative mining men are not here."

Mr. COSTE—"I claim that this is not a representative body. No one saw yesterday's credentials; they were whitewashed. Matters were rail-roaded through."

Chairman CONMEE—"Order, Order! I shall not permit you to say so." (Uproar.)

Mr. COSTE persisted and Mr. Conmee again ordered him to sit down.

Mr. COSTE then claimed the right to speak to Mr. Bell's amendment.

Chairman CONMEE—"This convention was advertised in the papers and I contend that this is a representative mining meeting."

Mr. BELL pressed his motion.

Mr. CONMEE—"It's not before the meeting."

Mr. BELL—"It is always in order to consider a motion to adjourn. I move that we now adjourn."

Mr. CONMEE—"If that is passed you burst all these resolutions."

Mr. BELL'S motion was put and lost.

The remaining resolutions were passed and a committee selected to wait on Premier Ross.

Coal and Iron Returns 1902.

Inverness Railway and Coal Company.

The following returns have been received since our last issue.

Output 1st Quarter	6,742 tons.
2nd "	16,927
3rd "	14,655
4th "	30,182
	<u>68,506</u>

Cape Breton Mining Company.

To Quebec	1,718 tons.
Nova Scotia	3,719
Newfoundland	2,134
P. E. Island	514
New Brunswick	126
Other Countries	1,554
Colliery Consumption	3,083
Colliery Employees	
Total	<u>12,838</u>

Cumberland Railway and Coal Company.

To Nova Scotia	103,339 tons.
New Brunswick	171,602
Quebec	48,713
United States	112,123
Total	<u>435,797</u>

Intercolonial Coal Mining Company.

To Nova Scotia	86,083.08 tons.
New Brunswick	9,941.05
P. E. Island	20,502.00
Quebec	74,593.06
Coke ovens	8,108.00
Ontario	930.03
Colliery employees	4,018.18
Colliery engines	15,762.00
United States	130.00

Total..... 220,369.00

Coke made 1902	4,685 tons.
Total Coal raised	216,180
" shipped (rail and water)	191,560

Canada Coals and Railway Company.

To New Brunswick	28,994 tons.
Nova Scotia	3,847
Quebec	7,545
Employees, &c.	12,223
Total	<u>52,609</u>

Hamilton Steel and Iron Company.

Canadian Ore used	76,222 tons.
Foreign Ore used	33,914
Cinder	12,285
Flux used	32,665
Pig Iron made	69,123

Deseronto Iron Company.

Canadian Ore used	1034-1260/2240
Foreign Ore used	16568-1460/2240
Charcoal Iron made	9727-1350/2240

Nova Scotia Steel and Coal Company.

COAL DISPOSALS.

Shipped	176,238 tons.
Intercolonial Railway use	6,466
Local sales	7,701
Workmen at the Colliery, &c.	7,342
Coal gifts to widows	223
Colliery use, engines, locomotives, &c.	19,839
Sundries (coke ovens and washers)	39,062
On hand	1,586

Total coal raised.... 258,457

Nova Scotia Steel and Coal Company.

IRON AND STEEL OUTPUT.

Nova Scotia ore used at Ferrona	13,389
Wabana hematite (Newfoundland)	30,665
Limestone quarried	20,145
Coke made at Ferrona	6,731
" " Sydney Mines	25,932
Pig iron made	23,034
Steel ignots made	17,907

Canada Iron Furnace Company.

MIDLAND FURNACE.

Canadian ore used	17,401,188
Foreign " "	41,608,328
Flux charged	25,782,366
Pig iron produced	29,170,260

RADNOR PLANT.

Ore mined	7,115,260
" purchased	5,725,173
Charcoal made	686,614 bushels.
Charcoal iron made	5,561,346 tons.
Ore charged	14,170,318 "
Fuel " bushels charcoal	686,520
Flux " "	1,256,338 "

H. W. McNeil Co.

Tons raised Anthracite Colliery	16,550
" " Canmore	91,400

Alberta Railway and Coal Co.

