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Established 1882

Vol. XXIII—No. 11.

MONTREAL, NOVEMBER 30th, 1904.

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25 cts. per copy.

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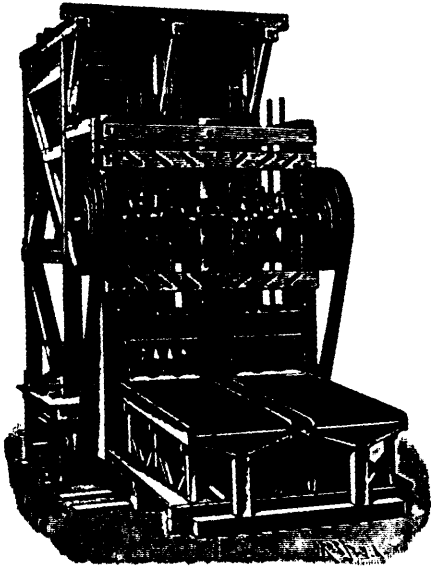
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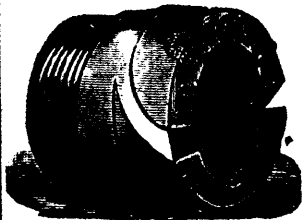
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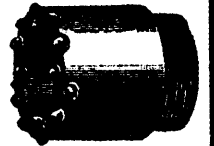
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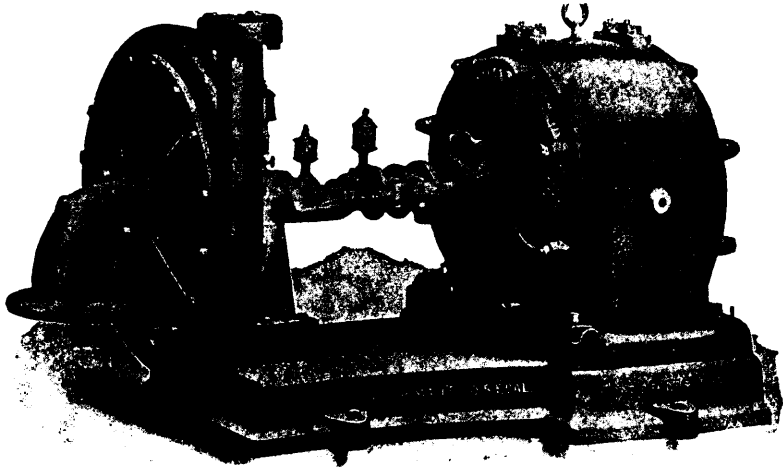
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### EXTRACTED FROM CATALOGUE.

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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 45 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 Haematite 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 Haematite 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."

Messrs. DE WENDEL & Co., Hayange, Lorraine, after seven years' experience of air cylinders (four) 54 in. diameter by 6 ft. 6 in. stroke write:—"The working of the air cylinders you supplied leaves nothing to be desired."

