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The CANADIAN MINING REVIEW

Established 1882

Vol. XXIII—No. 9

MONTREAL, SEPTEMBER 30th, 1904.

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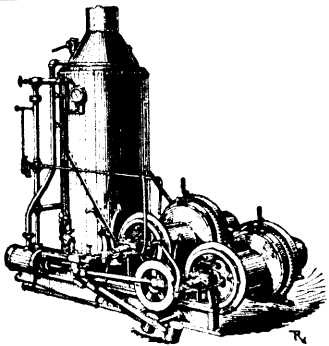
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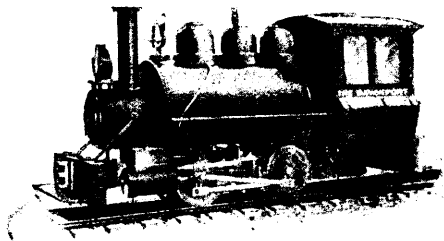
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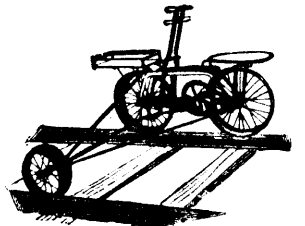
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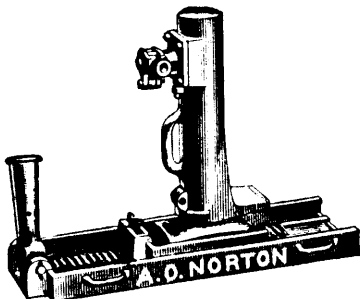
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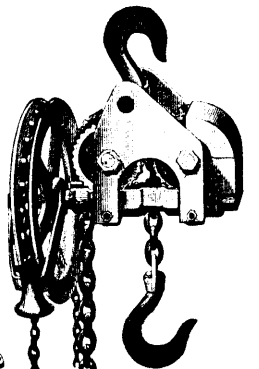
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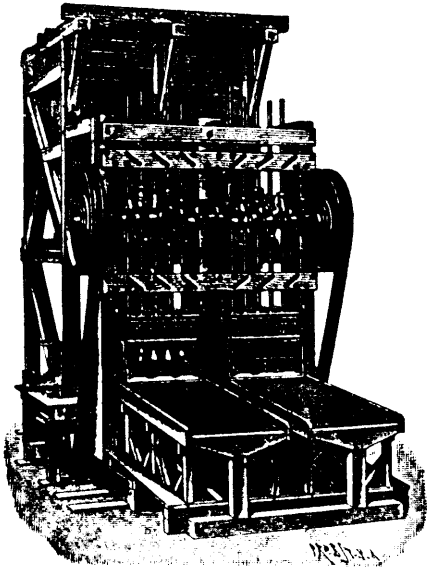


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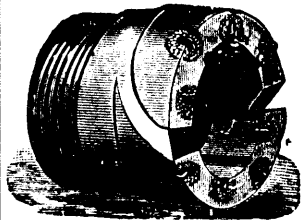
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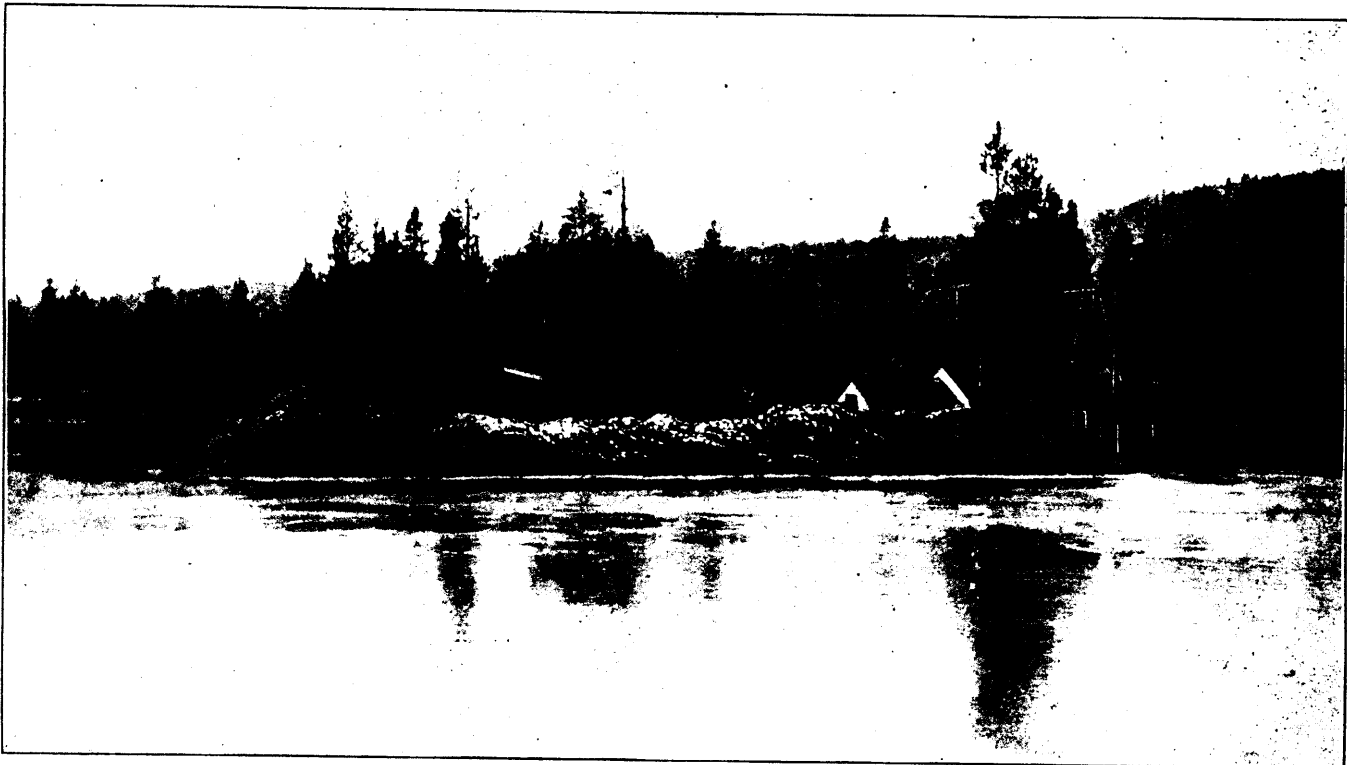
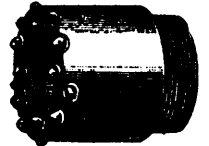
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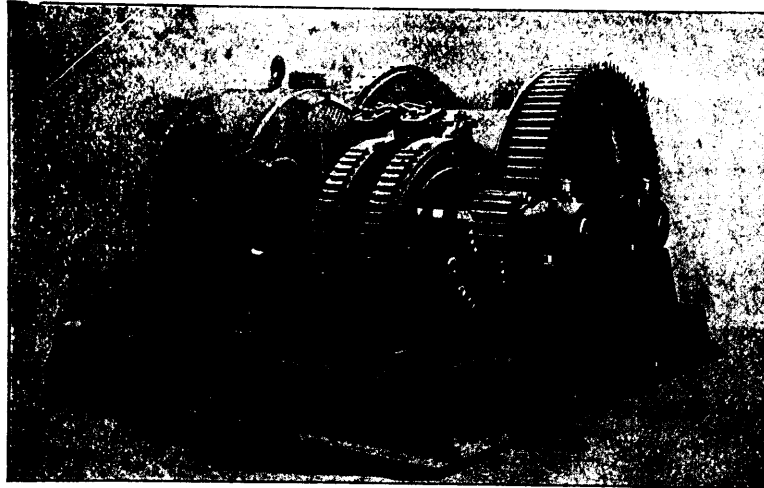
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Messrs. WALKER BROTHERS, Loftus Mines, Loftus in Cleveland, R.S.O.,
3rd December, 1901.

Dear Sirs,—I have much pleasure in stating that the air compressing machinery, supplied by you in 1891 and 1897, to Pease and Partners, Ltd., Loftus Ironstone Mines, has given every satisfaction.

The valves of the air cylinders are remarkably good, and have never given any trouble or needed repairs. The compressor is a double horizontal compound engine, steam cylinders, 28 in. and 49 in. diameters, air cylinders, 40 inch diameters by 72 in. stroke.

The compressed air is used for rock drilling, hauling, and pumping underground.—Yours faithfully,
For Pease and Partners, Ltd.,
W. MOORE, Manager.

[NOTE.—These engines have four steam cylinders and two air cylinders.—WALKER BROS.]

The United Alkali Co., Ltd., Chief Engineer's Office,
Widnes, 23rd December, 1901.

Messrs. WALKER BROS., Pagefield Ironworks, Wigan.

Dear Sirs,—In reply to your enquiry of the 29th November, we have pleasure in being able to state that your blowing engines have given us great service and satisfaction.

We have had for several years quite a number of your large blowing engines in operation, driven direct by both single and cross compound arrangement of steam cylinders.

We consider that the arrangement of the "Walker" valves on the compressor cylinders is a valuable one, possessing the merit of simplicity and efficiency, while giving a large throughway with a small clearance space.—Yours faithfully,

For the United Alkali Co.,
EDWARD J. DUFF, Chief Engineer.

[NOTE.—See the number and dimensions of the compressors referred to in the list of users in our catalogue. The steam and air cylinders are nearly 70 in number, from 20 in. to 50 in. diameter.—WALKER BROS.]

Barrow Hematite Steel Company, Limited,
Barrow-in-Furness, 7th Oct. 1901.

Messrs. WALKER BROS., Pagefield Ironworks, Wigan.

Dear Sirs,—I have much pleasure in stating that after a long experience of your Bessemer blowing cylinders, extending over 15 years, we find the valves perform their work most satisfactorily, and they are most enduring; indeed, we cannot speak too highly of their performance or life.—Yours faithfully,

For Barrow Hematite Steel Company, Limited,
J. M. WHILE, General Manager.

[NOTE.—The various blowing engines (air compressing engines) referred to above include several air cylinders 48 in. diameter.—WALKER BROS.]

Messrs. The GLENGARNOCK STEEL AND IRON COMPANY write, in November, 1901, after 15 years' experience of Walker Bros.' blowing engines, having air compressing cylinders 54 in. diameter by 6 ft. stroke:—"These engines have given us every satisfaction."

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S. PEARSON AND SON, Contractors,
Blackwall Tunnel Works, East Greenwich, S.E.,
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Messrs. WALKER BROS., 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 and Son, E. W. MOIR.