Tons raised in 1902	153,704
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Crow's Nest Pass Coal Co.

Tons raised in 1902	393,961
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Canadian American Coal and Coke Co.

Tons raised in 1902	75,000
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Souris Coal Mining Co.

Tons raised in 1902	64,000
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For other deliveries see January REVIEW.

OPENING OF POLITICAL NAVIGATION ON RAINY RIVER.



CONSTITUENT: An' fwhat port are yez making for now, Mr. Conmee, sor?
 MR. CONMEE: Port Folio, Denny—Port Folio, no less.

—Toronto World.

COMPANY NOTES.

War Eagle.—The annual report to the shareholders, dated 24th Feb., says "during the past year developing work has been steadily pushed and the ore reserves increased. The heavy decline in the price of copper has been offset by the reduction in smelting rates, while the satisfactory solution of the problems of treating the low grades by milling now makes it certain that the large bodies of this ore exposed throughout the mine will soon be made available. The ore sales during the year were 21,455 tons net, averaging \$14.58 smelters gross assay value. The average contents were gold .66 oz.; silver 1.2 oz. and payable under the new smelter rates are estimated at about 42,000 tons, averaging \$10.95 smelters gross assay value (pricing copper at 12 cents instead of 16.25 cents as the previous reports. The development of the mine has from the beginning continued to expose large quantities of ore too low in grade for smelting, but rich enough to promise a handsome profit to successful milling. Now that the difficulties of such treatment have been overcome, these low grade masses will soon be available. It is impossible to present any reliable estimate of their quantities or precise value, because their limits have not been clearly defined, and, until milling begins, they cannot be accurately sampled without excessive expense. The process of stoping them for the mill will undoubtedly developed much ore of higher grade which is not now disclosed by the workings."

Ymir Gold Mines.—The report of the Ymir Gold Mines, Ltd., to be submitted at the statutory meeting on the 15th inst., states that the total number of shares allotted is 200,000, all of which have been issued credited as paid up to the extent of 17s. per share, in consideration of the property and assets of the Ymir Gold Mines, Ltd. (Old Company), acquired by this company under agreement with the liquidator of the Ymir Gold Mines, Ltd. (Old Company), dated 21st November, 1902, which agreement has been filed with the registrar of joint stock companies. The total amount received by the company in respect of the 200,000 shares is £14,725. Payments in London on capital account—on account of liabilities of old company—amount to £14,027; handed to solicitors for registration expenses, etc., £550 (preliminary expenses are estimated at £600). In a circular accompanying the report, the directors state that of the £30,000 provided by the reconstruction, £15,000 has been called and £14,735 has been paid up, and this, with the profits of the mine, has enabled the completion of the shaft to be carried out with other important development work, and also has provided for all the company's liabilities, which, with the exception of about £3,000 not yet payable, are now extinguished. As requested by several shareholders, the directors have resolved to call up the balance of 1s. 6d. per share (making them fully paid). This will provide the necessary funds for still more vigorously proceeding with the development work, and at the same time leave the profits now being made available for distribution. The latest news received from the mine continues to be of a satisfactory nature—the profits for the months of November, December and January, after charging against revenue, development, repairs, and all other expenditure,

amounted approximately to £2,000, £1,540, and £2,380 respectively. The result was obtained by working 50 stamps in November and December, and 60 in January. Until connection had been made between the shaft and No. 10 level, development below No. 5 level was not practicable. Now this has been done, it is hoped that the full 80 stamps will shortly be employed. As shareholders have already been informed, the prospects here in an easterly direction were found to be very favourable.

Mabou Coal Mining.—Mr. J. Boardman Conn, C.E., writing to the Review on the operations of the Company says: "This Company acquired areas covering 15 square miles of coal lands on the northwest coast of Cape Breton about one year ago this coming spring. These areas are probably the only ones so far as known that contain all of the coal seams of the Nova Scotia coal fields in such position that they may be readily examined. Seven seams varying in thickness from 15 feet down to 3 feet are here exposed, and contain coal of almost all of the various grades mined in the Province.