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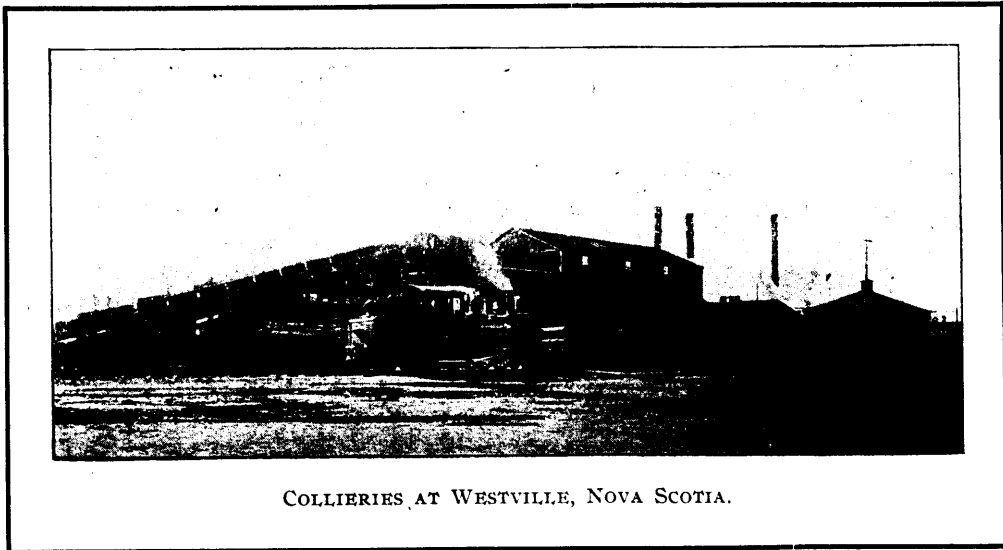
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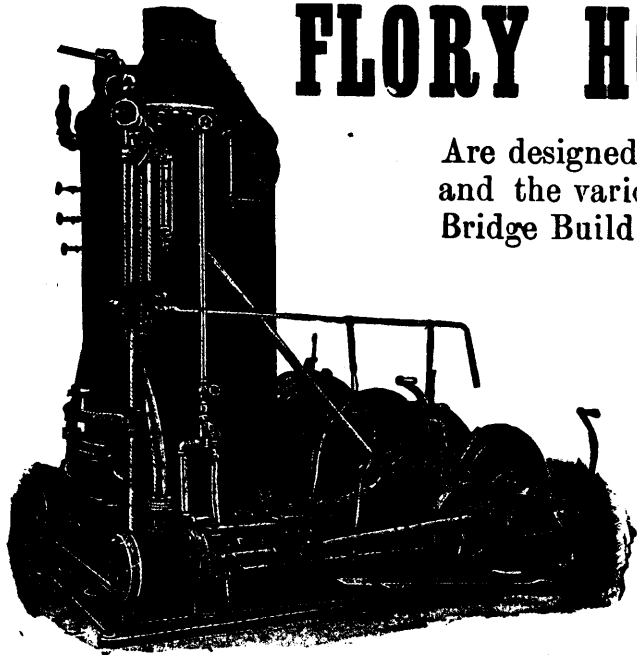
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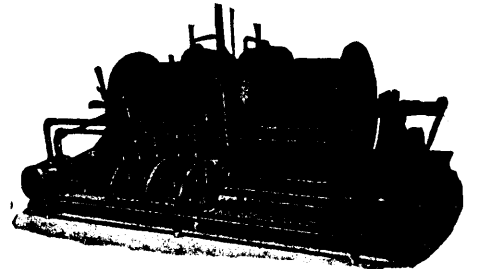
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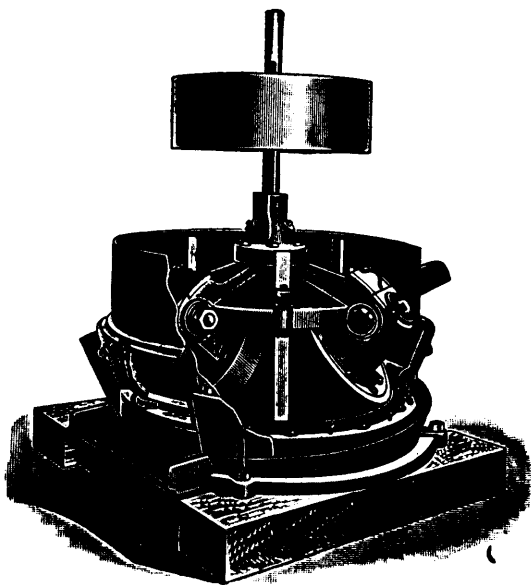
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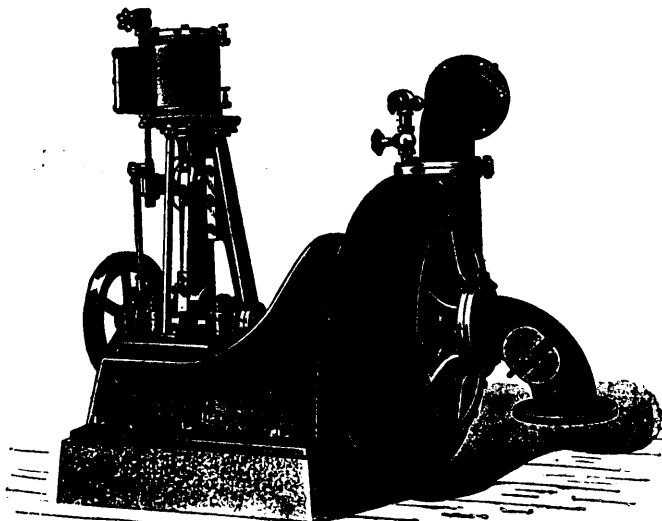
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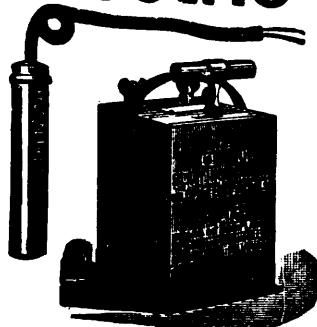
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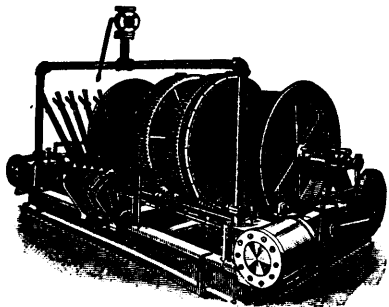
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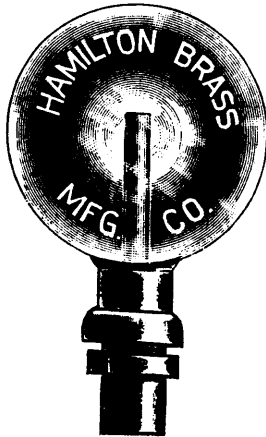
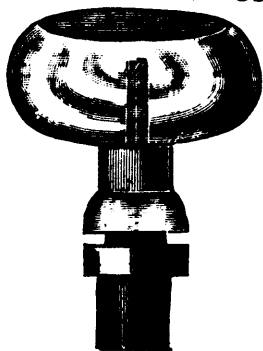
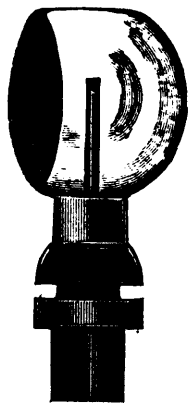
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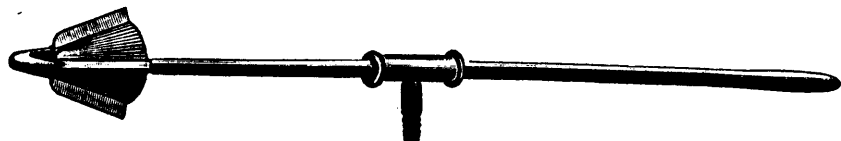
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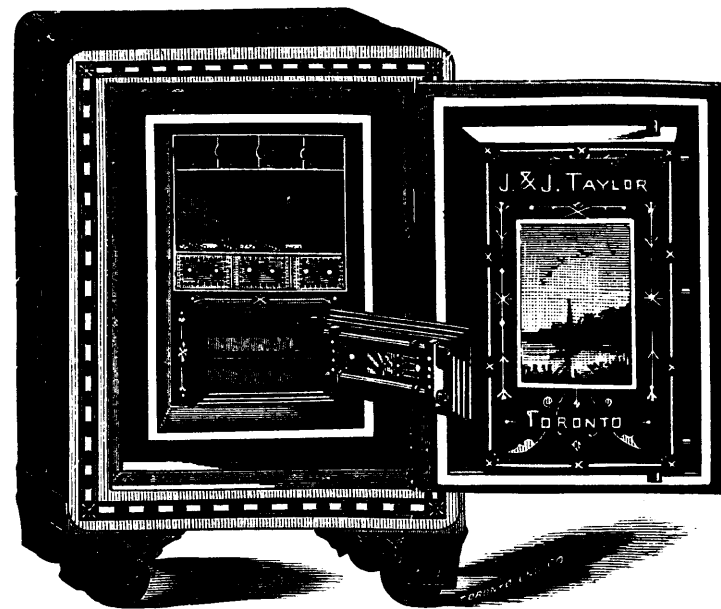
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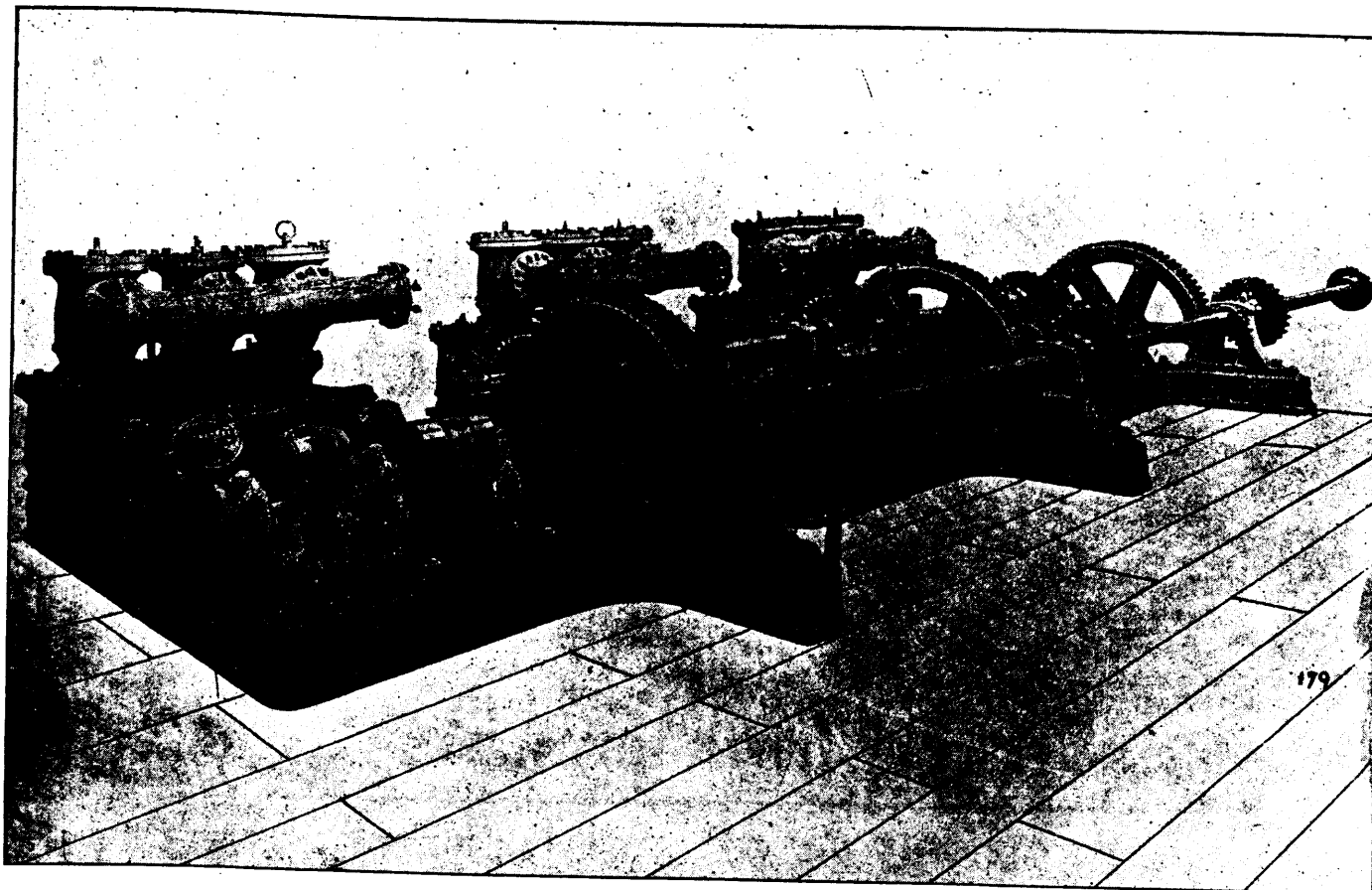
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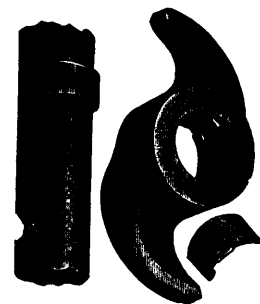
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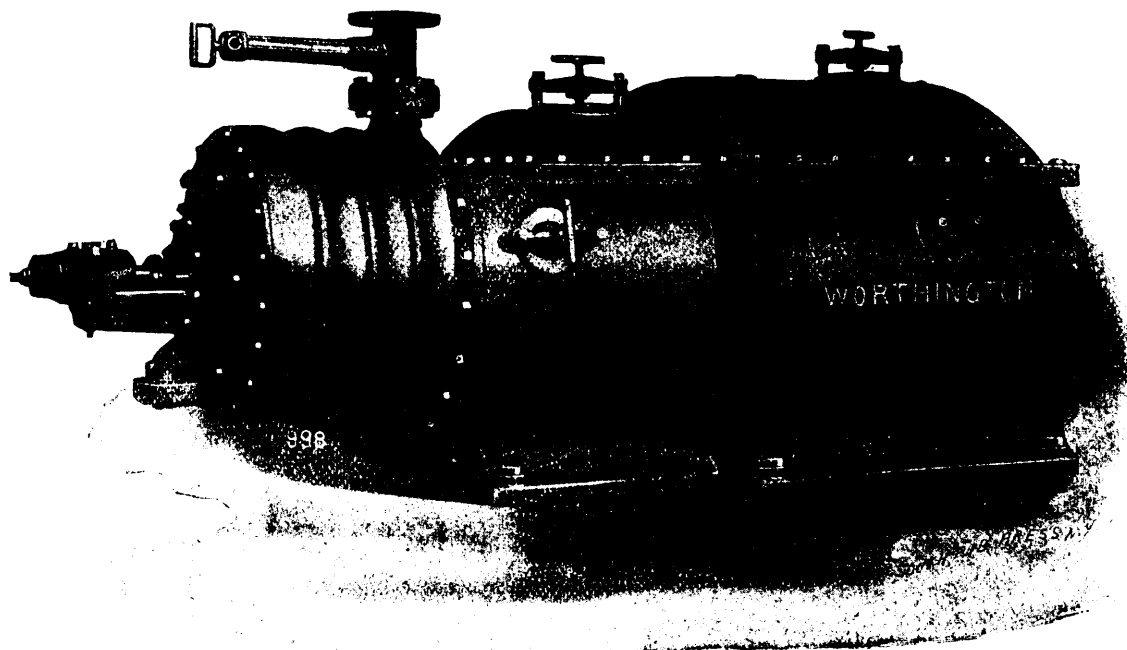
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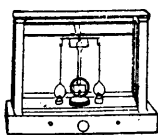
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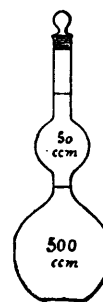
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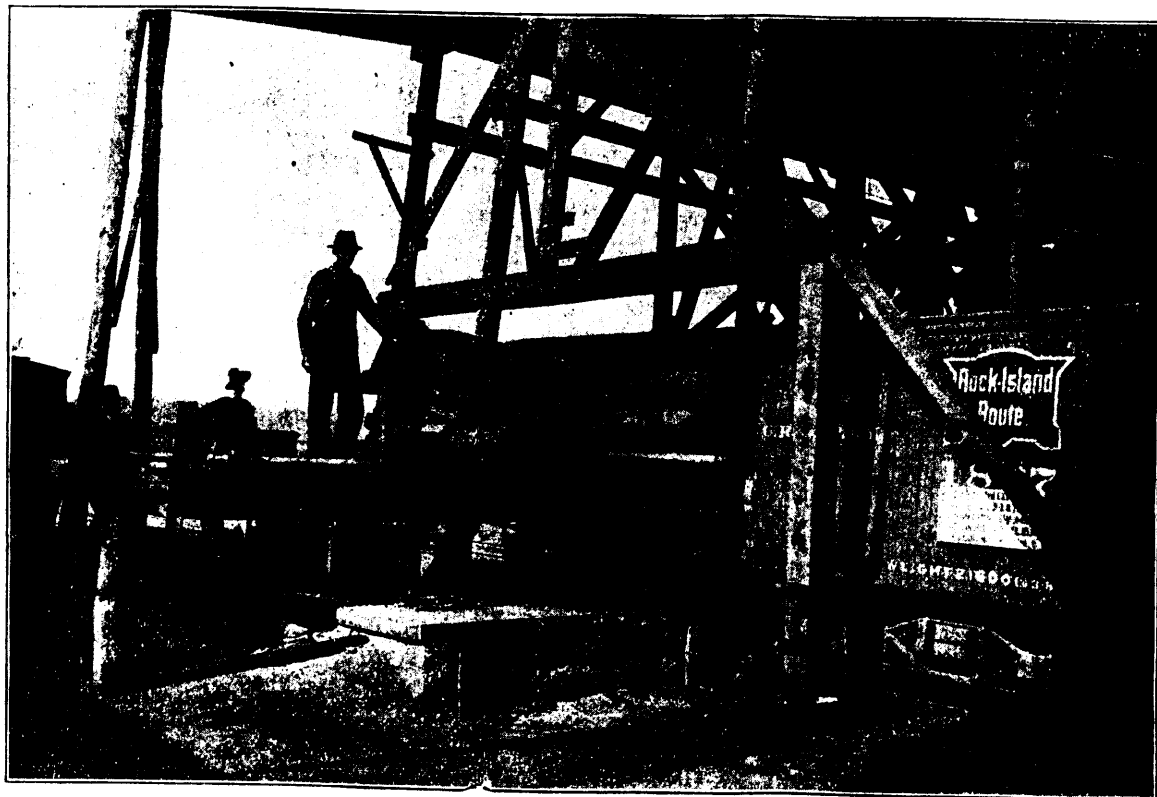
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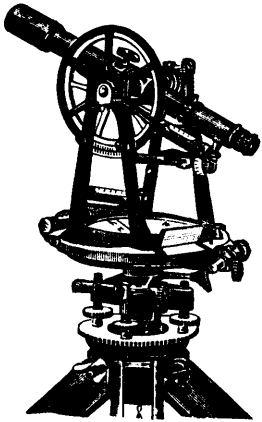
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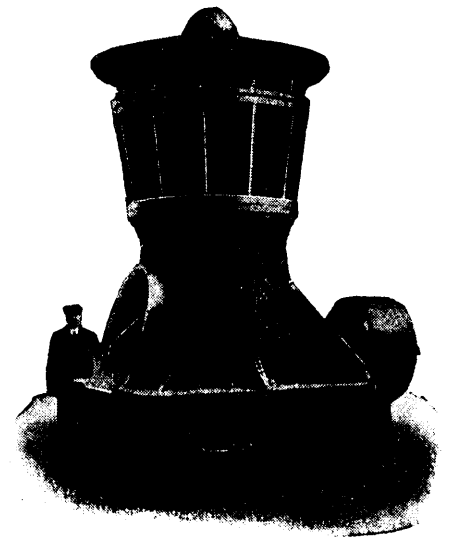
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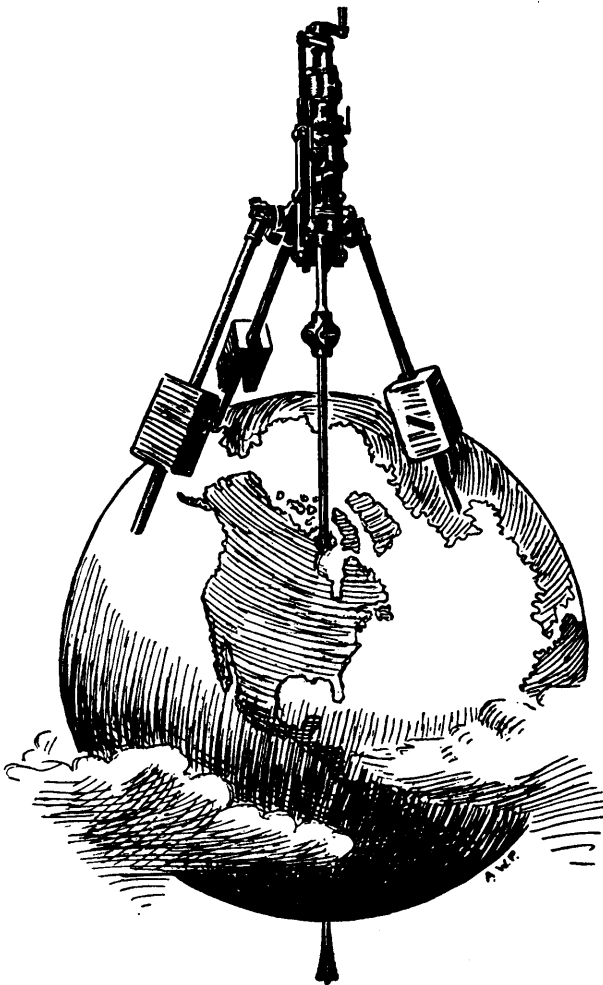
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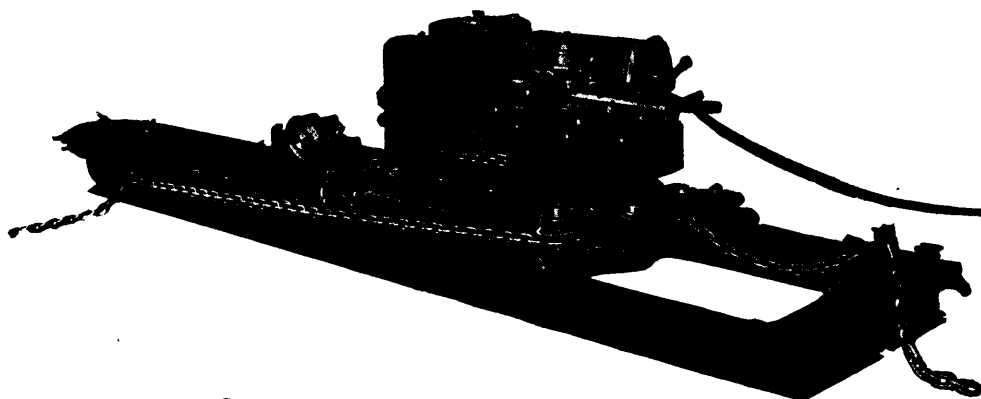
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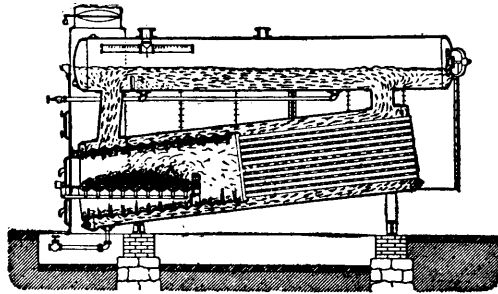
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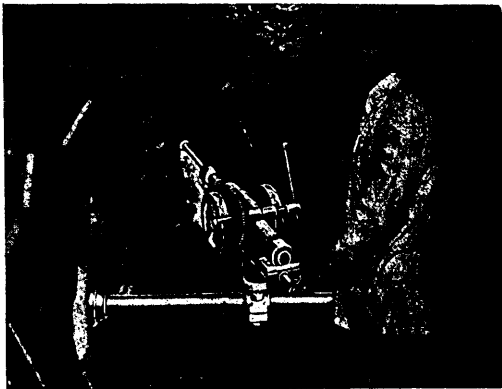
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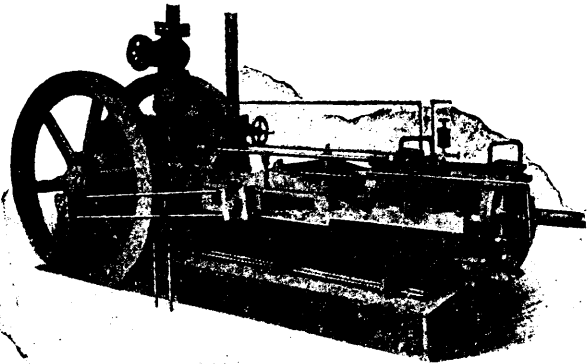
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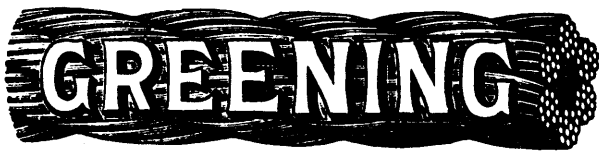
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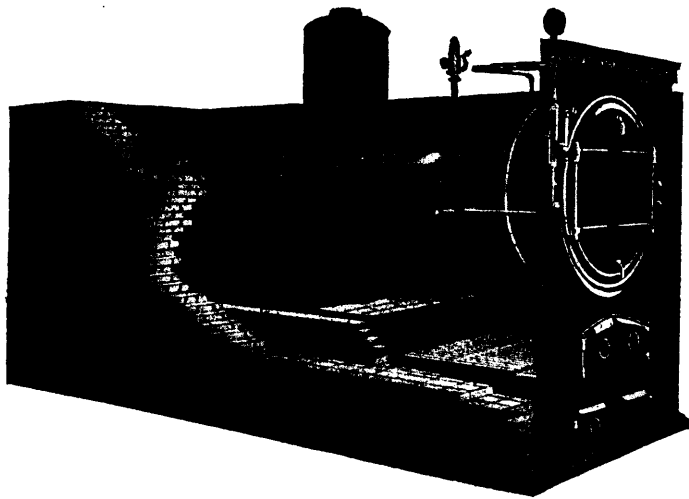
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Our article on The Nicola Coal Field in the August issue has occasioned the receipt of two letters from gentlemen interested in corporations operating in that field, who object to the characterization of the coal which our correspondent gave as "of a low bituminous character, just a little removed from lignite."

In support of their objections our correspondents give analyses which support their views that the coal is bituminous. At the same time the REVIEW begs to say that the words it used characterized the coals as *bituminous*, not as *lignitic*. The REVIEW has no wish to depreciate property, nor to misrepresent facts, and has taken steps to have this matter settled in time for publication in our next (October) issue.

While on the subject of coal, we cannot refrain from again impressing upon investors the fact that coal deposits of great magnitude have been discovered in various parts of British

Columbia during the last half dozen years. With coal on Vancouver Island, in the Nicola District, at Crow's Nest Pass, at Banff, at Anthracite, at Lethbridge, Canmore, Frank, Coleman, Hosmer, and in the Blairmore, Flathead and Elk Districts, and with every grade known, from lignite to anthracite, there is sure to be a surplus for the comparatively limited market now existent. Supply and demand will settle how many of the score of coal companies now in the field can weather the storm; certainly there is no present market for all the coal these companies can send out.

The many improvements which have been made in connection with gold-dredging machinery are attracting much capital to this most successful branch of gold mining. The centrifugal elevator, or refuse ejector, of Messrs. Payne and Peck, and the silt-distributor of McGeorge, are two of the most important new inventions. In view of the fact that some 50,000 acres of good arable bottom lands and orchard country are being yearly destroyed on the North American continent, the invention of McGeorge is likely to be of permanent value. Essentially the apparatus is intended to distribute soil on top of the rocks and boulders left by the dredge so as to re-make arable land. So far the tests made have shown that grass, grain and young trees planted on the new ground have thriven and done well. If further results continue to be satisfactory, the hue and cry of the low land farmers will be effectually silenced.

A piece of news which Eastern shareholders profess no knowledge of is that the dredge of the Ogilvie Gold Dredging Co. has left its rich (?) bar on the Stewart River and gone into contract work on the Klondike River, about half a mile above the bridge; Dawson papers of the 26th of August report the dredge to have been at work on that date. Outsiders (and perhaps some shareholders) might be curious as to why a dredge, built to save gold on a concession extending over more than 80 miles, should have been diverted to a 50 per cent. tribute lay on another concession some 150 miles distant. But if such outsiders were shareholders in the Ogilvie Co. they probably would receive the declaration that their president was omniscient, and not to be annoyed by vulgar questions.

There are divergent rumors as to the results which have been obtained this season on the Stewart River ; one set of rumors declares the work to have been unremunerative, another set predicts the payment of a handsome dividend in December. If results have been such as to justify a dividend, it seems difficult to understand why the dredge should have been put to work on another concession. The Williams concession, on which the dredge is now working, is reported to contain a large amount of pay dirt.

Lead in Ontario.

A small disturbance among the British Columbia producers of lead ores has been occasioned by the request made to the Department of Trade and Commerce by the owners of the small lead furnace at Bannockburn, Ont. These gentlemen, having smelted a quantity of ore and produced several tons of lead bullion (about 25 tons), desired the Government to send an official to inspect and verify their product so that they might avail themselves of the provisions of the Lead Bounty Act, and obtain the \$15.00 per ton to which they are entitled. But there is not the least occasion for the British Columbia gentlemen to get excited over the possibility of losing their share of Government pay.

The existence of ores of lead in Ontario, Quebec, and Nova Scotia has been known for more than thirty years, and the various and spasmodic attempts which have been made to work these ores are of equally clear knowledge. The deposits in Tudor (of which the Bannockburn is one) occur in calcareous and micaceous schists associated with limestones and dolomites of Silurian age. Some of these deposits occur associated with a gangue of barytes and calc spar, and are small in extent, others are from 18 in. to 24 in. in width, the ore appearing in bunches and as disseminated grains in the gangue. Some larger masses of galena are occasionally found, but the characteristic of the region is a lack of continuity to the deposits.

In both Tudor and Lake Townships there appear to be two distinct sets of deposits, one striking north-west, the other north-east, and where two veins cross each other there is usually an enlargement at the surface which does not continue in depth. There are, in addition, other veins, usually with a quartz gangue, which are somewhat larger, and which cut through the gneisses of Elzevir Township.

The association of arsenical and antimonial ores with the galenas of this section is not infrequent; their values in silver are low, running from 3 to 8 ozs. of silver to the ton of galena, and the majority of samples show no gold whatever.

The REVIEW has no personal knowledge of the Bannockburn mine, but only of the district in general. It sincerely hopes that a lead industry may arise and thrive in Eastern Ontario, but the known and recorded facts are in opposition to such a hope.

Our British Columbia producers will have exhausted the provisions of the Lead Bounty Act before Ontario becomes a formidable rival in the production of lead ores.

The Le Roi Mining Company.

It is not long ago since "Le Roi" was a name to conjure with in mining circles. Just how many successful promotions have been effected on the strength of Le Roi ore, Le Roi profits, and Le Roi share values, will probably never be known, but the veriest tyro in mining knows that their name is legion. No mine of genuine merit has had a more chequered career. To recount the various stages in its downward career, from the date of its sale by the Turner syndicate, would require more space than is at our disposal, and, at the present crisis of its affairs, we are more disposed to "point a moral" than "adorn a tale." In the permanent worth of this property, if completely and honestly handled, we have every confidence, for it could not have survived its many vicissitudes were it not that no amount of misrepresentation and manipulation could obscure the fact that it is a large and profitable property. Passing by the Whittaker Wright "coup" and the assaying error of last winter, we find a recent development of which comparatively little has been said, but which invites close enquiry, both in the interests of the shareholders and of the province.

It was noted, a few months ago, that negotiations were on foot for the amalgamation of the Le Roi, War Eagle and Centre Star properties. On being interviewed, the leading officials of the companies named admitted the fact. Later on reports from London showed that the directors of the Le Roi had the matter under consideration.

A feature of the proposed combination, which was of still greater importance, was the contemplated erection, or purchase, of a smelter on Canadian soil. This latter feature we do regard as essential to the ultimate success of the Le Roi for reasons which will shortly appear.

The latest information from London is that this proposed merger has fallen through—no explanation is given—and since we have it on the authority of Mr. T. G. Blackstock that the scheme was desirable in the interests of the companies he represents, it must be considered that the failure is due to indifference on the part of the Le Roi corporation. The giving out of this information synchronizes with the return of Mr. A. J. McMillan to this country, and a complete reorganization of the management staff. How far the personnel of the new staff is significant as indicating the future policy of the Le Roi must be left to the public to decide for itself. It demonstrates, however, the control of Mr. McMillan, who will now have a free hand since Messrs. F. W. Bradley and J. H. MacKenzie, the engineers who have recently advised the company, are not retained.

The future policy of the Company may be indicated by the fact that negotiations have been commenced by the Le Roi Company for the purchase of the Snow Shoe Mine in the Boundary. This mine belongs to a London company, of which Mr. Waterlow is the chairman and the largest shareholder.

It is also a matter of common report that the Le Roi Company have recently been purchasing interests in the Pack

Train Claim at Rossland—a property to which little or no importance is attached locally. No doubt the object of this policy is to consolidate the position of the Le Roi by securing other properties containing ore which can advantageously be treated with its own product, but such a selection should be made with the utmost care, and with the sole consideration of Le Roi interests. This raises finally the most important and serious aspect of the question as affecting all parties, viz., that of smelting.

This, after all, is the crux of the question, because it has the most vital influence on the question of profit or loss, and there is no question that the treatment of the Le Roi ores can be more profitably dealt with on the Canadian side, irrespective of any scheme for amalgamation, and irrespective of the acquisition or non-acquisition of other properties to be worked in conjunction with Le Roi. If the present action of the Le Roi directorate is to be regarded as final, we must assume that they are as much in love with their own smelter at Northport as ever, and will continue to operate it for the reduction of Le Roi and any other ores they may produce. This policy was clearly foreshadowed by the chairman of the company at the last annual meeting, when he expatiated at considerable length on the excellence of their smelter and its value as an asset.

It has always been a grievance in British Columbia that Rossland ores should go to Northport for treatment. There can be no question that Northport smelter would never have been built but that, at that time, the Le Roi belonged to Senator Turner, of Spokane, and his associates. It has long since been demonstrated to the satisfaction of everyone, except the Le Roi directorate, that, instead of being "a valuable asset," it is a "white elephant." However great Canadian solicitude for Canadian interests may be, the abandonment of the Northport smelter on patriotic grounds alone could not be advocated, nor could it if the change would involve pecuniary loss, but when such a course would vastly benefit the shareholders of the Le Roi Company, it becomes difficult to understand why a policy should be inaugurated perpetuating a constant loss.

To show that Rossland ores can be, and have been, treated more advantageously at Canadian than American smelters, it is only necessary to point out that the adjoining mine to the Le Roi (Centre Star) during its last financial year, made a net profit of \$228,359.00, as per balance sheet published. This was on the sale of 88,387 tons of ore, averaging \$10.58 a ton gross assay value. This ore was treated at the Trail smelter, and received an advantageous freight and treatment rate, which enabled the mine, using the Canadian smelter, to obtain actual cash results that compare more than favorably with its bigger neighbor. The Le Roi shipped to its own smelter at Northport 172,669 tons of first class ore of an average gross assay value of \$13.36 per ton, and 7,196 tons of second class ore averaging \$11.18 per ton, upon the whole of which the estimated profit of \$378,421.00 was made, though later developments tend to cast doubt on the accuracy of the estimate. A comparison of these results shows a surplus in favor of the

ore treated at the Canadian smelter of \$3.00 a ton. Of course this is not all accounted for by cheaper treatment, but, after making every allowance for other items, it is evident that a substantial balance is attributable to that source.

We respectfully submit that the foregoing statements are well worthy the consideration of the directorate and shareholders of the Le Roi Company. The Province of British Columbia has been the graveyard of not a few reputations, both financial and professional. It has been blamed for all the misdeeds of all the unscrupulous promoters and incompetent managers who have exploited its mineral wealth, but if confiding shareholders choose to plunge ahead regardless of the advice and warnings of the mining press and of the men who have the true interests of the province at heart, they must take the consequences, and need not look for sympathy.

The Alaska Gold Belt

The U. S. Geological Survey will shortly publish a bulletin on the Juneau (Alaska) gold belt by Messrs. A. S. Spencer and C. W. Wright. These gentlemen were detailed to make an extensive examination of the schistose country in southeastern Alaska last summer, and have now completed their field work.

The Juneau gold belt, which includes the famous Treadwell mine on Douglass Island, is found to present many similarities to the rocks of the Mother Lode districts in central California. The component members of the rock series are very similar in character, and, perhaps, are of similar age, being composed of a more or less conformable series of slates and schists, with occasional bands of eruptive igneous rocks. The veins of the Juneau district, like those of the Mother Lode, are usually conformable in strike and dip with the enclosing rocks, but in the Juneau belt there are a larger number of quartzose veins crossing the dip and strike of the country. There are also, as in California, many independent deposits not correlated to the main complex of veins, but lying outside thereof.

Another point of resemblance is that, out of the very large number of veins met with, but a very small percentage carry free gold in commercial quantities, and the continuity of any one single vein is not usually extensive in a lateral direction.

There are now seven productive mines in this belt, three on Douglass Island, and four on the main land, whose united production for 1904 is estimated closely at \$2,500,000.

Since the inception of mining (in 1880) the production of the Juneau belt has exceeded the sum of \$20,000,000.

The REVIEW begs to suggest to the Department of the Interior the advisability of having a competent man from the Geological Survey, or from the Superintendent of Mines office, sent to familiarize himself with the geological conditions of the Juneau district, and then to commission him to make an investigation and comparison with the slates and metamorphic schists of the Yukon Territory.

The Granby Smelting Co.

The announcement which the REVIEW made several months ago, when Mr. S. H. C. Miner was on a visit to British Columbia, that Mr. J. J. Hill had acquired control of the Granby concern, turns out to have been quite correct, and on his recent return from the West Mr. Miner himself has confirmed the report. As to the effect of this important move on the fortunes of the Granby smelter, the principal result will be a reduction of 25 per cent. in the cost of transportation, amounting to at least \$150,000 a year, and there would seem to be no ground for complaint, as the large amount which is invested in the railway enterprise is a guarantee of permanency. There is, however, another side to the question, and one which is wider-reaching in its effects than the interests of the Granby shareholders, and that is the fact that this latest acquisition of the Great Northern Railway is but one link in the chain by which Mr. J. J. Hill is seeking to bind the mining and smelting interests of Southern British Columbia to the Great Northern transportation system. Already arrangements have been concluded for the shipment of Boundary ore in considerable quantities to the Northport smelter, over the new Phoenix and Grand Forks branch. This will be the main factor in yielding a probable profit to the hitherto profitless V. V. & E. Railway, but it will also tend to perpetuate the smelting of Canadian ores on American soil. The distance from Phoenix to Northport is in the neighborhood of 150 miles, and it is stated on good authority that a rate of 50 cents a ton has been made by the railway, although that rate would not cover the actual costs of transportation, and therefore may only be temporary, still it shows the competition with which Canadian railways will have to contend. The control of the largest ore bodies in Southern British Columbia may lead to the smelting of their output across the line, and the enriching of the transportation company which enjoys the longer haul. Another important consideration which must not be lost sight of is that every ton of freight of which Canadian railways are deprived by American competition lessens the ability of the Canadian roads to meet the demands of their customers for lower rates, and thus may retard the development of the province. We are not of those who decry healthy competition, nor consider J. J. Hill a "bogey" man, but we can clearly see that there is a struggle in Southern British Columbia between a Canadian and an American transportation company in which the natural aim of each must be to establish industries on its native soil, and for that reason Canadian interests require special protection, since the enormous disproportion of population and development renders the conflict an unequal one, in which the Canadian interests are bound to suffer defeat by sheer force of circumstances if left to themselves.

Extension of the Lead Bounty Act.

The text of the Order-in-Council which permits the application to exported lead ores of any unappropriated portion of the bounty on lead is as follows:—

At the Government House, Ottawa.

18th day of August, 1904.

Present—The Governor-General in Council:—

Whereas by clause 3 of the Act 3, Edward VII., Chap. 31, intituled "An Act to provide for the payment of bounties on lead contained in lead bearing ores mined in Canada," it is provided that if at any time it appears to the satisfaction of the Governor-General in Council that the charges for transportation and treatment of lead ores in Canada are excessive, the Governor-in-Council may authorize the payment of bounty at such reduced rate as he deems just on the lead contained in ores mined in Canada, and exported for treatment abroad, and

Whereas, it appears that the lead smelters in Canada are unable at present to treat the whole of the lead ores mined in Canada, except at an excessive rate:

Therefore, the Governor-General-in-Council is pleased to order that, after the payment of the full amount of bounty payable under the Act above referred to and amendments thereto, upon lead ores mined and smelted in Canada, and dating from the 1st day of April, 1904, until the 30th day of June, 1905, a rate of 50 cents per 100 lbs. of lead contained in lead-bearing ores mined in Canada, and exported for treatment to Europe, shall be paid, provided that the quantity of lead upon which such bounty shall be paid shall not exceed 11,000 tons of 2,000 lbs. in any one fiscal year.

(Sgd.) JOHN J. MCGEE,

Clerk of the Privy Council.

It will be noted that the provisions of the order restrict the amount to be exported to 11,000 tons of lead, and prescribe the importing port to be in Europe. Ore sent to the United States smelters will not, therefore, be entitled to the bounty.

Canadian White Lead.

Mr. Barber, of the Carter White Lead Factory, Chicago, when seen in Montreal lately, stated that arrangements had been completed for the establishment in Montreal of a large lead corroding industry. Satisfactory arrangements have been completed with the Canadian Pacific Railway for the carrying of the product from the British Columbia mines. In this connection the REVIEW is able to say that the old Delorimier Avenue shops of the C.P.R. have been secured for premises, and that the first car load of lead, sent to the Carter Company at Chicago, was so satisfactory that the Carter people wrote to Mr. W. H. Aldridge, manager at Trail, B.C., as follows:—

"We might mention that we were extremely well pleased with the results obtained from this car of electrolytic lead; in fact, the product was noticeably whiter than that produced from refined corroding lead we are in the habit of purchasing. The amount of tailings was also less than is usual. We sent a sample of lead to a chemist at Racine, Wis., and his analysis is as follows:—

Physical and Chemical Analysis.

Lead Carbonate	71.42 p.c.
Lead Hydroxide	28.57 p.c.
or	
Oxide of Lead	86.10 p.c.
Carbonic Acid	11.77 p.c.
Water	2.13 p.c.

Specific gravity 6.562

Volume, 12.53 lbs. per gallon.

"The percentage of carbonate is a little higher than the average, but not enough to cause the slightest trouble. In fact, this analysis shows the finished article to be of very fine quality."

There is, therefore, no reason for doubting the ability of the Trail lead to satisfy all demands of the Canadian market, and the continued importation of dry white lead, practically free from duty, must soon cease.

Obituary Notices.

In the death of Mr. Marcus Smith, of Ottawa, the Dominion loses one of its oldest and best-known civil engineers. Mr. Smith was born at Berwick-on-Tweed, England, on the 16th of July, 1815, and was therefore in his ninetieth year. He came to the United States at the age of thirty-four, and removed to Canada two years later, in 1851. In 1852 he was employed on the location of the Sarnia branch of the then Great Western Railway, and in 1853 was made chief engineer. He returned to England in 1860, and was sent to an important position on the Cape Town and Wellington Railway in South Africa, where he remained until 1865. Returning to England, he was recalled to Canada in 1868, and received an appointment on the staff of Sandford Fleming, then chief engineer in charge of the construction of the Intercolonial Railway.

Mr. Smith resigned this position in 1872, to become deputy to the chief engineer of the Canadian Pacific Railway, and was given charge of the surveys in British Columbia. From 1886 until 1892 he held a position as consulting engineer in the Government service.

The REVIEW regrets to chronicle the death of Mr. John F. Stairs, ex-M.P., of Halifax, N.S. Mr. Stairs died in the Toronto General Hospital on the 25th of September of an affection of the kidneys, from which he had been suffering for some time.

Mr. Stairs was born in Halifax on the 19th of January, 1848, and was in his fifty-seventh year. He was the eldest son of Hon. Wm. J. Stairs, the founder of the firm of Stairs, Son & Morrow, one of the oldest and most responsible shipchandling firms in Canada. The late Mr. Stairs entered the firm at an early age, and devoted himself to the development of various local enterprises, which were conspicuously successful.

At the time of the founding of the original Nova Scotia Steel and Forge Company, in 1890, Mr. Stairs was one of the first to join with Mr. Graham Fraser in promoting and building up the Forge Works at Trenton, N.S. He was also president of the New Glasgow Coal, Iron and Railway Company, and was prominent in the amalgamation of these two companies in the year 1895. In all the work of building up

the present Nova Scotia Steel and Coal Company from the original Forge Company, Mr. Stairs played a prominent part, and should justly, with Mr. Graham Fraser, be considered as one of the founders of Nova Scotia's prominence in the iron and steel industry.

In politics, Mr. Stairs was a Conservative and strong protectionist.

Notes Concerning Northern Ontario.

A considerable amount of exploratory work has been done this season through Northern Ontario, with a view to ascertaining more fully what it contains in minerals, timber and agricultural lands. Reference has already been made to the valuable discoveries of cobalt, native silver and other ores on the line of the Temiskaming and Northern Ontario Railway, and the full extent of these deposits is not yet known, as fresh discoveries are constantly being made. With the facilities for shipment and getting in supplies which the new line will furnish, these deposits will be vigorously worked. One man who possesses a claim is said to have taken out \$70,000 in native silver from a vein discovered only three months ago. Rich ore is being stored in ore sacks until the railway is ready to carry it away. New deposits of nickel have been found, and arsenical ores also abound. A mispickel property is being operated by New York parties, and a Sudbury company is developing an iron pyrites mine.

At Temagami a valuable iron mine has been found close to the railway, in which B. O'Connor, of that place, T. N. Caldwell, of Lanark, and Sir Wm. Mulock have each a third interest. At another point Major Leckie has a deposit of iron pyrites, and copper and gold have been found by prospectors. T. W. Gibson, Director of Mines, Aubrey White, Deputy Minister of Crown Lands, the members and officials of the Railway Commission, and several Grand Trunk and other officials recently drove over the line from the end of the rails to Haileybury, and found evidences of mineral wealth at various points. The writer spent some time on Lake Temagami and adjoining waters last month, where in a number of places prospecting is going on with a certain amount of success.

Farther north, in the Abitibi country, J. G. McMillan, who has charge of an exploring party, reports that in the country so far explored the rocks are Huronian, with few outcroppings. In only one place was the Laurentian formation encountered. Most of the land is level and covered with stratified clay. It is wet, on account of the level nature of the country, but the banks of the rivers are high, so that it can be easily drained, except where there are muskegs, and these do not cover more than one-tenth of the area. These, too, can be drained off, as the peat surface is not deep—from 3 to 6 feet—extending in some places to 10 or 12 feet. In the township of McHart Huronian greenstone was found, varying in appearance, with veinlets of serpentine and a bluish quartzose schist bearing magnetite; in Tully township a greenstone impregnated with pyrites; in Little township a bluish quartzose schist bearing magnetite and pyrites; in Wark and Gowan townships the only rock seen was a hard schist with some stringers of quartz. Glacial accumulations are few. In McHart are some moraines, one being noticed 60 or 70 feet high, heavily timbered with birch. In the south-west quarter of Little there are some sand ridges covered with jack-pine. The rocks along the Abitibi River

and to the south are mostly diabases, diorites and green schists, with outcrops of quartzite.

A writer in the *Toronto Globe*, referring to the mineral wealth of the Abitibi country, says:—"Evidences of coal, copper and iron are many and prominent. I picked up a nugget of gold half the size of a five cent piece. The Indians tell of a discovery of free gold by Indians some years ago, but the locality is kept secret. Miles and miles of gypsum and mica have been found, also a lake of pitch, which was discovered accidentally by an Indian while chasing a fox."

Not far to the north, and east of Chapleau, on the Canadian Pacific, a tract of good land has been discovered extensive enough to contain eight townships. It contains as good land as any in Ontario, and is well watered and attractive. It lies due east of the Michipicoton iron country, and is evidently a dip down of the clay belt. An immense area of good land has also been located to the north-west of Lake Abitibi and about 150 miles from Lake Temiskaming. The soil is a rich alluvial clay, well suited for agricultural purposes.

These valuable possessions will all be rendered accessible by the Grand Trunk Pacific, the construction of which is now assured. The Temiskaming and Northern Ontario will be open to New Liskeard, at the head of Lake Temiskaming, in a few weeks. At North Bay, its southern terminus, connection is made with the C.P.R. east and west, and with the G.T.R. south. The latter is making a strong bid for the tourist traffic, which comes largely from United States cities, with which connection is made by way of Toronto and Hamilton. It also gives an outlet to many large manufacturing centres which will consume much of the mineral product of this vast undeveloped territory. J.J.B.

Appraisal of the Value of Coal Lands.

By H. M. CHANCE, Philadelphia, Pa.

(Concluded.)

EARNINGS AS A MEASURE OF VALUE.

The third method is one most valuable for the purposes for which it is used by Mr. Harris, namely, as a basis upon which reorganization may be planned, and a new company financed. It may not be adapted for general use, because it is cumbersome, and also because it does not include allowances for the value of established trade and connections.

The fourth method is useful in a majority of cases as corroborative of valuations reached by the fifth method.

The fifth method is based upon the actual earnings and the ability to maintain output at an increased rate for a long period. Should the value so reached be greatly in excess of the appraisal obtained by valuing the lands at what they fairly are worth, plus the value of plant and improvements, it is evident that the "good-will" or earning capacity is too highly valued.

While it is unwise to appraise at a high valuation the good-will of a purely commercial business, the value of a manufacturing industry producing staple products includes, as one of its most important factors, the established reputation of its products, its facilities for selling and distributing its output and the connections and friendly affiliations with consumers, dealers and transporting agencies that enable it successfully to retain its grasp upon the trade, to extend its operations and to expand and enlarge its business. In other words, an industry of this character can only be valued at its

true worth by taking as a whole its property, plant, improvements, reputation of its products, its established trade, selling facilities and connections. Proper investigation having shown that the output of the concerns can be maintained for a long period, even at a rate of production in excess of present shipments, its value as a business proposition may be safely appraised, and in so doing it is customary to assume that the business, including plant and property, is reasonably worth a sum upon which the yearly net earnings will pay a satisfactory return.

In order to confirm the valuation determined by this method, separate appraisals in detail should be made showing the value of the lands, plant and improvements.

VALUE OF PLANT.

It is a comparatively simple matter to fix the value of plant and improvements, because the cost of the materials, machinery and supplies, together with the cost of transportation and erection, or installation, can readily be ascertained. It may, however, be proper to discuss the principles upon which the valuations should be based and what allowances should be made for depreciation.

When the mine has a reasonably long life—i.e., is not approaching exhaustion—the plant and improvements, if modern (adapted to economic operation) and in good repair (in condition to give many years' service, or until the property is exhausted), may fairly be appraised at first cost, including the cost of erection, or at the present cost of replacement, because they are fairly worth this sum if the mine is to continue in operation. If this principle be adopted, no deduction should be made to cover depreciation excepting on those parts of the plant and improvements which have deteriorated in efficiency, or are approaching a condition requiring considerable expenditures for repairs or renewals, or are so old that their usefulness will be of short duration.