The Company commenced operations in April, 1902, by starting a slope 11 feet by 7 feet in the clear on what is called the 7 foot seam, driving the slope at angle of 40 degrees. This slope was driven to the depth of 420 feet when levels were broken off to the right and left, and also a tunnel started at this depth connecting the so-called 8 foot seam; a tunnel is to be continued at this same depth to reach a still overlying seam of 11 feet. In June a slope was started 11 feet by 7 feet in the clear on an angle of 40 degrees on the so-called 15 foot seam. This slope has been driven down a distance of 400 feet, while levels have also been started on both sides of the slope. These levels will give a lift of some 300 feet of coal to a rise, and the first mining will be carried on from these levels. These slopes are now being continued downward, and at 800 feet a second set of levels will be broken off. Underground connections will be made with the overlying and underlaying seams as at the 400 foot levels, and the coal worked in rises of 400 feet.

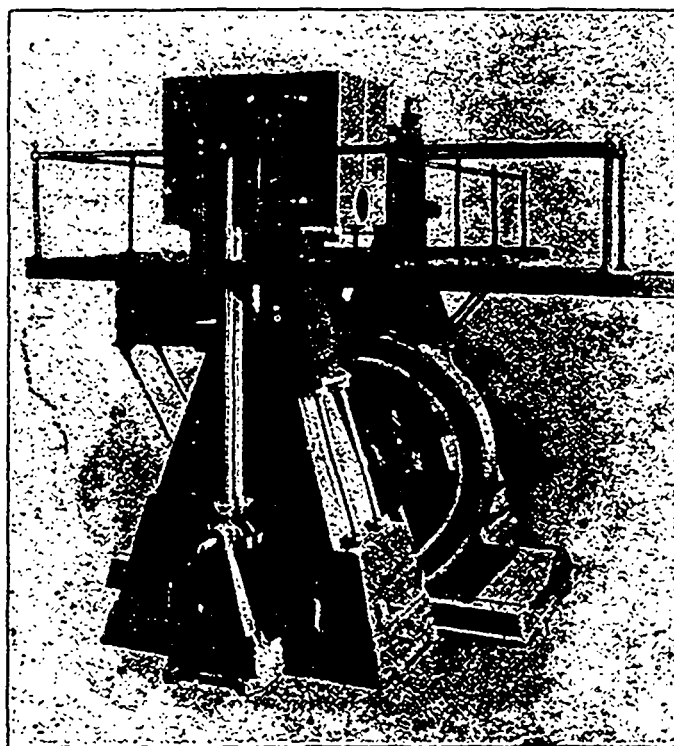
Eight 400 horse power boilers have been installed for air and hoisting purposes, and a duplex 20x32 Rand Compressor has been installed, and also a double 20x30 hoisting engine.

These slopes are so arranged that the bank heads from the mouth of the slope unite in the main bank head some 1000 feet distance where the coal is delivered to the screens situated over the cars upon a railroad which the company has just completed to a shipping port in Mabou Harbor. The company is also extending its line to a shipping point on Cariboo Cove where a wharf 800 feet long with coal pockets will be constructed as soon as the ice has gone in the spring.

The usual number of machine and blacksmith shops, barns, houses, and out buildings have been erected at the mines, and a force is kept constantly busy erecting new dwelling houses for the operators.

Shipments of coal will commence this coming spring, and the quality for its various purposes is thought to be as good as any now mined in the Province.