VALUE OF DEVELOPMENT.

In assigning values to underground mine development, the life of the mine, its daily tonnage capacity and quantity of coal tributary to it should be reviewed; the first cost of the improvements necessary for working the property, including shafts, air shafts, slopes, etc., should be computed; and a valuation reached approximately equal to the cost of the development and improvements necessary to secure a like capacity under similar conditions at a new plant. This estimate should fairly represent the value to the owner of the underground development work, but in cases where the life of the mine is short, a material deduction must necessarily be made from the appraised value.

In addition to the value placed upon underground development work proper, an additional sum should be included to represent the value of development work or dead-work, that has been done in excess of that required to maintain the output of the mine at its rated capacity. This work usually consists of headings, or entries, driven into new territory from which no coal has yet been mined; and they should be appraised at their full cost. In addition, in some mines a large amount of heading or entry work exists from which the coal has partially been mined; in these cases the work may be appraised at a value proportioned to the quantity of available unmined coal tributary to them. Another item of value which should be included in an appraisal of the value of underground development is the special work provided for future requirements connected with ventilation, drainage, underground transportation and the opening of new territory by means of inside slopes, planes or shafts.

VALUE OF COAL LANDS.

Coal lands should be appraised at what they are fairly worth to the coal operators, including the increment in value due to the fact that the property has been opened and is being worked, but without considering the value of the good-will, or of the plant and improvements. A distinction must necessarily be made between lands already developed, those that can, or are likely to be, developed in the near future, and those the development of which may be postponed for many years.

No rules can be laid down for the determination of fair value. The appraiser must review the prices at which similar property has been actually sold, the earning capacity, mining costs and profits, and the value placed upon the land by the owner, or, in other words, the least price at which the owner would be willing to sell. These factors must be carefully weighed, and his final appraisal should represent an unbiased judgment of the real value.

In appraisals covering large areas in which the workable coal exists under greatly differing conditions of depth, accessibility, quality, etc., the territory should be sub-divided and separate appraisals made of each section. In this way deep territory is separated from that of moderate and shallow depths, drift coal is distinguished from shafting territory, coal of a specially good quality is appraised separately from that of moderately good quality, and thick coal-beds are given larger values than thin ones.

VALUE OF LEASEHOLDS.

In appraising the value of a leasehold it may be assumed that the lessee, having developed the property and being engaged in working it, can be expected to earn as profit a sum at least equal to the royalty paid for the coal. Of course this is a matter capable of being investigated by reference to the books of the operating company—a proceeding which is rarely necessary, because the mining engineer should be able to determine whether the coal can be worked at this profit or not. Upon this basis the revenue derived by the operator would equal, and probably exceed, the revenue received by the lessor, and when this is true it is safe to assume that the right possessed by the lessee to mine the coal is equal in value to the vested right still remaining in the lessor. As it not infrequently happens, in regions being actively worked, that the owners of leased property sell the lands to others subject to the operation of the lease, a means is thus presented for determining the commercial value of the leasehold.

Attention may here be directed to the fact that this latter method of determining the value of the vested rights of the lessor and lessee in property operated under lease, indirectly offers another method for the appraisal of the value of lands, where the coal is owned in fee by the operator; for it may be assumed that, if operated under lease, the coal would command a certain royalty per ton, and the vested right of the lessor in the lease would be marketable at a fixed price per acre; further, that the vested right of the operator in the lease would be worth a certain price per acre. Merging these two interests into one, the value of the lands as owned in fee may be taken as equal to the sum of the values if operated under lease.

FACTORS AFFECTING THE VALUE OF COAL LANDS.

Before proceeding to an appraisal of coal land values, the engineer must familiarize himself with the quality and quantity of coal available, the thickness of the workable beds, the cost of mining and of transportation, the mining conditions presented by the district, the character of improvements re-

quired, and other conditions affecting the industry as a whole, in the region concerned. In the following paragraphs an attempt has been made to discuss briefly the principal factors which should be carefully investigated. While much of this information may appear unnecessary to the engineer, because the facts may seem self-evident, his clients, and others, may have merely a superficial knowledge of coal mining, and may need enlightenment upon the most simple matters.

1. Quality of the Coal.—Coal of superior quality commands a higher price, assures a ready sale, retains the trade and insures a large output and a low mining cost during times of depression. Coal of poorer quality rarely brings as high a price and is difficult to sell, especially when the trade is depressed; large commissions must often be paid for selling it, and the reduced shipments with irregular operation of mines, due to lack of orders, materially increase the mining cost per ton.

The same considerations apply to coke. Therefore it is evident that quality is a factor of prime importance.

2. Thickness of the Coal.—To compete successfully with other operators, it is essential that the beds to be worked should be as thick and as free from troublesome slate-partings, and that they should exist under conditions as favorable to cheap mining as the average present conditions at a majority of mines in the same district.

Other conditions being equal, the thicker coal seams, and those containing little refuse, can be mined at a lower cost than those thinner or more impure. In each district, experience determines the proper thickness, character and quality necessary to constitute a workable coal bed, that is, one that can be profitably mined.

It follows, as a matter of course, that in each district as the thicker and better beds become exhausted, and competition from them eliminated, the thinner and more impure beds will become workable.

In appraising the value of the coal property, it is customary to include only those coal beds that are now, or shortly will be, workable; and to ignore the thinner and impure seams. For the reason that past experience has proven that in time the latter will become valuable, attention should be directed to this additional asset of large prospective but of indeterminate present value.

3. Cost of Mining.—The cost of mining is a most important element. It is not essential to success that the mining cost at any operation should be low as compared with the region or State in which the mine is located; but it is important that the cost should not exceed the average of the district in which it is located. This statement is true because coal from each district usually has a definite market, i.e., the market is limited to certain districts, certain railroads, or to a certain class of consumers who are best served by the coal from that particular district; and coals from different geographic districts commonly do not compete in open market upon an equal basis, except where the transportation companies make compensating differences in freight rates, in order to enable the miner to deliver coal from a district where the mining cost is relatively high at the cost of a more cheaply mined coal from other districts.

4. Transportation.—The question of transportation enters vitally into every discussion of values. Coal land so located that it cannot be reached by railroad at a reasonable cost, or owned by persons not commanding sufficient capital, or influence, to secure the building of a railroad, is of small value. Coal underlying farm lands situated at a distance from existing railroads is of little value so long as the ownership remains

vested in the farmer, or those unable to secure its development.

5. Ownership.—As already indicated, the value of a coal property is affected by ownership. If the coal is owned by those able to mine it quickly, the value is greater; if it is to remain untouched for a long period, or to be worked on a small scale, the value is less. The concentration of large holdings into one corporation increases the value of the whole as a unit to a sum far greater than the sum of the values of the individual tracts, because a corporation can establish selling agencies at all important distributing and consuming centres; can spend large sums for advertising; can form close affiliations with manufacturing and transportation companies; can retain able counsel and employ the best managers and representatives that can be found; can own its cars and can make whatever outlay may be necessary to build up a large and permanent business.

6. Geographic Position.—Under this heading it is sufficient to direct attention to the fact that those areas of workable coal, situated on existing lines of railway nearest the largest markets, must always be more valuable than territory remote from the large consuming centres. This fact is of especial importance with reference to lands situated upon any of the main trunk lines of the United States, and to those near the great manufacturing centres of the country or most accessible to tide-water trade.

7. Quantity of Workable Coal.—It may seem rather paradoxical to assert that the larger the territory controlled by one corporation, the greater the value per acre of that territory because attention has elsewhere been directed to the fact that the value of coal property is greater where the coal can be quickly mined, than when its extraction (and the returns therefrom) must extend over a long period. This latter statement must be confined to properties of relatively small size, and is undoubtedly true of small properties. But the advantages accruing from the consolidation of ownership of large tracts under one management outweigh these considerations; because the large control justifies extensive improvements and developments of a more permanent nature, and enables the owners to expend large sums in providing facilities for the upbuilding of a large trade, which necessitate extensive advertising, the establishment and maintenance of offices at all large distributing and consuming centres, and the employment of able managers for the conduct of the business. For these reasons the value of the coal land within certain limits increases with the acreage controlled under one management.

8. Mining Conditions.—The factors affecting the cost of mining are—(1) actual cost of mining operation; (2) possibility of planning large development with improvements of permanent nature; (3) output possible from each operation; (4) the capital required for the plant and its development. These items depend upon many other conditions besides the thickness and purity of the coal; among which may be noted—the depth at which the coal is found; the dip, pitch or slope of the bed; the quantity of water to be pumped, or the facilities for draining it away from the lands; the relative ease or difficulty of maintaining efficient ventilation; the character of the roof and the floor of the coal bed; the hardness of the coal; the presence of gas in the mine; the character of the coal-dust (whether readily explosive or not); and the presence or absence of faults, rolls, and other disturbances affecting the regularity of the coal bed.

It not infrequently happens that, while the quality and thickness of a coal bed may be all that could be desired, other

conditions may exist which render the bed almost, if not absolutely, unworkable under existing competitive conditions of other mines. These objectionable conditions are—extreme depth or dip, troublesome faults or rolls, bad roof, soft floor, a great quantity of gas, a large quantity of water to be pumped, and troublesome dust.

9. Character of Improvements.—The value of any coal property is affected by the cost of installing the plant necessary for its efficient development. If this plant be small, simple, quickly erected and inexpensive, other things being equal, the property will have greater value than if a large, complicated and expensive plant be necessary.

The character of the improvements needed depends somewhat upon the uses to which the coal is to be put. If it is to be sold for steaming purposes (as run-of-mine coal) a very simple tippie is required. If it is to be sold in markets demanding screened coal, or if the seam contains objectionable impurities which must be removed, screening and cleaning devices must be installed, which require outside improvements of considerably larger cost than in the former case. Should the coal be especially adapted to coking, and the mines situated in a district where the economic conditions render it necessary, or desirable, to transform the coal into coke, the erection of coke ovens, and possibly also of cleaning or washing appliances may be unavoidable.

10. Market Reputation of the Coal.—Under this head it is desired merely to recall the fact that the name of a coal bed may be as valuable to the operator as is a trade-mark, brand, or copyrighted name, to the manufacturer of any well-known article or product. Furthermore, the mere location within the boundaries of some districts is an asset materially enhancing the value of coal lands. This is a matter of great importance in the appraisal of coal properties in the older districts, because it may enable the operator to find a ready market, and to derive large benefit from the established reputation of coal from other mines and from other coal beds in the same district.

Some Recent Rock Movements in the Laurentian and Huronian Areas.*

By S. DILLON MILLS, Toronto, Ont.

As our ordinary life experience and the records of mining developments from the earliest known works down to the present day show the earth's crust to be practically in a position of stability, there has arisen naturally an idea that the period of instability has long past away and that since the glacial period, at all events, no movements other than those of volcanic origin have taken place. At least, this used, to a great extent, to be my own attitude of thought on the subject, and I have no doubt that others would agree with it; but since I commenced the study of the Laurentian and Huronian districts of Ontario some years ago, a contrary conviction has been gradually forcing itself upon me as regards even these apparently most solid areas of the earth's surface. With the idea that, in looking upon glacial action and atmospheric erosion as the only formative agents in the shaping of the picturesque features in the wilder districts of our land (where so many of our citizens go yearly to enjoy the varied scenery and to cast off for a brief period some of our city-made civili-

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zation, the white man's burden) we have been laying upon the icebergs and glaciers of the past a load sufficient to reduce them to a condition of harmless quiescence. I may here remark that I believe we should, in case of our Canadian archaic areas, make a distinction between the glacial period, when this and other parts of the now habitable earth were covered by immense quantities of ice thousands of feet in thickness, according to some authorities, when there could be in these districts, owing to absence of elevation, no motion and no erosion; and that period when were produced those glaciated surfaces and striae, with which we are all so familiar. The period when these were produced must have been one of submergence in flowing waters, with tides or currents bearing ice floes laden with gravel and boulders, and with seasons of warmth, when the grounded ice melted, and deposited its load; possessing, in fact, a climate but little different from, and conditions very similar to, those now existing in the Georgian Bay, but with perhaps stronger currents. If the Georgian Bay Islands were subject to the strong currents, which have left their mark, in the shape of sand bars and boulder-strewn gravel-reefs, high above some of the fertile lands of Central Algoma, they would show much greater evidence of recent glacial action than they do to-day, if, indeed, any remained to tell the tale.

As mining engineers we are not specially interested in picturesque scenery, but the few facts to which I wish to call your attention may be found to have some interest in connection with the condition of the country, rocks, location of shafts, etc. It is by attention to little things that we arrive at knowledge.

To save time I will limit myself to observations made recently at two points. The first in Haliburton County, Ont., the second in Gladstone and Patton townships, Algoma.

In that portion of Haliburton County, near Wilberforce station, on the Irondale, Bancroft & Ottawa R.R., one of the most picturesque features of the scenery is Lake Farquhar, which is bounded on the south by a rocky ridge of considerable height, broken by peculiarly formed rocky ravines which have their eastward or south-eastward sides precipitous, in some places perpendicular, from 100 to 150 feet in height, while the westerly sides are gentle slopes of 15 to 20 degrees. The rock on the summit of the steep side is rounded by glacial action, but not the edge of the cliffs; near the bottom of the gentle slope, on the opposite side, the rocks show indications of the same action, but I do not think the valleys can have been formed in this manner for the following reasons: First, the shape of the valley could not be explained on the glacial theory except by a difference in the hardness of the rocks; now, in some places, there is no difference in resisting quality, and in some places the soft rock is at the summit. Secondly, the absence of indications of glacial action on the faces of the steep cliffs might be accounted for by supposing the glaciated face to have fallen in consequence of weathering, and the point must be conceded in places where there is much talus at the foot of the cliff, but in some places there is none. Thirdly, that at the bottom of one valley wider than the rest there are three hog-backed ridges of gneiss, shaped evidently by glacial action, running not lengthwise, but across the valley, one of them running almost to the base of the cliff; looking as if they had been furrowed out while in a position higher than the present summit, and had then dropped by a gradual movement, or series of movements, to their present position. The evidences of these movements are abundant. There are indications of at least four different outlets from Lake Farquhar, each at very different levels, one of them terminating

in a beautifully rounded pot hole about 12 feet in diameter by 8 feet deep, situated on the south side of the rocky ridge probably 90 feet above the present outlet.

In view of these facts, we seem driven to one of two conclusions: First, that the rock movements which formed these ravines took place prior to the glacial era, that the ravines were filled with solid ice, so protecting from glaciation all but the summits of the ridge, till, towards the end of the ice age, when this anchor ice moved out, grinding out the bottoms of the ravines as it went, at the same time gradually lowering the outlets from place to place. But this does not appear satisfactory in view of the great length of time during which the level must have remained stationary in order to allow of the great wearing action which has taken place at each separate outlet; the direction of the "hog-back" of gneiss above mentioned also is against this explanation. There remains then only the original supposition, namely, that the changes of level have occurred since the glacial period, this view receiving additional support from the fact that the sand-bar formed by the current from the outlet which preceded the present one is still visible in the alluvium to the south of the ridge, that outlet being now about 30 feet above the present natural lake level.

There are numerous exposures of Laurentian crystalline limestone in some parts of this neighborhood which have by their gradual weathering caused many changes in the appearance of the scene, but the ridge through which the ravines pass consists of a medley of gabbro, roxelite, gneiss and intrusive binary granite, limestone being found only in one place on the outer or south side of the ridge.

Turning now to observations made in Algoma, in the Huronian of Gladstone and Patton townships, some time after my first visit to Lake Farquhar, I was sent to Gladstone township to report on some development there in progress on a copper property near Iron Bridge P.O., and found part of the work to consist of a shaft 8 x 12, then about 45 feet deep, sunk on the south flank of a rocky knoll near the upper end of a small sloping ravine extending up the side of the main ridge, which rose in places probably 250 feet above the farming lands on the south-west; the east and west ends and north side of the shaft were in good solid rock, but the south side was completely shaken up; the shaft had been sunk on a lead of quartz carrying a fair amount of chalcopryrite, the lead was very irregular, without partings, being frozen to the rock on both sides. Both it and the country rock, an intrusive syenite, showed evidence of secondary movement in small fissures filled with secondary quartz formation carrying a little chalcopryrite occasionally, but the shaken condition of the south wall was evidently caused by a still later movement, as the seams remained uncemented except by a little limey matter in places. No evidence of this movement could now be seen at the surface, as the rock at that side was completely covered by the dump. Had this rock been properly examined in the first place by anyone who understood these rock movements, the shaft would never have been sunk in this place, and a loss of \$1,500 would have been avoided. East and west of the shaft a dense growth of underbrush extended for some distance, with a few large trees. To the north, about 40 feet from the shaft, rose a perpendicular face of rock 15 to 20 feet in height; the top of this rock had the ordinary rounded appearance of these glaciated hill tops, and extended between 20 and 30 yards northward, then dropping at a slope of about 45 degrees to a sloping wet swale about 80 feet below. To the westward it extended probably 150 yards, then dropping perpendicularly about 90 feet, to a sandy ridge, heavily tim-

bered, which stretched westward for some distance, bounded on the north by the swale above noted, and sloping south to the general level of the cleared land. The shoulder of rock on which the shaft was located presented somewhat the appearance of the slips so common in tidal harbors, forming a sloping causeway; it dipped down westward beside the wall of the upper bluff till it reached the level of the sandy ridge, but it was covered mostly with earth and debris from above. Where the rock was exposed it showed the same glaciated appearance as the upper rock, and was full of small stringers of quartz with traces of chalcopryite running parallel to the bluff wall, east and west approximately. The dense growth of leafy underbrush and the presence of the earth over most of the rock prevented my gaining any further knowledge as to the rock structure at that time, but, having occasion to visit the place early in the spring following, I made a further examination of the matter, and found that nature had assisted me in an unexpected manner. A few yards west of the side of the shaft a large pine tree of probably sixty years' growth had been blown down, lifting a great mass of earth in its matted roots, laying bare the rock beneath and showing a sharp edged step down about three feet in depth, at the bottom of which was another glaciated surface similar to the upper one. The cleavage had taken place along a stringer of quartz parallel to the upper bluff; in some spots the quartz had remained, adhering to the face of the step; in others it had gone down with the lower rock. There were indications of a further drop outside this, but the depth of earth was too great to admit of examining it without an expenditure of much time and labor.

Shortly after this, while walking along through the bush to the south-west of the shaft, near the lower end of the little ravine, I came upon an exposure of reddish felsite rock, showing a line of sharp fracture running nearly north and south. A little examination showed that it ran for a considerable distance in this direction, and detached masses along its face (the edges of which were as sharp as if broken quite recently, some of the fragments having dropped 18 inches, some more) showed that here also had been a rock movement coincident probably with the other. The upper surface of the rock in situ, and of the detached portions, was beautifully smoothed by glacial action, and the position of the fragments showed that there had been no lateral motion (by a sufficient lifting power they could have been fitted again to the places from which they had dropped). The accumulation of earth and debris prevented the total drop being ascertained, but it may have been anything over ten feet. In this district we have, therefore, evidences of four different periods of action which have combined to give the present surface configuration.

First—That in which a series of fractures occurred producing gradually the disconnected rents and chasms running nearly east and west, which were then filled with quartz, calcspar, siderite, etc., with chalcopryite.

Second—Another period of dislocation causing the secondary formation of stringers or small veins already noted, and a movement of greater extent along lines running north and south so that the veins cannot be traced beyond these faults in some cases. This latter north and south dislocation may have been later than the east and west one; this I have not yet been able to determine, but it was prior to the glaciation period, and to it the country owes its most striking feature in the way of cliffs and ravines. The results differ from those in the Farquhar district in that the cliffs are on the west side of the north and south ravines instead of on the east and the upper edges, where not changed by falls of rock occa-

sioned by frost cleavages, etc., show the glacial rounding very distinctly. In tracing the course of one vein, I came to a spot on the lower shoulder of a cliff, overhanging a ravine, where the alluvial matter and the rocks debris had formed a slope up to, and over, the edge of the lower cliff. On removing the upper part of this I found a vein, consisting here of calcite and siderite chiefly, about three feet wide, showing a beautifully rounded shoulder on the edge of the concealed cliff, which here showed, so far down as I was able to have it exposed, a smooth glaciated perpendicular face, and beyond this point the vein could not be traced with any certainty (though another vein occurs about 400 yards to the eastward and about 150 yards north of the true line), till it reappears about 1½ miles to the eastward on the same line. If this property is ever developed, it will be an interesting point to decide if there has been any lateral motion in this case, or only a downward drop of an area about half a mile in width.