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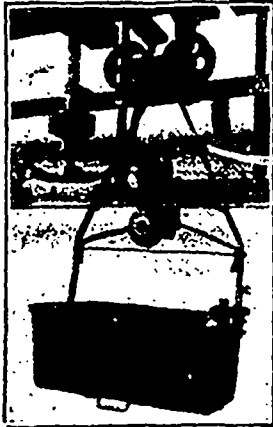
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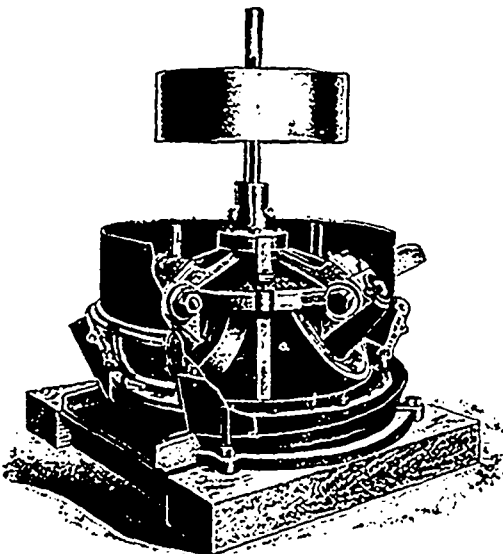
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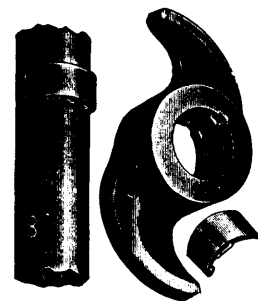


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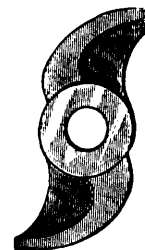


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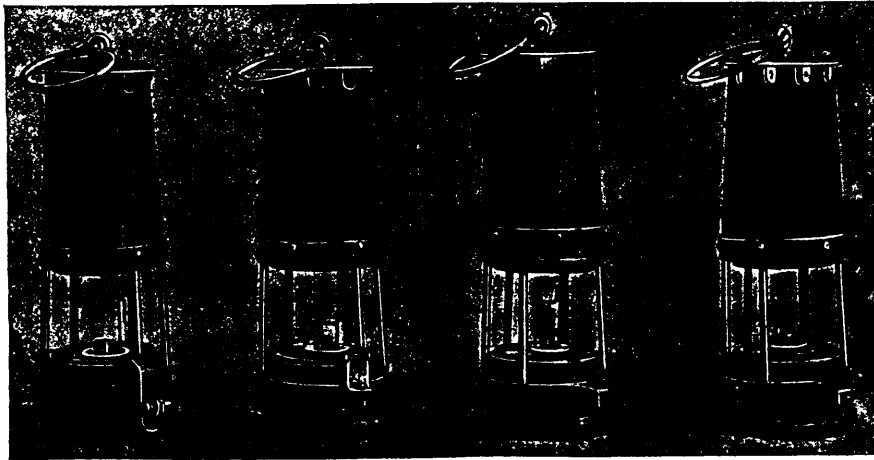
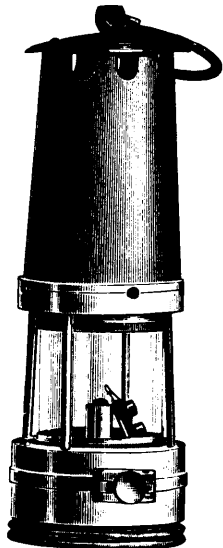
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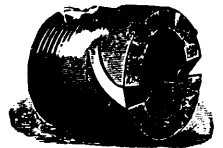
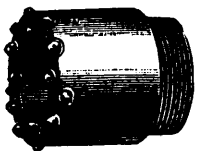
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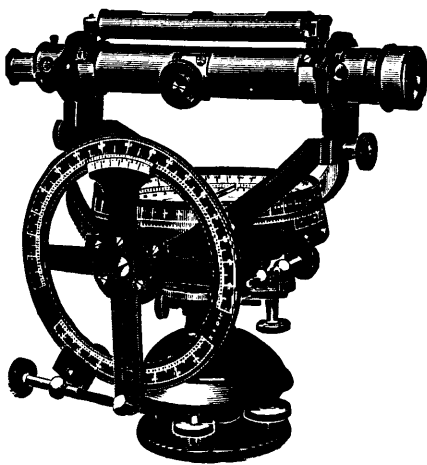
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ORNAMENTAL AND STRUCTURAL MATERIALS IN ABUNDANT VARIETY.