Third.—This period is the glacial era when the rugged outlines produced during the two or (as the case may be) three previous periods were rounded off to something approaching their present aspect.

Fourth.—Another period of gradual dislocation, which perhaps still continues in operation.

There is here much that is puzzling, yet worthy of protracted investigation—the movements have not been coincident over large extents of territory; the movements in Algoma have, for instance, not coincided with those in Haliburton, while in the intervening Sudbury district there may have been only one movement (this I have not investigated); in fact, in some cases, a difference may be found within the limits of a few townships. That this has always been the case is shown by the difference in the type of vein prevailing in different parts of Algoma. At Bruce Mines we have a series of well defined veins curved and twisted in various directions, mostly of considerable width, with well defined walls, carrying a low percentage of copper. In Gladstone and Patton, veins showing dislocating action along east and west lines, traceable for eight or ten miles in one straight line with occasional gaps as above noted, carrying a much higher percentage of copper, and offering the peculiar feature that while practically continuous and forming parallel lines across the country at various distances apart, the veins at the surface pass from fissure to fissure as if the rending force, while acting along the general east and west course, had in some places produced fissures slightly diagonal to that course, differing from it by 5 degrees to 10 degrees. The ore deposits in those fissures centre about on the general east and west line, but are too thin and too much elongated to be properly called lenses. Then further east we have the more lense-like formation of the Massey district, while at Sudbury we have a totally different formation as shown by Dr. Coleman in his very interesting report on that district.

The subject is a somewhat difficult one to investigate owing to the impossibility of doing any satisfactory work when there are leaves on the underbrush or snow on the ground, so the time available becomes practically limited to an average of a month or six weeks in the year. If these movements had been noticed in a limestone formation, or in a district showing evidence of volcanic agency, or recent subterranean chemical action, I would not have thought it worthy of particular notice, but in the districts spoken of, where all such agencies seem to have been at rest, since the formation of the mineral deposits, it would appear as if something remained yet to be learned in this direction, by those who desire to look more deeply into the workings of nature. Perhaps

the new geology, with its theory of the subterranean origin of water springs, may account for the movements above noticed.

Rate of Solution of Gold in Potassium Cyanide.*

By T. H. PLUNKETT, School of Practical Science, Toronto, Ont.

Authorities on the use of the cyanide process as an extractor of gold from its ores, while being unanimous in the opinion that potassium cyanide can only be used on fine gold, have made few attempts to define the exact limits of fine and coarse gold. These terms, fine and coarse gold, so commonly used in discussing the merits of the several methods of gold extraction, are very indefinite. While authors do not hesitate to assign certain processes of extraction for fine, and others for coarse gold, no one seems to have endeavored to find a limit so as to be able to state definitely to what extent certain processes can be used to advantage.

Having had occasion to use this process on different ores, the writer has made several experiments to find what effect cyanide solutions have on particles of gold of varying sizes. This effect varies greatly with the manner in which the solution is applied. Estner made it clear that oxygen was an essential element to enable the potassium cyanide to do its work. It has also been suggested, by recent writers, that temperature played a part in the extraction.

With these points in view, the writer has treated the gold in three ways. First, by allowing the solution to percolate around the gold. The gold bead was placed in a porcelain dish containing the solution and the latter was drawn off at intervals of an hour or two to enable it to absorb oxygen from the air. Second, air was made to bubble through the solution while in contact with the gold. Third, the solution, with air passing through it, was heated to about one hundred degrees Fahrenheit.

In preparing the gold particles a known weight of the metal was dissolved in aqua regia and diluted with water to five hundred cubic centimeters. Certain volumes of the solution were then taken, and the nitric acid boiled off, after which it was evaporated to dryness on troughs made of pure lead foil. The lead was then cupelled, leaving beads of gold, spherical in form. These were carefully weighed, and their diameters measured under a microscope.

A three-tenths per cent. cyanide solution was used in the following experiments :

RESULTS OF EXPERIMENTS.

Weight of Bead	Average Diameter	Process	Time	Weight Dissolved
.800 mg.	.455 mm.	Percolation.....	16½ hours	.040 mg.
.800 "	.455 "	Agitation.....	16½ "	.180 "
.800 "	.455 "	Agitation and Heat	16½ "	.250 "
.300 "	.299 "	Percolation.....	7 "	.007 "
.300 "	.299 "	Agitation.....	7 "	.080 "
.300 "	.299 "	Agitation and Heat	7 "	.100 "
.170 "	.260 "	Percolation.....	3 days	.100 "
.170 "	.260 "	Agitation.....	16 hours	.070 "
.170 "	.260 "	Agitation and Heat	7½ "	.080 "
.130 "	.247 "	Percolation.....	5 days	.080 "
.130 "	.247 "	Agitation.....	20 hours	.130 "
.130 "	.247 "	Agitation and Heat	16 "	.130 "
.110 "	.208 "	Agitation.....	16 "	.060 "
.110 "	.208 "	Agitation and Heat	7½ "	.060 "
.100 "	.201 "	Percolation.....	5 days	.088 "
.100 "	.201 "	Agitation.....	16 hours	.070 "
.100 "	.201 "	Agitation and Heat.	12 "	.100 "
.070 "	.195 "	Percolation.....	3 days	.070 "
.070 "	.195 "	Agitation.....	16 hours	.070 "
.070 "	.195 "	Agitation and Heat.	10 "	.070 "

*Paper presented in Competition for Prize Medal at the Sixth Annual Meeting of the Canadian Mining Institute, 1901.

From these results it would seem that agitation and agitation aided by heat have a decided advantage over the percolation process, while agitation aided by heat has a less decided advantage over agitation alone. To obtain an extraction in a reasonable time, beads of about .100 m.grams in weight, with an average diameter of .201 mm. seem to be the maximum size.

Another Australian Zinc Process.

The Potter zinc process devised by C. V. Potter, and now in use on one of the Broken Hill mines, is recently described at some length by the Australian Mining Standard. Summarized, the process follows:—Dry ore in a fine state of division is fed in a thin stream into a hot dilute acid solution contained in a shallow vessel which forms the body of the machine. The ore is drawn along the bottom of this vessel and discharged by rakes formed of wire attached to suitable chains. The bottom of the machine is covered by deflector plates arising from a short distance above it. Some of the plates are joined together at the bottom, forming troughs, while the adjacent plates overlap them, leaving a small space between at the top. As the ore passes along, the action of the acid upon it generates gas, the bubbles of which attach themselves to the zinc-blende, and raise the particles to the surface, the gas there disperses and the blende falls into the trough, along which it is drawn to the discharge end by suitable scrapers attached to a chain, and is thus recovered in a very clean state.

Commercial Wet Lead Assay.

Some months past a Colorado organization, to which belonged many of the assayers and chemists connected with the larger mining, metallurgical and chemical-manufacturing companies of Colorado, took up the subject of the wet lead assay, with a view of working out a method which would be uniformly used, and which would do away with the differences now arising over the employment of various methods of arriving at the true lead contents of ores. Since the matter was first taken up, little has been heard from the special committee having the task in charge, although it is known that uniform samples of representative ores were distributed to all those agreeing to assist in the work. H. A. Guess, of Silverton, Colo., has prepared for the next meeting of the American Institute of Mining Engineers, to be held next month in the Lake Superior country, a paper on the "Commercial Wet Lead Assay," from which the following paragraphs are excerpts :

"For a number of years I have used for the commercial wet assay of lead generally the ammonium molybdate, and occasionally the ferrocyanide method. These well-known methods need no detailed description here. In the ore-selling and ore-buying establishments of the West, 90 per cent. of all wet lead assays are made by one or the other, and at least nine-tenths of this proportion by the molybdate method.

"A procedure so well-established must have merit; and, in fact, the ammonium molybdate method, when applied to siliceous ores or products of fairly high grade, has proved itself both rapid and accurate to a satisfactory degree. Yet those who use it most constantly clearly recognize its weaknesses in certain respects and under certain conditions; and I believe that a method free from such weaknesses would be welcomed by analysts. In this belief, I submit the results of my laboratory experiments, covering a period of nine months, during

which a new method was developed, and more than 2,000 wet lead-assays were made by that method, on various ores and under purposely varied conditions, in order to determine the conditions necessary to accuracy, and to test the applicability of the method to all kinds of pure and impure lead ores and products.

"One weakness of the ammonium molybdate method is the end reaction with the indicator—a freshly prepared solution of tannin. The usual practice is to titrate at boiling heat, and, for a high percentage of metal, to make a second boiling after getting a faint end reaction, and then to finish to a complete end tint. The correction for the indicator is, to some extent, affected by the personal equation involved in the operator's conception of a perceptible yellow tint, and varies among different analysts from 0.3 to 0.5 cc. of a standard solution of which 1 cc. equals 10 mg. of lead. It is evident that while this is quite permissible with fair grade ores (and at the same time have different operators check quite closely enough for commercial purposes), it is an entirely different matter in dealing with tailings, containing, say, 0.3 per cent. lead, in which the variation in the correction used for the indicator would represent practically the total quantity of lead present.

"A somewhat extreme instance showing this weakness came under my notice a few months ago. A series of samples of siliceous tailings, carrying from 0.3 to 0.5 per cent. lead, were sent for checking purposes to a leading umpire assaying establishment in the West, with the statement that they were tailings for wet lead-assay. The report was, for about half of the lot, 'trace'; for the remainder, 'none.' The analyst wrote us that the ammonium molybdate method had been used, and that, although he could see fine galena in the tailings, and could even pan it out, he had found, on assaying, that the number of drops of molybdate solution necessary to react with the tannin was in each case no more than the correction amount for indicator; so that he was forced to make the report as he did.

"Assuming that the amount of ammonium acetate used, and the bulk of solution for titration, were at the minimum limits for such fractional percentages, it is probable that if, in these cases, the analyst had given his flasks a prolonged boiling after adding the first few drops of molybdate solution, he would have found that his end tint had faded sufficiently to accommodate a few additional drops of the standard solution. This would have given him, above the indicator requirements, a small fraction which he could then have labeled 'lead.' A result, however, which has to be squeezed out by such labored and uncertain efforts is neither gratifying to the analyst nor really valuable to his client.

"Furthermore, the lead molybdate precipitate being white, and the practice being common among analysts of not pouring the ammonium acetate solution through the sulphates on the filter, but of depositing filter and all in the original flask, digesting therein with ammonium acetate, and then titrating, it follows that, with only slight traces of lead present, there is no proof positive to the eye that the few drops of molybdate added really found any lead to precipitate, the solution being turbid from the slimes of the filter. The analyst is in doubt whether to report, say, 0.2 per cent. of lead, and chance it; to compromise on a 'trace'; or to make a clean sweep and say 'none.' This hypothetical case may be considered by many as overdrawn, but I know from personal experience whereof I speak.

"The other main and commonly occurring weakness of the molybdate method is shown in dealing with ores containing

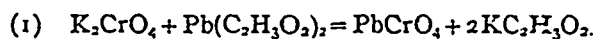
large quantities of lime. Should the percentage of lead be fairly large, say 5 per cent. or more, the molybdate method does very well; but with small and fractional percentages of lead, all the above-cited troubles occur and are aggravated by the tedium of washing the bulky precipitate of pasty calcium sulphate derived from the sulphuric-acid evaporation. Ores of this class are common in south-eastern Missouri; and, although remarkably pure in the sense of containing little else than galena in slightly siliceous dolomite, they have given much trouble to analysts who have to look for fractional percentages of lead in such material.

"Some years ago, having experienced difficulties somewhat analogous to those above mentioned, I gave up the using the molybdate method on material containing less than 1 per cent. of lead, and for some time employed a method of precipitating those small amounts of lead from the hot, filtered ammonium acetate solution (after it had been acidified with hydrochloric acid), on a strip of pure aluminum free from silicon. The precipitated lead was removed from the aluminum strip by rubbing, washed, dried at 110 degrees C., between filter papers, and weighed as metallic lead. This method is tedious if many determinations are to be made, and it possesses several disadvantages, not the least being that, when the quantity of lead present exceeds from 20 to 30 mg., small portions of the lead film are liable to become detached before the operation is completed, and, floating around in the acid solution, to be slowly re-dissolved.

"The result of many trials led me to experiment with the precipitation of lead as chromate under various conditions; and this method, as finally elaborated and tested, has proved so rapid and satisfactory in every way that I have discarded all other methods, and use this not only for small percentages of lead, but for all wet lead-assays, on whatever material.

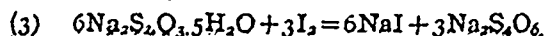
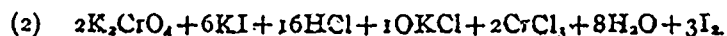
"The insolubility of lead chromate in water, and in dilute acetic acid, is well-known, and the gravimetric method of estimation by chromatic precipitation has been in use to some extent for years. Modifications, looking to the development of this method into a volumetric one, have also been published; but the fact remains that, at the present time, the volumetric chromate method as a commercial wet lead method is practically unknown.

"Taking advantage of the reactions of lead chromate, together with such literature as bore upon the subject, preliminary trials were made. A solution of normal potassium chromate was generally used, although dichromate in some cases answers as well, the normal chromates being converted to dichromates on addition of acids; but as I have generally used the normal chromate for the precipitating solution and as its equations are somewhat simpler, I will consider it here.



"The potassium chromate solution is added in slight excess of the fine quantity necessary to precipitate all of the lead; the lead chromate is separated by filtration and washing; the filtrate containing the excess of chromate is acidified with about 25 cc. of dilute hydrochloric acid (1:1); a small crystal of potassium iodide (about 0.5 g.) is then added; and the liberated iodine is titrated with a standard solution of sodium hyposulphite in the usual manner, running-in the 'hypo' until the brown color of iodine is almost discharged. Then a few drops of starch paste are added, and the titration is continued until the blue color is just discharged, and a clear solution remains. The standard hyposulphite solution is preferably made of such a strength that 1 cc. will equal 0.5 cc of chromate solution, in order to afford an easy calculation of

the back titration, in terms of chromate. The equations of the back titration are :



"Equation (1) shows that, of a solution of K_2CrO_4 of 9.396, or approximately 9.4 g. per liter, 1 cc. will precipitate 10 mg. of lead. If the dichromate solution be used, it should contain 7.12 g. to the liter, in order to give the same strength. Equations (2) and (3) show that, of a solution of 'hypo' of 36 g. of the pure crystalized salt to the liter (or 18 g. to the liter, if the more desirable half-strength be used), 1 cc. equals 1 cc. of the chromatic standard. This is very nearly the strength of the standard 'hypo' in common use for the iodide assay for copper, and if only a small number of wet lead-assays are made daily, it may be more convenient to use the copper 'hypo' solution for the back titration of the chromate; in the latter case the factor necessary to convert the copper 'hypo' solution to terms of chromate is about 0.54, the exact factor being readily ascertainable by standardizing the one solution against the other.

(To be continued.)

The Cassiar Coal Co.

The Cassiar Coal Development Company, with headquarters at Toronto, is pushing work on its coal areas which were discovered some three years ago. These areas lie in the Babine Range, north of Cariboo, and are reported as being only fourteen miles from Kitimat Harbor. The near advent of the Grand Trunk Pacific Railway Company is the cause for the development, as there is, at present, no possible outlet for the coal. Five valuable seams, of which two measure 16 feet and 20 feet in thickness respectively, are said to occur in the fifty-two square miles now licensed to the Cassiar Coal Company. Prof. A. P. Coleman, of Toronto, is reported to have examined the areas this summer, and to have a favorable opinion of their value.

The officers of the company are well known men of good standing. The president is the Hon. John Dryden, Minister of Agriculture for Ontario; the vice-president is Mr. R. Y. Ellis, of the Crown Bank, and Mr. W. Munns, Toronto, is the secretary. Both the local members from Hamilton are on the Board of Directors.

The Company has a paid-up capital of \$300,000.00, and hence is in a strong financial position. Of this sum, \$200,000.00 has been set aside for the purchase of the area now held under license, and \$100,000.00 has been appropriated for the development of the coal seams. Over \$20,000.00 of this has already been expended on the property.

The Shakespeare Mine Accident.

W. E. H. Carter, of the Ontario Bureau of Mines, attended the inquest held by Dr. Flaherty, coroner, on the bodies of six men who last month lost their lives at the Shakespeare gold mine, near Webbwood, Ont. The accident is one of the most serious that has occurred in mining in New Ontario, and the Department was anxious that there should be a full investigation, in order that the responsibility should be placed where it belonged.

The Shakespeare is a newly developed gold property, which was opened up a year ago by T. W. Trotter, and sold to J. D. Miller, who subsequently sold to the Shakespeare Gold Mining Co., retaining a large block of the stock. The shaft is perpendicular, 100 feet deep. On the morning of the accident the bottom of the shaft was filled with the heavy gas which follows a blast. The natural ventilation of the lower workings has always been poor, and it has been customary, after each blast, to blow in air under pressure to remove the poisonous gases. This had not been done on the day of the accident. Four miners who descended by a ladder were overcome and called for help. The engineer, instead of turning on the air blast, also descended the ladder, to be in turn overcome by the gas. The manager, Mr. N. McMillan, who had been in charge only eleven days, turned on the air, and, after waiting fifteen minutes, proceeded to investigate. He also was asphyxiated. The verdict of the coroner's jury was "Accidental death by suffocation owing to neglect of the company to provide proper ven-

tilation." The mine had been inspected three weeks before, and the ventilating apparatus found to be in good order. It appears, however, that it is somewhat expensive to operate the apparatus, and that some miners make a practice of doing so only at intervals. The miners who lost their lives were prompted by curiosity to visit the place to see what the blast had disclosed. The engineer neglected to turn on the air before descending, and the death of the manager. Mr. Carter declares, was an act of deliberate self-sacrifice. Mr. McMillan, who was only thirty-four years of age, was inexperienced in mining, being by profession an accountant. He had been business manager of the Mikado, in the Lake of the Woods district, for nine years. With the appointment of Mr. McMillan to the Shakespeare, arrangements had been made to push development work more vigorously than ever and to erect a stamp mill. The accident is a most regrettable one, but we hope it will have its salutary lessons as to mine ventilation.

PERSONALS.

Mr. Eugene Coste, President of the Canadian Mining Institute, returned to Toronto during the month, but was called to Manitoba again, where he is making some investigations into possible territorial petroleum fields.

Dr. H. M. Ami, of the Geological Survey of Canada, recently made an investigation of the oil wells in the vicinity of Moncton, N.B., and has reported favorably on what he saw.

Much satisfaction continues to be expressed at the election of Mr. G. G. S. Lindsey as General Manager of the Crow's Nest Pass Coal Company. Mr. Lindsey is also third vice-president of the Company, as well as being its legal adviser, and will probably be a resident of Fernie for a portion of each year.

The Canadian Manufacturers' Association elected Mr. W. K. George, of Toronto, to the presidency of that association at the closing session on Thursday, the 22nd September. Mr. George is well known in the silver-plate trade, being the managing director of both the Simpson, Hall, Miller Co. and of the Standard Silver Co.

Mr. Homer N. Galer, manager of the International Coal and Coke Company, at Coleman, Alberta, was married to Miss McLaren at Carson on the 20th inst.

Mr. J. D. Kendall, the eminent English mining engineer, advises that after October 1st his London offices will be at Mansion House Chambers, Queen Victoria Street, London, E.C.

Professor Coleman, of the School of Practical Science, Toronto, recently made an examination of the nickel deposits in Northern Ontario, for the purpose of making a full report to the Provincial Department of Mines. T. W. Gibson, of the Bureau of Mines, accompanied him during part of his inspection.

A. McPhail, D.Sc., has been appointed professor of general engineering, and W. O. Tague, lecturer in mechanical engineering, at the Toronto School of Mines. Mr. McPhail is a graduate of McGill University, and has recently been engaged in large engineering works in the vicinity of Boston. Mr. Tague is a graduate of the Massachusetts Institute of Technology, and has been employed by the New York Shipbuilding Company and the Fore River Shipbuilding Company of Quincy, Mass.

H. A. Guess, a graduate of Queen's University, has been appointed chemist to the Consolidated Copper Co., Canca, Sonora, Mexico, the fourth largest copper producing organization in the world. Mr. Guess previously held a position at Silverton, Colorado, and has also had experience in British Columbia and Ontario.

Mr. J. Walter Wells, late of the Belleville assay office, has been in Manitoba investigating the cement-making material of that province. This has involved the examination of many deposits of limestone, shale and clay.

Alexander K. Kirkpatrick has been appointed to the chair of civil engineering in the School of Mines in Kingston, Ont.

G. H. Barnhart has resigned the management of the Ymir mine, and will give his personal attention to the Porto Rico mine. He is succeeded by S. J. Speak, of London.

Mining Share Market.

There has been but little movement during the month, and the amount of stock that has changed hands, both here and in the West, is comparatively small.

The chief transactions were in Canadian Gold Fields Syndicate, Payne, White Bear and Granby Consolidated; the former stock is firm

and the price has advanced on reports from the St. Eugene mine and the rumor that a dividend may be expected on the latter before a great while.

The demand for White Bear appears to come from those interested in the company, and as the amount of stock offered is limited the sales have not been large.

A considerable amount of Granby Consolidated sold at about three dollars per share, and it would appear that since the control has passed into American hands the Canadian interest is being sold, and the Boston market is taking the stock.

The Iron and Steel stocks have been fairly active, with prices ranging higher, due apparently to the improved trade outlook in the States, and in sympathy with the bull speculation in the steel stocks in that country.

The fixed dividend paying preferred stocks maintain a steady price, and are mostly absorbed by investors, but the common stocks are largely in the hands of the speculating public, and their price reflects more the market conditions than intrinsic value. Nova Scotia Steel and Coal Co. has been traded in at prices ranging from about 61 to 67, and the Dominion Iron and Steel securities have somewhat enhanced in value; during the earlier part of the month a large amount of the bonds were taken off the "street," and there are comparatively few offerings at present.

The following list shows the quotations (bid and asked) which have been made during the month ended Saturday, September 28th, as supplied to the Review by Robert Meredith & Co., 57 St. Francois Xavier Street, Montreal:—

Par value of Shares.		Asked.	Bid.
.10	Canadian Gold Fields Syndicate.....	.05	.04½
5.00	Cariboo Hydraulic .....	.75	—
1.00	Centre Star .....	.25½	.24
1.00	Deer Trail Consolidated .....	.02	—
1.00	Giant .....	.63½	.01
10.00	Granby Consolidated	3.00	2.87½
10.00	Montreal and Boston	—	—
1.00	North Star .....	.02	—
1.00	Payne .....	.04	.03½
1.00	Rambler Cariboo .....	.18½	.17
1.00	Republie .....	.03½	—
1.00	St. Eugene .....	.45	.40
1.00	War Eagle .....	.12	.11
1.00	White Bear .....	.04¼	.04¼
100.00	Nova Scotia Steel (common) .....	.65¼	.65¼
100.00	Ditto ditto (preferred)	—	—
100.00	Dominion Coal (common) .....	.58½	.58
100.00	Ditto ditto (preferred)	1.12	1.09
100.00	Dominion Iron and Steel (common)..	.12	.11¼
100.00	Ditto ditto ditto (preferred) ..	.39	.38
—	Ditto ditto ditto (bonds) .....	.73	.73½

CHEMICAL NOTES.

Prof. Park, of Otago University, New Zealand, lays urgent stress on the necessity of fine grinding raw pyritic concentrates before attempting solution of the contained gold either by percolation or agitation; the finer the material the less the time required for high percentage recovery.

A new crucible process for hardening iron is reported from Germany. The carbonizing mixture is made of bone dust, yellow prussiate of potash, phosphorus and cyanide of potassium. The iron and mixture are placed in a crucible with a luted cover, and heated to a bright red heat, after which the iron is taken out and plunged into warm water. The conversion appears to be only skin deep.

At a recent meeting of the Faraday Society, Dr. F. M. Perkins and Mr. W. C. Prebble gave the results of researches to arrive at an electrolytic method of estimating gold, which should be perfectly accurate, and yet far more rapid than the ordinary double cyanide method, which the authors, differing from Classen, consider inordinately long, even in hot solutions. Solutions of sodium thiosulphate, cyanide, sodium sulphide, potassium thiocyanate and ammonium thiocyanate were all tried and the results compared. The first-named was useless; of the others—which are all accurate—the thiocyanates gave the best results and the ammonium salt was better than the potassium. With currents of .2 amperes per sq. dem., the deposition of .05 to .08 gms. of gold was complete in five or six hours. With a current of .4 to .5 amperes, 1.5 to 2 hours sufficed. The presence of a little persulphate considerably reduced the voltage required. Experiments were also made to determine the best method of removing the deposited gold. Chlorine or bromine water was satisfactory, but slow; aqua regia was risky; the authors recommended a 2 per cent. solution of potassium cyanide containing a little hydrogen peroxide or a persulphate. One or two minutes then sufficed to remove the gold.

Stability, of Standard Solutions of Potassium Permanganate and Ammonium Oxalate.—"A statement is often found in standard textbooks on analysis that a solution of potassium permanganate gradually becomes weaker on exposure to light, by slow decomposition of the salt; and that it is necessary on this account to re-standardise the solution at frequent intervals. In the course of some recent work involving the use of this reagent we found occasion to doubt the accuracy of this statement, and have, therefore, made experiments extending over a period of twelve months. These have established the fact that, both in the solid state and in solution, pure permanganate retains its strength if kept in well-stoppered bottles, even when exposed to light. On March 30th, 1904, a solution of permanganate prepared from the specially purified salt described in the paper above referred to was made declinormal by weighing, and the accuracy of the solution was confirmed by titration of pure ammonium oxalate and pure ferrous ammonium sulphate. On October 28, 1903, i.e., seven months afterwards, the factor of the solution was found by titration to be 0.997, and on April 15, 1904, the same solution gave precisely the same factor. A similar N/10 solution of permanganate was prepared on October 28, 1903, from the same lot of solid re-crystallised permanganate of potash preserved during the seven months in a closely stoppered bottle. The solid permanganate had attained its original strength, and the second solution re-standardised on April 15, 1904, after an interval of six months, was again found to have the factor 0.997. The above results show that a solution of pure permanganate may be considered to retain its original strength for all practical purposes for at least twelve months, if pure water is used in its preparation and the solution kept in a closely stoppered bottle; and it is not necessary to keep such a solution in the dark."—Journal of the Society of Chemical Industry, June 15, 1904.

INDUSTRIAL NOTES.

The General Electric Company of Schenectady, N.Y., has closed its mica works at Perth and Smith's Falls, and reduced its staff at Ottawa in consequence of dullness in the trade.

The Ontario Pipe Line Co., which has gas wells at Grimsby, has applied for a franchise to enable it to convey natural gas to Hamilton. It proposes to begin laying pipe next spring, and to complete at least ten miles within six months. The rates agreed on between the City Council and the Company under the proposed franchise are as follows: 45c per 1,000 feet for the first five years, 40c for the next ten years, and 38c for the next five years. The rate to manufacturers is to be, for 200,000 cu. ft. a month, 42c; 1,000,000 ft., 40c; 2,000,000 ft., 37½c; 6,000,000 ft., 35c. Cleveland capitalists are largely interested in the company. A Pittsburg syndicate also proposes to enter the field.

A cement factory is to be erected by Messrs. Peter Lyall & Sons at Longue Pointe, near Montreal; a block of land comprising some 300 acres having recently been purchased by the company for this purpose.

A contract was recently closed between the Canadian Northern Railway Company and the Canada Foundry Company for the building of the proposed bridge over the Saskatoon River, north-west of Battleford.

The John MacDougall Caledonian Iron Works Co., Ltd., completed a two-unit Elzore oil concentration plant in August, and shipped it to the Massey mine in Ontario. They have also completed and shipped a large plant for the Consolidated White Bear Mining Company, at Rossland, B.C. The Massey mine plant has an estimated capacity of fifty tons of ore per diem, and is especially designed for the treatment of low-grade copper ores. The makers are manufacturing these concentration plants under a license from the Canada Ore Concentration Company, Ltd. Details of the operation of these plants will be furnished by the Review after each has had several months' operation.

The Aymer Iron Works Company, Aymer, Ontario, will increase their capital from \$30,000 to \$70,000.

The Canadian General Electric Company of Toronto have entered into a contract with the Ontario Power Company, at Niagara Falls, Ont., to supply \$2,000,000 worth of machinery, including practically all of the plant for the Ontario company necessary for the transmission of power.

The Pittsburg Coal Company have installed a new clamshell unloader at their dock at Sandwich, Ont.

The corporation known as the Cramp Steel Company has been reorganized under the name of the Northern Iron and Steel Company, Major J. A. Currie being the president, and Mr. Duncan Donald being the secretary. The head office will be in Toronto.

The manufacture of steel rails by the Lake Superior Corporation, at Sault Ste. Marie, Ontario, has commenced, and the Dominion Government have contracted with this company for the supply of 10,000 tons of 80-lb. rails to be used on the Intercolonial Railway.

The Western Engineering and Construction Company propose building a continuous bucket dredge for use on their concessions in the Atlin Country. This dredge, it is estimated, will cost \$200,000.

A new factory is building in Ottawa by the Laurentide Mica Company for the manufacture of mica for electrical purposes.

MINING NOTES.

NOVA SCOTIA.

The first blast furnace at North Sydney Mines, Nova Scotia, of the Nova Scotia Steel and Coal Company was blown in in August, and has worked so far very satisfactorily. It has a capacity of 250 tons per diem.

Coal shipments from Nova Scotia up to the first day of August show an increase for some of the shipping companies and a decrease for others. The Nova Scotia Steel and Coal Company increased its output by 27,665 tons, the Inverness Railway and Coal Company by 12,624 tons, the Intercolonial Coal Company by 10,058; the Dominion Coal Company decreased 138,933 tons; the Cumberland Railway and Coal Company decreased its output by 20,511 tons, and the Acadia Coal Company showed a decrease of 5,891 tons.

The August output of the Cumberland Railway and Coal Company amounted to 37,596 tons.

The Dominion Coal Company, Ltd., report the outputs of their various collieries and their shipments for the month of August to be as follows:—

Dominion No. 1	40,439
" 2	59,107
" 3	29,352
" 4 (Caledonia)	44,016
" 5 (Reserve)	75,435
" 7 (Hub)	20,192
" 8 (International)	23,813
	<hr/>
	292,354

Total shipments for month of August, 307,084 tons.

This is an increase of about 13,000 tons over the previous month of July.

The increase over July for Dominion No. 1 was 7,000 tons; for Dominion No. 2, 12,000 tons; for Dominion No. 5, 10,000.

The local press have reported a discovery in Cape Breton of a large deposit carrying nickeliferous copper with associated gold and silver; this report, however, lacks confirmation.

The stock of the Nova Scotia Steel and Coal Company has been subjected to a severe bear attack in the eastern markets during the current month, but has recovered successfully, and is now somewhat in a boom condition. The successful working of the new blast furnace at North Sydney, together with the reported successful financing of the new loan, makes the market position of the company better than it has been for some time past. The directors are to be commended for abstaining from making any official statements which would encourage speculation in the stock, for the uncertain business outlook will prevent any approximation of future estimated profits being reliable.

Rumor has it that the Cape Breton Copper Company is to undergo reorganization, and to suffer a fresh start. There seems no reason, however, to anticipate any greater success in the shape of dividends for shareholders than the past has shown.

It is reported that the entire output of the Dominion Coal Company until the end of 1904 has been sold, and operations are distinctly on the increase. Resumption of work at the Dominion Steel Company has, of course, increased the delivery of coals, and the increase in outside consumption will give the Coal Company a very good ending for the current year.

The shipping pier of the Dominion Coal Company, at Louisburg, has been reconstructed and enlarged. The old pier was a double-decked one, on the upper track of which the coal cars were run by gravity, and the coal was then dumped into chutes leading to the vessels. The cars were dropped to the lower track by a table, and run by gravity to the ground surface, where they were returned to the mines for re-loading. The reconstruction has consisted in building large storage bins on shore, from which the coal is conveyed by belt conveyors and discharged at suitable intervals into the chutes leading to the vessels. This new arrangement adds to the capacity of the pier, which retains all its original facilities for transshipping coal direct to the boats. The storage bins, which are built of timber, have an aggregate capacity

of 10,000 tons of coal. The coal is discharged from the bins to the belt conveyor, and by it elevated and carried along the pier to be discharged into the vessels alongside.

The operating power consists of a 125 H.P. engine, which runs the first two sections of the belt conveyor. The power house also contains electrical generators, which furnish the current both for lighting and for driving the electric motor which operates the end section of the conveyor belt. The conveyor belt has a travel of about 700 ft., with a total rise of 70 ft., and is 35 in. in width; its capacity is from 750 to 800 tons of coal per hour.

The Cape Breton Coal, Iron and Steel Company, Ltd., which is the name of the corporation organized by Mr. Horace Mayhew in conjunction with Coates, Sons & Co., is to proceed at once with the work of developing its coal areas. The management states that it will be a year before the colliery is equipped and producing. The management is as yet undecided whether the shipping point will be at Louisburg or at Sydney. This company, it will be remembered, controls the eastern areas formerly held under option by Mr. Mosely, as well as the western areas.

QUEBEC.

Work at the several asbestos mines in Quebec is being energetically carried on. There is a general scarcity of labor, both at Thetford and Black Lake, which in several instances is hampering operations. The output of the different grades of crude and fiberized asbestos at the older established mines will be quite up to that of 1903.

At Black Lake the mills of the Standard Asbestos Co., Johnsons' Co., and the Union Mines are in regular operation; in addition, the pits of the Manhattan Asbestos Co. are being operated, and some crude asbestos is being mined; their mill has not been operated this season.

The pits of the Glasgow and Montreal Asbestos Co. are being opened up. This property has been idle since the winter of 1902. It has lately been leased on a royalty basis by a Mr. Robert Stather, and the work now being carried on is under his direction.

Some parties from Syracuse, New York, have acquired the property of Dr. James Reed (Lot 29, Range A), and some work is being done there. It is the intention of these gentlemen to equip the property with a complete milling plant. The property is at present equipped with boilers, compressor and hoisting plant.

The most important development in the local asbestos business is the construction of the new plant of the American Asbestos Co. on the H. H. Murphy property (Lot 32, Range B.). The milling plant is placed near the main line of the Quebec Central Railway, a short distance north of the Black Lake station. The plant is housed in buildings of a most substantial construction, consisting of main mill buildings, crusher and dryer building, and a storehouse. There is a commodious machine shop, equipped with fine tools. The mill proper is laid out on somewhat different lines to those in operation on other properties; the chief point of difference is in the method of grinding the rock after it has been crushed by the rock breaker. A rotary crusher, of the well-known Sturtevant mill type, is used in place of a "Cyclone Pulverizer." It is claimed for this machine that it does not damage the fibre to the same extent as the older method, and that the crushing is done with a much less expenditure of power than is required for the cyclone mill. The plant is about ready to run, and the results are being looked forward to with considerable interest by all interested in the industry.

It was the intention of the American Asbestos Company to take power from the St. Francis Hydraulic Co., but the unfortunate bursting of their dam made it necessary for the American company to put in its own steam plant and generator to furnish power to its motors. The mill is connected with the pits by a narrow gauge railroad, the rock and waste being moved by a locomotive. Several comfortable cottages have been erected for the workmen, close to the works.

At East Broughton, the Broughton Asbestos Company have rebuilt their mill, which was destroyed by fire last November. The new mill is of greater capacity than the one destroyed, and has been in operation since July; it is turning out a fine grade of fibre.

The Quebec Asbestos Company now has its plant in operation. This company began producing fibre at the end of July. At this mine the rock is raised from the pits by means of a cableway with 700 ft. span. The rock-breaker and dryer is near the heading of the derrick. The rock is conveyed from the dryer to the top of the mill by a 16 in. conveyor. Mill and dryer are about 100 ft. apart. The crushing machinery consists of Blake crusher, rotary crusher, and Cyclone mills. The mill is driven by a 16 in. x 36 in. Jenckes-Corliss engine; crushers and dryer by a separate engine; power is supplied by two 100 H.P. horizontal tubular boilers. This property was formerly known as the "Walsh-Mulvena" mine, and was last operated about twelve years ago; the present plant was installed during the spring of

this year. The company is composed entirely of Sherbrooke parties. The rock from this and the Broughton property is of a very fibrous nature. Nearly all the rock taken from the pits goes direct to the mills, and yields a very good fibre.

The Black Lake Chrome and Asbestos Co. are operating two mills at Black Lake, and the output of chrome concentrates is steadily increasing. There is very little doing at any of the other Chrome properties, the price of Chrome iron ore being, perhaps, responsible for this. Neither the mill of the Montreal Chrome Co., nor that of Beebe Bros., at Lake St. Francis, is being operated.

There is every hope that the effort to establish a custom smelter, for the smelting of copper ores at Sherbrooke, will be successful. Negotiations to this end are under way, with fair chances of success. Those interested have decided not to apply to the City Council for a bonus. It is the opinion, generally expressed, that such a smelter would be successful, and go far to aid the development of the many promising copper properties of the Townships.

ONTARIO.

Natural gas has been struck about two miles from Owen Sound, where the Grey and Bruce Co. were drilling for oil, and at Rymal Station, seven miles from Hamilton, where drilling was being done for water.

A strike of oil is reported at Melrose, about twelve miles east of Belleville, Ont.

A great impetus has been given to the oil industry at Petrolia by discoveries recently made in territory which was considered of little or no account in the early days of oil development. Recently the Petrolia Torpedo Co. struck a well yielding 100 barrels a day, a couple of miles south of what was supposed to be the limit of the oil pool, and about the same time J. D. Noble & Son struck a 40-barrel well half a mile further north. Drillings had previously been made in the vicinity without success. The general run of the new wells is from 10 to 15 barrels a day, though the Canadian Oil Fields, Ltd., struck ore yielding from 30 to 40 barrels.

The International Nickel Co., operating in Canada as the Canadian Copper Co., has secured a contract with the Japanese Government for all the nickel required by Japan. The new works at Copper Cliff have commenced operations with a capacity of 1,000 tons a day. About \$1,000,000 has been spent in improvements, which, without adding materially to the cost of operation, will double the capacity of the old plant.

The courts have been applied to on account of Alexander Quigley, of Sault Ste. Marie, for a winding-up order against the Rock Lake Mining Co., Ltd., which owns some copper properties near Bruce Mines. It is alleged that the company has liabilities amounting to \$200,000, which exceeds the value of the assets, including mine and plant. Among the creditors are the Ontario Powder Co., Carney & Stoen, the Wellman-Seaver-Morgan Co., and Quigley, who holds a judgment for \$400. The company was incorporated in 1899 with a capital of \$3,000,000, the directors all being residents of the United States. The application was granted, but not to take effect until a report had been received on an option which certain parties had secured for the purchase of the property. A. E. Plummer, of Sault Ste. Marie, was appointed provisional liquidator if the order issues.

New development work at the Sultana mine, Lake of the Woods, has revealed fresh ore bodies. At the eighth level quartz has been found as rich as in the former workings. It was cut in the winze, but the dip seemed to indicate that it would extend to the shaft at a lower level. Active work is now going on at the mine.

A report which has been in circulation in the papers to the effect that tin has been discovered in Eastern Manitoba, south of Cross Lake, and close to the boundary line of Ontario, is not correct. Tests made by the Ontario Bureau of Mines fail to reveal any sign of tin. Such a discovery would be very valuable, but tin has yet to be discovered in Canada in any quantity.

Three of the miners who made the murderous attack on Wm. Welsh, engineer, at the works of the Canada Corundum Company, Craigmont, referred to in the last issue of the Review, are in jail at Pembroke awaiting trial. Only Welsh's splendid physique and temperate habits prevented the charge being that of murder. Welsh was badly cut up, and has not yet quite recovered from the effects of the attack.

Authority has been given to the Giant Gold Co., Limited, to hold its meetings without the Province of Ontario.

The following mining leases heretofore granted in the Province of Ontario have been cancelled: Dr. R. B. Patty, E. Kelly, John Mode, and H. Token, for the south part of Lot No. 3 in Concession A of the Township of Hains, in the District of Nipissing, 80 acres; Charles Stewart,

District of Algoma, for the south half of Lot No. 8, in the Third Concession of the Township of Aberdeen, District of Algoma, 161 acres; Walter Thomas Ward, of Marquette, Michigan, for the south-east quarter of Section 26 in the Township of Shedden, District of Algoma, 160 acres.

Toronto interests will control the Northern Iron and Steel Co., which is the name of the reconstructed Cramp Steel Co.

W. P. Bullard is responsible for the statement that petroleum in quantity has been found on Manitoulin Island. Four holes have been drilled in the Indian reserve at the eastern end of the island to depths of about 400 feet. Three of these will have to be pumped, but the fourth (which has not yet been shot) promises to be a gusher.

The Tip-Top mine, on Round Lake, is a copper-gold proposition. The return from 23 tons shipped to New York for a smelting test gave \$550, or nearly \$24 per ton. After paying freight, smelting charges, etc., the net returns were \$13.44, which is very satisfactory.

The Tip-Top is one of the properties in which the late James Hammond was interested.

The first indication of a result from the recent trip of the Dominion Commission to investigate the electric smelting of iron ores appears in paragraphs from Ottawa, which announce that Mons. P. Heroult, of La Praz, France, has been in the Ottawa district looking at the iron ores of the section in respect to their availability for conversion by the electric process. This is probably inspired by the gentleman who controls, through option, the properties near the Chat Rapids, and who has been actively engaged in an endeavor to obtain the necessary capital for their development. The Review trusts he may meet with success, not alone in finding his capital, but in obtaining a market for his finished product.