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

Mining concessions are divided into three classes:—

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

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

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

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

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

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

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

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

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

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

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GOLD AND SILVER.

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

Licenses are issued to owners of quartz crushing mills who are required

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

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

MINES OTHER THAN GOLD AND SILVER.

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

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

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

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

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

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

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

THE HON. A. DRYSDALE,
Commissioner Public Works and Mines,
HALIFAX, NOVA SCOTIA.



DOMINION OF CANADA

SYNOPSIS OF REGULATIONS

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

COAL.

Coal lands may be purchased at \$10.00 per acre for soft coal, and \$20.00 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at such rate as may from time to time be specified by Order-in-Council shall be collected on the gross output.

QUARTZ.

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

A Free Miner's Certificate is granted for one or more years, not exceeding five, upon payment in advance of \$10.00 per annum for an individual, and from \$50.00 to \$100.00 per annum for a company, according to capital.

A Free Miner having discovered mineral in place may locate a claim 1500 x 1500 feet by marking out the same with two legal posts, bearing location notices, one at each end of the line of the lode or vein.

The claim shall be recorded within fifteen days if located within ten miles of a Mining Recorder's Office, one additional day allowed for every additional ten miles or fraction. The fee for recording a claim is \$5.00.

At least \$100.00 must be expended on the claim each year or paid to the Mining Recorder in lieu thereof. When \$500.00 has been expended or paid the locator may, upon having a survey made and upon complying with other requirements, purchase the land at \$1.00 per acre.

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

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

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

Placer mining claims generally are 100 feet square; entry fee, \$5.00, renewable yearly. On the North Saskatchewan River claims are either bar or bench, the former being 100 feet long and extending between high and low water mark. The latter includes bar diggings, but extends back to the base of the hill or bank, but not exceeding 1,000 feet. Where steam power is used, claims 200 feet wide may be obtained.

DREDGING IN THE RIVERS OF MANITOBA AND THE N.W.T., EXCEPTING THE YUKON TERRITORY.

A Free Miner may obtain only two leases of five miles each for a term of twenty years, renewable in the discretion of the Minister of the Interior.

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

The lessee shall have a dredge in operation within one season from the date of the lease for each five miles, but where a person or company has obtained more than one lease one dredge for each fifteen miles or fraction is sufficient. Rental \$10.00 per annum for each mile of river leased. Royalty at the rate of two and a half per cent., collected on the output after it exceeds \$10,000.00.

DREDGING IN THE YUKON TERRITORY.

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

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

The lessee shall have one dredge in operation within two years from the date of the lease, and one dredge for each five miles within six years from such date. Rental, \$100.00 per mile for first year, and \$10.00 per mile for each subsequent year. Royalty ten per cent on the output in excess of \$15,000.00.

PLACER MINING IN THE YUKON TERRITORY.

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

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

The person or company staking a claim must hold a Free Miner's certificate.

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

Entry fee \$15.00. Royalty at the rate of 2½ per cent. on the value of the gold shipped from the Territory to be paid to the Comptroller.

No Free Miner shall receive a grant of more than one mining claim on each separate river, creek, or gulch, but the same miner may hold any number of claims by purchase, and Free Miners may work their claims in partnership, by filing notice and paying fee of \$2.00. A claim may be abandoned and another obtained on the same creek, gulch, or river, by giving notice, and paying a fee.

Work must be done on a claim each year to the value of at least \$200.00, or in lieu of work payment may be made to the Mining Recorder each year for the first three years of \$200.00, and after that \$400.00 for each year.

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

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

HYDRAULIC MINING, YUKON TERRITORY.