The current press reports an alleged discovery of coal in Eastern Ontario, in Melancthon; the quality is reported to be anthracite, but the item lacks confirmation.

At the Massey Station copper mine five levels have been run, and a large quantity of low grade ore has been found. At the Hermina mine a shaft has been sunk to 140 ft. depth on a narrow but somewhat rich vein of copper ore.

The Shakspeare gold mine near Webbwood is being rapidly opened up, and the ore pans gold freely, even where no free gold is visible. A paragraph on the late disastrous accident at this Shakspeare mine will be found in another portion of this issue.

A paragraph is going the rounds of the Toronto press to the effect that Location A.L. 282 in Western Ontario has turned out a brick valued at \$8,000 from a thirty days' mill run. If this output can be maintained for twelve months, Location A.L. 282 will be a mine. It belongs to the N.Y. and Ontario Mining Co.

The Steele mine at Sturgeon Lake has about completed its ten-stamp mill, which it expects to have in operation on the 1st of October. Results from this Sturgeon Lake district will be awaited with interest, as the district during the first two years has had a very large local newspaper boom. The auriferous belt from which the gold is obtained has been cross-cutted by an open cut, and a shaft has also been sunk to a short distance. The most of the gold contained is free and visible.

Much interest is shown in the iron deposits of Loon Lake, in the Township of McTavish, Western Ontario. Some two years ago these deposits were examined in the interests of United States iron men, and were declined, chiefly on the ground that their quality was not particularly good, and also on account of a suspicion that the deposits might not continue to any depth. The grade of the best bulk samples thus far seems to run from 52 to 56 per cent. metallic iron, with a large amount of silica, but reports say that the recent diamond drill tests have shown that the grade of the ore is higher with depth, and that the silica disappears. The deposits are only about fifteen to eighteen miles distant from Lake Superior, and shipment to lake ports would be an easy matter if the quality justified such shipments.

A thirty days' mill run at the Sunbeam gold mine, on the Canadian Northern Railway, near Port Arthur, produced a gold brick valued at \$8,000. The shaft is now down over 300 feet. A new engine-house has been built.

BRITISH COLUMBIA NOTES.

On the first of the month word was given out that a complete reorganization of the Le Roi mine was to take place at once. Mr. A. J. McMillan, the managing director, becomes general manager; Mr. J. W. Astley, general superintendent; Mr. A. I. Goodel, manager of the smelter; Mr. W. S. Rugh, manager of the mine, and Mr. Jas. H. Treverrow, mine superintendent. Mr. John H. MacKenzie has not yet submitted his report on concentration experiments.

The foreign shipments of coal from Nanaimo for August amounted to 15,627 tons.

The shipment of concentrates from the St. Eugene mill during August amounted to 1,300 tons.

The North Star mine at Kimberley, B.C., reported early in the month the finding of a new body of ore; if the news is confirmed by further exploration, the winding up of the company may be deferred.

The Vancouver Island Development and Exploration Company are making steady shipments to the furnace at Ladysmith. The ore continues to carry high values.

Mr. Constant Fernau has returned to the Kootenays from England, and has announced that he is prepared to at once proceed with the construction of a zinc enriching plant at Roseberry, Slocan District, and of a smelter at Fernie, East Kootenay. The enriching plant will take the zinc concentrates from the Slocan mills, and treat them so as to take out most of the lead ore and silica which the ordinary concentrating mill leaves with the zinc blende, thereby producing a concentrate high in zinc and low in lead and silica. From this enriching (or re-concentrating) mill the product will go to the furnace at Fernie, which place is selected on account of its proximity to the coal fields. Cheap coal is necessary to produce the gas, which is an essential feature of Mr. Fernau's process for the recovery of zinc from its ores.

The Slocan Star mine has paid its tenth dividend, amounting to \$25,000. The total dividends paid to shareholders now aggregate \$557,000. The stamp mill is turning out daily twelve tons of silver-lead concentrates, and about twenty-six tons of clean lump ore. The zinc concentrates, which are a by-product, are stacked at present, needing a further concentration before they are saleable.

The O.K. stamp mill at Rossland is now treating twenty-five tons daily from the I.X.L. gold mine, which has been leased by Mr. Jacob Loff.

The Helen mine, Greenwood Camp, is now shipping high grade ore. The vein averages about ten inches in width, and shipments run over \$100 per ton in gold and silver.

The Montreal and Boston smelter at Boundary Falls has been receiving coke in preparation for a start, and has had a force of men preparing ore bunkers for both the Rawhide and Brooklyn mines.

The new company which has taken over the old Dundee mine has been incorporated under the name of Dundee Gold Mines Limited, with a capital of \$625,000, in 25c shares. The officers are E. B. Morgan, Vancouver, president; John Hendry, Vancouver, vice-president; the remaining directors are Sir Chas. Hibbert Tupper, F. J. Walker, and C. J. Major.

The Cascade Copper Mining Company have made a profitable shipment of ore to the Tacoma smelter. After deducting all costs and charges, the sum of \$22.40 per ton was realized. Periodical shipments are to be made from this date on.

The Joe-Joe mine, near Bear Lake, in the Slocan District, has made discovery of some remarkably rich gold ore, which also carried native silver. The mine is in the Three Forks belt, where galena from the McAllister mine is known to carry a high value in gold. The ore is in a narrow streak of about four inches in width.

During the year ending June 30, 1904, the Ymir mine, usually known as a gold mine, produced 2,195 tons of lead ore, containing 667,615 lbs. of metallic lead.

The Nicola, Kamloops and Similkameen Coal and Railway Company have procured a charter to build a railway from Spence's Bridge through the Nicola and Similkameen valleys to Osoyoos; at least, this is the announcement publicly made by Mr. George A. Begy, of St. Catharines. Mr. Begy, accompanied by Col. W. H. Merritt, of Toronto, completed a trip of inspection over the proposed line early this month. Mr. Begy is the president of the road named, and is authority for the announcement that all arrangements for financing the line have been made, and that Mr. Chas. H. Keffer, C.E., has nearly completed the necessary surveys. The first part of the mine to be constructed will be the forty-five miles from Spence's Bridge, on the C.P.R. to the coal deposits near Nicola.

The tunnel of the Consolidated Cariboo Hydraulic Company at Bullion, B.C., is making very satisfactory progress, being in now about 300 feet.

From the approximate returns compiled by the Provincial Mineralogist for the first six months of 1904 we give the following:—

	Jan. 1 to June 30, 1904.	Year 1903.
Gold	123,339 ozs.	232,831 ozs.
Silver	2,037,061 ozs.	2,996,201 ozs.
Copper	17,513,886 lbs.	34,359,921 lbs.
Lead	16,500,000 lbs.	18,089,283 lbs.

The above figures clearly show the stimulus given to silver-lead mines by the Government bounty; they also show the lower grade of ore which has been mined.

The forest fires have temporarily put Camborne Camp out of business by the destruction of terminals and damage to tramways and mills. A heavy fall of rain checked the danger, but protracted rains are needed to quench all danger.

The erection of the 30-stamp, 100-ton mill at the White Bear mine, and the liabilities incurred for the Elmore plant, not yet completed, have compelled the directors of the company to offer 40,000 shares of the stock to shareholders to provide ready money for pressing payments.

The Centre Star mine increased its weekly outputs during September by about 1,000 tons.

The Societe Miniere de la Columbie Britannique reports a favorable season's work on Boulder Creek, and the certainty of a dividend for this year.

The gold recovered by the Otter Creek Hydraulic Company this season has been very coarse and much worn.

A good strike of pay dirt is reported from Ruby Creek at a depth of 47 feet, where bedrock was encountered. At a depth of 23 feet the gravel averaged \$1.00 per yard. A nugget weighing 18 ozs. 5 dwts. was taken from 86 below on Spruce Creek on September 2nd.

It is reported, on good authority, that the Kootenay Valley Land Co., a London company, which some years ago acquired the extensive holdings of Mr. Grohman in East Kootenay, have, in conjunction with the C.P.R., successfully financed the construction of the Kootenay Central Railway, which is to run from Golden to Fort Steele, and thence to a junction with the Crow's Nest Railway near Elko. This will be good news to the owners of mineral claims along the Columbia and Kootenay Valleys, and will give a fillip to development in the Fort Steele and Windermere districts. The Estella and the Paradise mines are ready to ship considerable quantities of ore, and many promising prospects in the neighborhood of Wasa, and on Toby Creek, will have inducement for development.

YUKÓN.

The stampede to Tanana has seriously curtailed the supply of labor for the Klondike District during this season. At no time since the summer of 1897 has there been such a scarcity of men, and in consequence wages have advanced from 25 to 30 per cent. It is feared that winter operations will be much diminished in consequence.

Advices from Dawson state that the Government waggon road up Sixty Mile Creek has been completed for a distance of forty-two miles, leaving but sixteen miles to the terminal. Matters on Glacier and Miller Creeks are reported as prosperous, there being from 125 to 150 men employed outside of the force used by the N.A.T. & T. Co. on its concession. The company are putting in a reservoir at 16 below, on Miller, and at this point the hydraulic plant of the company is situated. The reservoir gives an effective head of 420 feet.

The day of the individual miner is slowly but surely passing, and the era of large companies, well financed, has begun. Ex-Mayor McLennan, of Dawson, is authority for the statement that the bulk of the output is now made by the big companies.

According to the figures of the territorial comptroller the shipments of gold from Dawson this year have been as follows:—

January	85,895.55
February	107,417.10
March	138,740.40
April	60.00
May	840,032.10
June	2,709,339.20
July	1,300,250.55

A total of 5,131,734.90
for the first seven months of the year.

Mr. W. M. Brewer, of Vancouver, who has been in the northern country for some months, is reported as saying that since July there has been little doing in the new gold fields to the west of White Horse but stampeding and staking. From information received, he is inclined to believe the area covered by the new diggings will approximate 100 miles square. Time and systematic development are needed to determine the future of the districts staked, which are principally the Aisek, the Kaskawulsh, and Kluane Lake.

The Alaska gold output for the fiscal year ending June 30th, 1904, according to the Department of Commerce and Labor, amounted to \$6,323,524, while in the fiscal year 1903 Alaska shipped to the United States gold ore and bullion to the value of \$4,754,578. These figures refer only to Alaskan gold, however. The same statistics noted an even larger quantity of Canadian gold shipped to the United States through Alaska, though less than during the preceding year. In 1903 the aggregate shipment of Canadian gold to the United States through Alaska amounted to \$10,979,285, while during the year just closed the Canadian shipment aggregated \$8,555,600.

A landslide on Flat Creek in the early days of August revealed good pay gravel, and the slide was at once followed by a mad scramble to the Dawson office by locators. The gravel is reported as yielding from 2 ozs. to 30 ozs. to the pan.

The successful operations of the Alaska Coal and Petroleum Company near Dyak Bay is once more directing attention to the coal deposits of the Pacific Coast. It is known in mining circles that the collieries now operating on Vancouver Island have a limited life, and this fact invests with importance every move made for the purpose of securing future supplies. A special report has been made for a London firm on the Graham Island deposits. High-class bituminous and at least one workable seam of anthracite coal have been located. The principal hindrance to development has been the necessity for building a railway to the coal camp, a distance of thirty miles.

COAL NOTES.

Mr. P. Burns, of Calgary, the well-known wholesale butcher of Calgary, who supplies the Kootenays with beef, has acquired some 16,000 acres of what is supposed to be anthracite coal, located in the Misty Range, forty-six miles west of Okotoks, Alberta. Reports from Toronto lead to the belief that Mr. Burns is endeavoring to form a Toronto company for the exploitation of his purchase. Mr. Burns is reported to ask the sum of \$320,000 for the option now held by him.

In reply to Trade and Labor communications received from Guelph and Toronto, the Ontario Commissioner of Crown Lands has stated that his Government last year sent out a special exploring party through various sections of Northern Ontario where coal was believed to exist, but that results were not definite.

For the fiscal year ended June 30th, 1904, there were imported into Canada from the United States 4,434,762 tons of bituminous and 2,022,810 tons of anthracite coal, a total of 6,457,572 tons. This amount is 1,472,148 tons in excess of similar imports for 1903. The increase in bituminous coal amounted to nearly 20 per cent., and in anthracite to nearly 55 per cent.

The exports of Canadian coal to the United States for the same fiscal year amounted to 1,317,979 tons, or but 20 per cent. of the amount imported. In short, Canada imported five tons of coal for each ton exported.

The average number of men employed in the Crow's Nest Pass coal fields exceeds 2,000.

The report of the Royal Coal Supplies Commission of Great Britain already fills three large volumes which deal with: The limit of depth in working, the minimum thickness of workable seams, and the waste in working. The limit of depth to which coal mines may be worked in England has been given careful attention, and much testimony was submitted. The rate of increase in temperature varied in different parts of the island, ranging from an increase of one degree for every 40 feet in Lancashire to one degree for every 108 feet in South Wales. According to some of the testimony presented, the temperature will average 98 deg. Fahr. at a vertical depth of 4,000 feet, and this temperature would limit further working.

Foreign exchanges say, that the Coal Trust of Germany, the Rhenish Westphalian combination, are selling coal in Havre (France) for \$3.45 per ton, against English coal at \$3.83 per ton, and that, in consequence, British sales have decreased by over 400,000 tons. The railways of France, which are owned by the State, are now burning German coal from the Ruhr district, which is delivered at Palisse for \$4.44 per ton.

Extensive prospecting and development work on the coal seams of Controller Bay, Alaska, is doing by the Alaska Development Company, which is an English corporation. Controller Bay is near the mouth of the Copper River in American territory. The country is rough and broken, but presents parallel outcroppings of coal seams varying from 4 ft. to 35 ft. in thickness. Discoveries of petroleum are also reported to have been made, and another English company, known as the Alaska Petroleum and Coal Company, has about a dozen men at work with a boring machine.

The coal opened along the Yukon River, at Cliff Creek and Coal Creek, has found a small market this season at prices averaging about \$12 per ton. It is a lignite occurring in comparatively thin seams, and will find no ready market where oil or the British Columbian coals can be obtained.

The United States Government statistics of the production of coal in that country for the calendar year of 1903 show the following figures:—Bituminous, 285,107,392 tons; anthracite, 74,313,919 tons; a grand total of 359,421,311 tons. These figures show the marvellous growth of consumption during the last ten years, for in 1893 the total production was less than 200,000,000 tons.

The large growth of the coal mining business in the interior of British Columbia is shown by the fact that in 1898 there were but 8,986 tons of coal and 361 tons of coke produced in the Crow's Nest Pass region, whereas in 1903 over 660,000 tons of coal and 167,700 tons of coke were mined and made in the same region.

The Review is informed that the object in consolidating the Dunsmuir coal interests with those of the Western Fuel Company was the effecting of a saving in the cost of producing and shipping British Columbia coals to the California market. A reduction of costs meant a lower selling price, which was necessary in order to counteract the reduced market due to sales of oil and gas as fuel in California. The Western Fuel Co. are to keep four vessels in constant commission between the mines and San Francisco.

The Dominion Coal Company has made a trial shipment to Mexico of 5,000 tons of coal. The Elder-Dempster SS. "Degama" took the cargo to Vera Cruz consigned to the Inter-Oceanic Railway, which runs from Vera Cruz to the city of Mexico. Should the shipment prove acceptable, a new and growing market will be opened to the Dominion Coal Company.

NOVA SCOTIA COAL SHIPMENTS.

Company.	August.		Eight Months.	
	1903.	1904.	1903.	1904.
Dominion Coal Co.	225,786	307,084	1,878,111	1,820,471
Nova Scotia S. & C. Co.	49,954	54,256	274,526	301,493
Cumberland Ry. & C. Co.	31,666	37,596	292,908	278,533
Acadia Coal Co.	25,331	23,708	225,254	167,240
Intercolonial Coal Co.	19,918	22,713	152,237	165,090
Inverness Ry. & Coal Co.	12,741	18,321	88,540	106,744

The Dominion Coal Company is preparing for an increase in its St. Lawrence River trade, and has ordered three new coal boats to be delivered in May, 1905. The order was given to a Norwegian ship-building firm.

Digest of Recent Patents; Mining and Metallurgical.

Aug. 23, 1904.

768,054—Electric-Furnace. Carl G. P. de Laval, Stockholm, Sweden. An electric-furnace chamber having a horizontal feed-opening, an escape-opening and a focus of electric heat within said chamber, and opposite said feed-opening; the said escape-opening being located above said feed-opening and between said feed-opening and said focus.

768,108—Sulphuric Acid Plant. Adolf Zanner, Brussels, Belgium. A plant for the manufacture of sulphuric acid, comprising a roasting-furnace, a Glover tower, a heating-flue for the passage of the sulphur fumes and gases from the furnace to the tower, and vessels for the concentration of sulphuric acid located within said flue and adapted to be inserted and withdrawn therefrom, said vessels being provided with an inlet or supply pipe extending through the wall of the flue so as to receive its supply from without, and a discharge-pipe likewise extending through the wall of the flue, and vapor-exit openings discharging into the flue, the inlet or supply pipe being located at the end proximate to the tower, and the discharge-pipe being located at the end proximate to the furnaces.

Sept. 13, 1904.

769,936—Process of Extracting Precious Metals from Ores or Slimes. Henry R. Cassel, New York, N.Y. The process of extracting precious metals from ores, which consists in adding a bromide and a cyanide in solution to the ore, then passing chlorine gas through the mixture to convert the bromide into bromine and form solvents for the precious metals, and reconverting the bromine into bromide.

769,689—Rabble for Roasting-Furnace. Michael Corcoran, Anaconda, Mont. A device having a supporting structure and a blade, one of said members being provided with a longitudinally-tapering guide, and the other said member being provided with a correspondingly-tapering head interfitting in said guide.

768,035—Extracting Zinc or other Sulphids from their Ores. Guillaume D. Delprat, Broken Hill, New South Wales, Australia. A method of separating ores from the gangue, which consists in forming an aqueous solution of an acid capable of reacting with the ore to form a gas and increasing the density of said solution by adding thereto a suitable substance, then feeding the mixture of ore and gangue to the solution, decreasing the density of the gas as it is formed on the ore particles, and removing the ore particles raised to the surface.

Aug. 30, 1904.

768,774—Construction of Frozen Walls for Shafts in Mines. Karl Schmidt, Erkelenz, Germany. Improved means for forming frozen walls for shafts embracing a plurality of groups of connected freezing-tubes, and a freezing medium conveyed through said groups.

768,748—Roasting-Furnace. Ottokar Hofmann, Argentine, Kans., assignor to The United Zinc and Chemical Company, Kansas City, Mo., a corporation of New Jersey. The combination of a series of shelves or roasting-hearths, a vertical hollow shaft, hollow stirring-arms connected to said shaft, a vertical air-pipe centrally located in said shaft, and branch air-pipes located in said stirring-arms, said hollow shaft having openings at top and bottom to provide for a draft there-through, and said branch air-pipes being arranged to discharge into the outer ends of said stirring-arms, the air so discharged passing through the stirring-arms to the vertical-hollow shaft.

768,976—Conveyer. Isaac Christ, Tamaqua, Pa. A conveyer comprising slotted chain-links and slotted flight-links, and double-headed pins pivotally connecting the ends of the chain-links and also supporting and locking the flight-links in position, all of said links having their slots formed with enlargements to permit the passage of the heads of said pins, the flight-links corresponding in length with the chain-links and supported against the sides thereof by said pins.

768,858—Charging Apparatus for Blast Furnaces. Walter Kennedy, Allegheny, Pa. A blast-furnace plant having in combination a skipway, a skip movable along such a way, a storage-bin arranged above the skipway at the skip-loading point, a line of track extending from the ore pile to a point above the storage-bin, and cars movable along such track.

Sept. 6, 1904.

769,280—Process of Extracting Gold from Ores, etc. Herbert S. Stark, Johannesburg, Transvaal. The process of extracting metallic gold from acid pyritic auriferous ores, consisting in treating the crushed ore with a solution of sulfocyanid of an alkali metal, in the presence of an oxidizing agent, including atmospheric oxygen, whereby the gold is dissolved out by the nascent cyanogen and hydrocyanic acid, produced in the presence of the acid in such ore by the mutual reaction of the sulfocyanid and oxidizing agent; and afterwards separating the gold from the solution thus formed.

769,489—Placer-Mining Machine. Nathaniel W. Pulsifer, Philadelphia, Pa. A hopper supported in an elevated position by suitable framework, an inclined grizzly leading therefrom, in position to receive material discharging from the hopper, a chute into which the grizzly discharges, a series of conical-shaped screens suitably mounted to receive materials from the chute, an extended assorting-table suitably positioned with relation to the screens, lateral chutes steeply inclined, having their upper ends adapted to receive material from the screens, and having their lower ends oppositely curved and downwardly curved, with the discharge ends extending in a direction parallel with the assorting table, and adapted to spread the material thereover by impetus.