Locations suitable for hydraulic mining, having a frontage of from one to five miles, and a depth of one mile or more, may be leased for twenty years, provided the ground has been prospected by the applicant or his agent; is found to be unsuitable for placer mining; and does not include within its boundaries any mining claims already granted. A rental of \$150.00 for each mile of frontage, at the rate of 2½ per cent. on the value of the gold shipped from the Territory. Operations must be commenced within one year from the date of the lease, and not less than \$5,000.00 must be expended annually. The lease excludes all base metals, quartz, and coal, and provides for the withdrawal of unoperated land for agricultural or building purposes.

PETROLEUM.

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

JAMES A. SMART,
Deputy of the Minister of the Interior.

Ontario's Mining Lands..

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

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

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

The output of iron, copper and nickel in 1900 was much beyond that of any previous year, and large developments in these industries are now going on.

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

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

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe. The Canadian Pacific Railway runs through the entire mineral belt.

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

HONORABLE E. J. DAVIS,

Commissioner of Crown Lands,

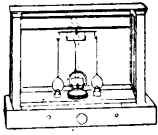
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THOS. W. GIBSON,

Director Bureau of Mines,

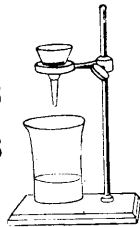
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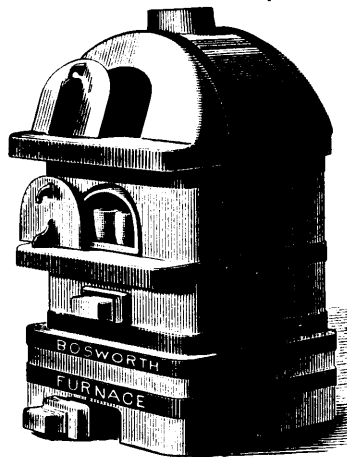
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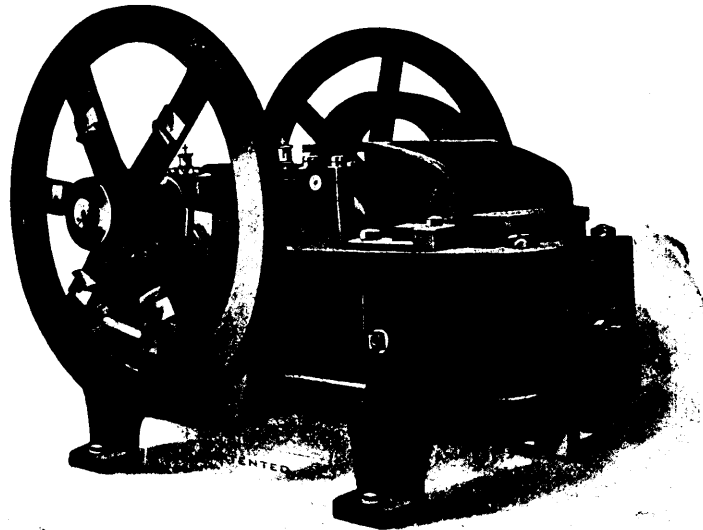
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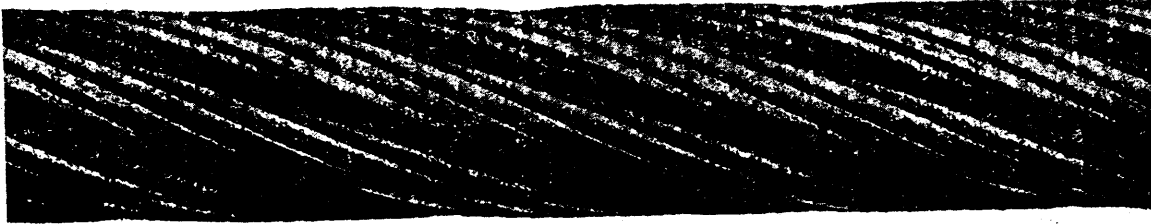
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