769,431—Ore Concentrator. Ira A. Cammett and Frank E. Shepard, Denver, Colo., assignor to Arthur R. Wilfley, Denver, Colo. The combination in a concentrator-table, the riffles, and the separating-pieces forming the table-surface and between which the riffles are placed, the said riffles lying between and projecting above the separating-pieces for a portion only of their length, and merging into and continuously between the said separating-pieces toward the tail end.

769,461—Mining Machinery. Erastus S. Bennet, New York, N.Y. The combination with a car-body, a vertically-movable rack-bar arranged to one side of the same, and working in a support connected with the car-body, a gear-wheel meshing with the rack-bar, a worm-wheel on the shaft of the gear-wheel and a vertically-extending shaft and worm thereon meshing with the worm-wheel and means for operating the vertically-extending shaft.

769,231—Ore Concentrator. George E. Perkins, Providence, R.I. A device comprising a concentrating-table, a distributing-trough arranged near one side thereof, and having perforations in its outer side, said trough being elevated whereby middlings may be passed thereunder, a second trough elevated above the plane of said discharge-trough and terminating at a point beyond the outer side of the latter and nearer the concentrate discharge than the initial pulp-feed, means for collecting the middlings from said table and delivering them to said elevated trough, and means for supplying water to said distributing-trough.

770,165—Conveyer. Henry H. Blighouse, Canton, Ohio, assignor to the Sultman Company, Canton, Ohio, a corporation of Ohio. The combination of a delivering-conveyer, a receiving-conveyer running at an angle thereto and a slide guide along the delivering-conveyer extending above its surface, which guide is terminated or partly removed at a point remote from the receiving-conveyer to permit the articles conveyed to extend at an angle to both said conveyers, whereby the forward end of such article is conveyed in one direction by the receiving-conveyer while the rear end of such article is conveyed in another direction by the delivering-conveyer.

769,749—Cement-Kiln. Frank M. Haldeman, Alpena, Mich. A cement-kiln consisting of a kiln portion proper and a hood portion, the kiln portion comprising a casing and a lining of refractory material extending to the lower end of the casing, the hood comprising a casing having a refractory lining, the casing of the hood extending beyond its lining and adapted to telescope on the end of the kiln, and a gasket of non-heat-conducting and non-fusible material interposed between the end of the kiln and the lining and the lining of the hood.

770,111—Apparatus for Charging Blast-Furnaces. Walter R. Reece, Pittsburg, Pa., assignor, by mesne assignments, to Clarence W. Coffman, Pittsburg, Pa. A blast-furnace-charging apparatus comprising a casing having curved walls and two axially-mounted valves movable toward each other, each valve fitting against the said curved walls and having a plurality of pockets, opposite coinciding pockets, a bell beneath said valves, and an actuating-rod therefor, said valves being designed to discharge against the apex of said bell.

NEW COMPANIES.

BRITISH COLUMBIA.

The Northern Gold Mines Co., Limited. Incorporated 17th August, 1904. Capital, \$1,500,000.

The Standard Oil Company of British Columbia, Limited. Incorporated 17th August, 1904. Capital, \$1,000,000.

The Challenger Mining and Development Company, Appleton, Wisconsin. Licensed in British Columbia, August 28th, 1904. Capital, \$24,000.

MANITOBA.

The Williams Quarry Company. Incorporated August, 1904. Capital, \$100,000. Provisional directors—A. Davidson, J. Williams and J. Dolmer, Winnipeg, Man.

QUEBEC.

The St. Lawrence Coal Company. Incorporated August, 1904. Capital, \$500,000. Provisional directors—James Robinson, G. A. Forbes and Chas. Brandeis, Montreal.

ONTARIO.

The Northern Iron and Steel Company, Limited. Incorporated 14th September, 1904. Capital, \$2,500,000. Head office, Toronto. Provisional directors—John Allister Currie, Duncan Donald, Fred Asa Hall, William John Lindsay, Toronto, and John Thomas Duguid, Collingwood Ont.

British Columbia Process Co., Ltd. Incorporated 28th July. Authorized capital, \$500,000, in shares of \$1.00 each. Head office, Toronto. Provisional directors—A. B. Cook, G. E. Kingsley, C. B. Taylor, R. M. Melville, C. P. Green.

Grand Valley Peat Products, Ltd. Incorporated 26th July. Authorized capital, \$200,000, in shares of \$50.00 each. Head office, Toronto. Provisional directors—J. C. Steele, W. D. Earngey, W. H. Jackson.

The Trout Creek Development and Mining Co., Ltd. Incorporated 17th August, 1904. Authorized capital, \$100,000, in shares of \$1.00 each. Head office, Trout Creek, Ont. Provisional directors, Moses Hewitt, Gilbert Trussler, Michael Corkerg, all of Trout Creek.

The Point Pelee Oil and Gas Exploration Co., Ltd. Incorporated 17th August, 1904. Authorized capital, \$40,000 in shares of \$1.00 each. Head office, Leamington. Provisional directors, Wm. C. Campbell, Andrew W. Palmer, John C. Forster, G. W. Videau, C. J. O'Hara, all of Detroit, Mich.

Mohawk National Gas Co., Ltd. Incorporated 7th Sept., 1904. Capital, \$150,000, in shares of \$25.00 each. Head office, Brantford, Ont. Provisional directors—Henry Cockshutt, E. L. Cockshutt, Wm. J. Atkins, Frank Cockshutt, Denis A. Coste.

The Eldorado Mining Company, Arizona, has been licensed in Ontario with a capital of \$50,000.



PROVINCE OF NOVA SCOTIA.

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

—AND—

PRECIOUS STONES.

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

GOLD AND SILVER.

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

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

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

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

MINES OTHER THAN GOLD AND SILVER.

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

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

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

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

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

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

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

THE HON. A. DRYSDALE,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.

PROVINCE OF QUEBEC

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

GREAT MINERAL TERRITORY

Open for investment in the Province of Quebec.

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

ORNAMENTAL AND STRUCTURAL MATERIALS IN ABUNDANT VARIETY.

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

Mining concessions are divided into three classes :—

1. In unsurveyed territory (a) the first class contains 400 acres, (b) the second, 200 acres, and (c) the third, 100 acres.

2. In surveyed townships the three classes respectively comprise one, two and four lots.

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

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

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

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

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

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

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

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

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

The fullest information will be cheerfully given on application to

THE MINISTER OF LANDS, MINES AND FISHERIES,

PARLIAMENT BUILDINGS, QUEBEC, P.Q.

Ontario's

Mining

Lands..

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

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

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

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

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

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

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

The Canadian Pacific Railway runs through the entire mineral belt.

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

HONORABLE E. J. DAVIS,

Commissioner of Crown Lands,

or

THOS. W. GIBSON,

Director Bureau of Mines,

Toronto, Ontario.



Dominion of Canada.

SYNOPSIS OF REGULATIONS

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

COAL.

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

QUARTZ.

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

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

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

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

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

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

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

PLACER MINING

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

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

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

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

DREDGING IN THE YUKON TERRITORY.

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

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

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

PLACER MINING IN THE YUKON TERRITORY.

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

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

The person or company staking a claim must hold a free miner's certificate. The discoverer of a new mine is entitled to a claim of 1,000 feet in length, and if the party consists of two, 1,500 feet altogether, on the output of which no royalty shall be charged, the rest of the party ordinary claims only.

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

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

Work must be done on a claim each year to the value of at least \$200. A certificate that work has been done must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a free miner.

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

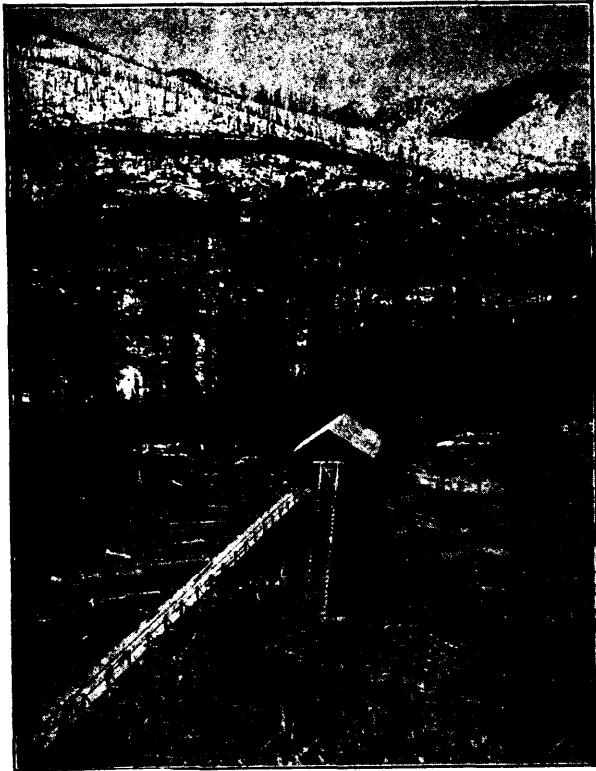
PETROLEUM

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

Department of the Interior

OTTAWA, February, 1904

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



ONE MAN can handle **1600 TONS**
per day with a

Riblet Patent

Automatic Aerial Tramway

You can figure the cost per ton.

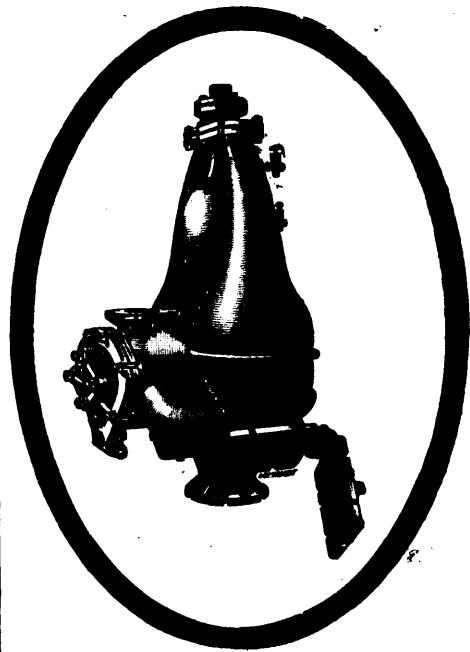
**More Riblet Tramways are now being installed
than of all the other systems combined.**

Write for Description and Prices.

RIBLET TRAMWAY CO.

Spokane, Wash., U.S.A.

Nelson, B.C., Canada



A Thing to Remember!

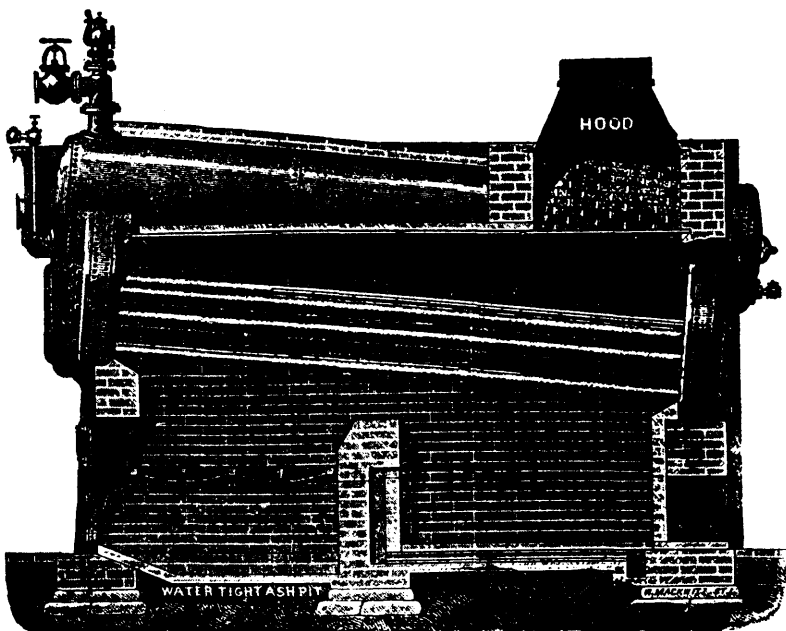
The water can often be got out
and the job finished by means of

Trade **The Pulsometer** Mark
Steam Pump

whilst you would be collecting the
necessary tackle for ordinary pumps.

The Pulsometer Engineering Co. Ltd., Reading, England.

CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** CANADA LIFE BUILDING Montreal



HEINE SAFETY BOILER

MANUFACTURED BY

The Canadian Heine Safety Boiler Co.
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THE HEINE SAFETY BOILER—Made in units
of 100 to 500 h.p., and can be set in batteries of any
number. Suitable for Mines, Pulp Mills, Water and Electric
Installations, and large plants generally. The best and most
economical boiler made.

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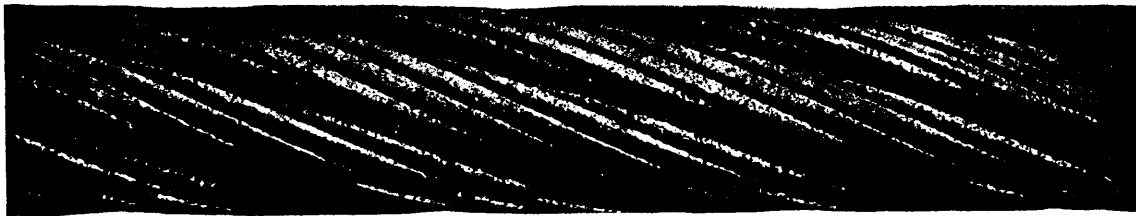
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WIRE ROPES for Collieries, Mines, Aerial Tramways

Transmission of Power, Logging and general Hauling and Hoisting Purposes.
Wire specially selected for own exclusive use.
We have made many records with our Winding, Haulage and Crane Ropes.

Illustration of Winding
Rope, 240 fms long x
3 1/4 circ. Galvanized
Special Improved
Patent Steel, Com-
pound Make, supplied



to Kennell Collieries
Bonness Scot., which
gave a record life of 6
years and months.
Showing condition
when taken off.

TELEGRAMS—"Ropery Rutherglen." A B C, A I and Lieber's Codes used.

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Wm. Stairs, Son & Morrow, Ltd., Halifax, N.S.
W. H. Thorne & Co., Ltd., Saint John, N.B.

Drummond, McCall & Co., Montreal
John Burns, Vancouver, B.C.

DRUMMOND, MCGALL & CO.

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Steel Plates—Tank, Boiler and Firebox Quality.
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MONTREAL PIPE FOUNDRY CO. Limited.

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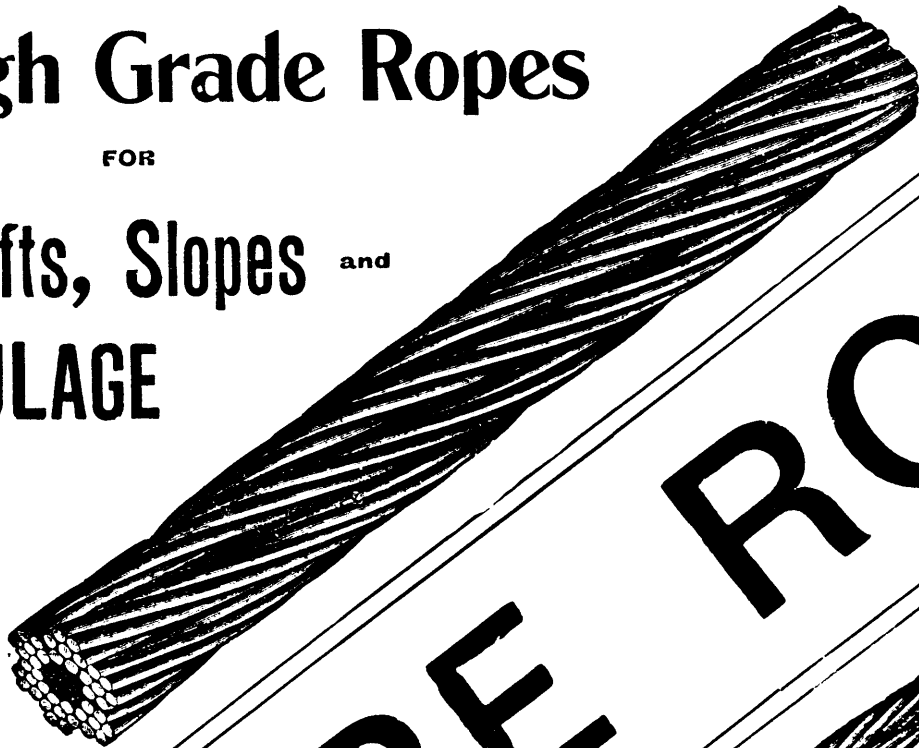
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CANADA LIFE BUILDING, MONTREAL

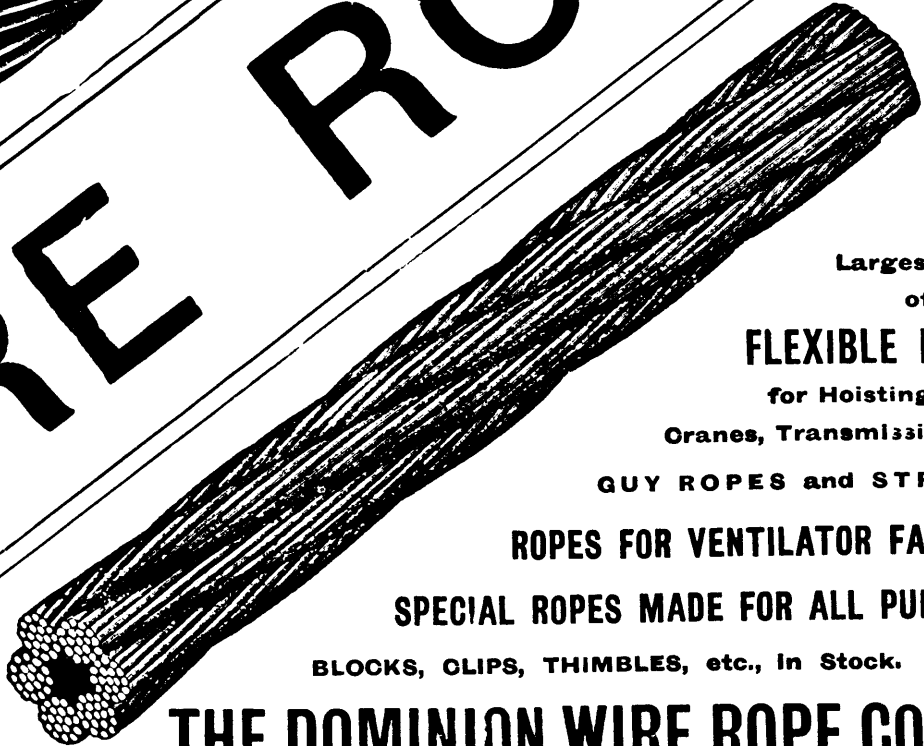
G. E. Drummond, Managing Director and Treasurer.

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for Hoisting,
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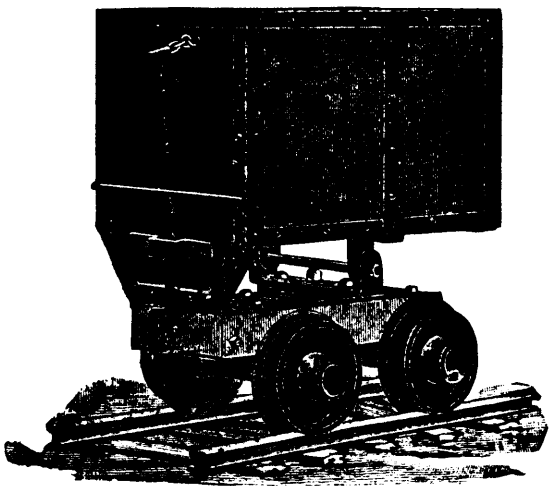
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SPECIAL ROPES MADE FOR ALL PURPOSES

BLOCKS, CLIPS, THIMBLES, etc., in Stock.

THE DOMINION WIRE ROPE CO. Ltd.
MONTREAL

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ORE CARS
ALL SIZES AND KINDS

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NEW AND SECOND HAND

STEAM SHOVELS **LOCOMOTIVES** **CARS**

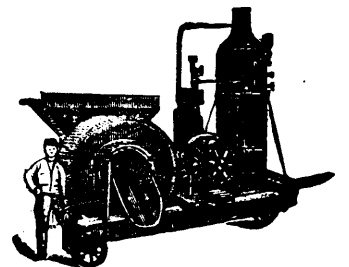
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FULL STOCK OF SUPPLIES

JACKS **CAR MOVERS** **PICKS** **SHOVELS** **HAMMERS**

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In Styles to Suit Everybody.



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