S. PEARSON AND SON, Contractors,  
Blackwall Tunnel Works, East Greenwich, S.E.,  
May 10th, 1897.

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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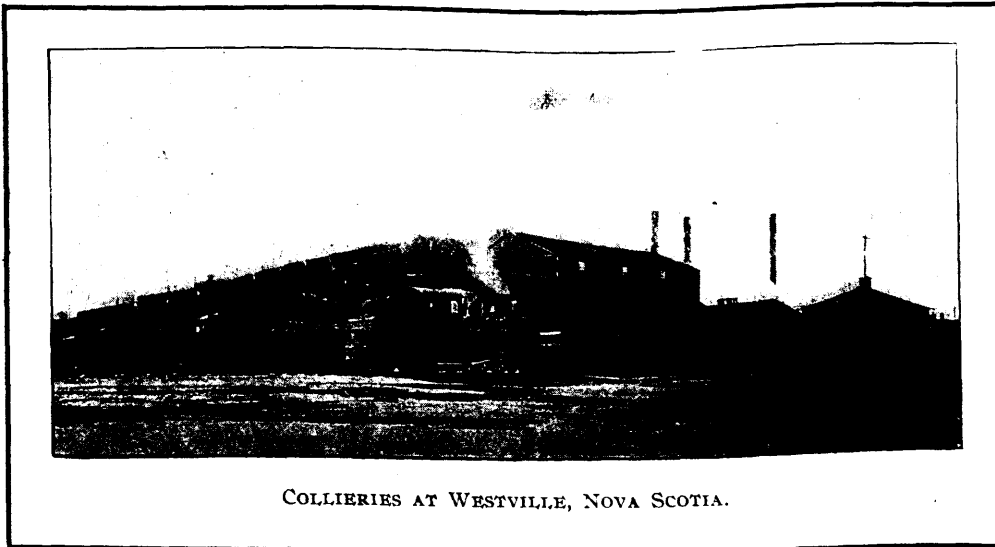
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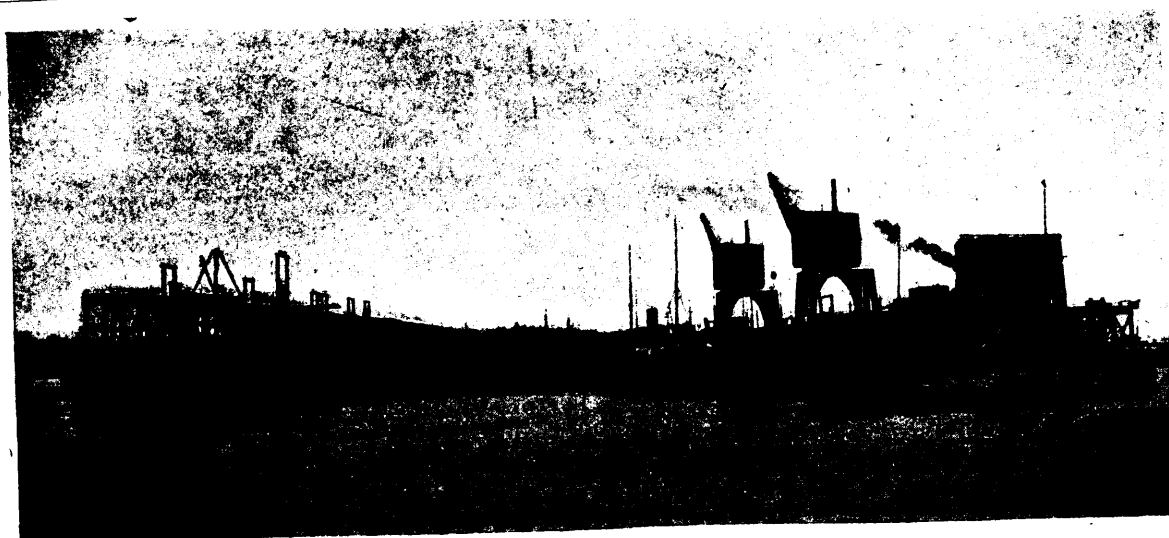
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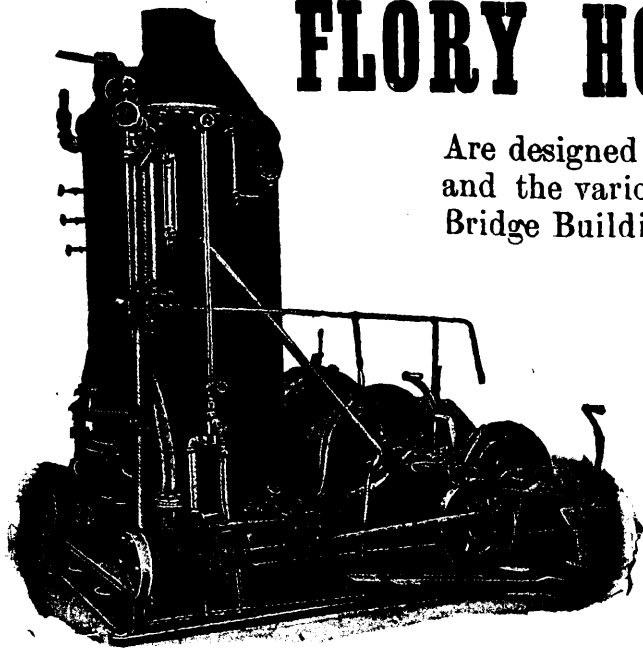
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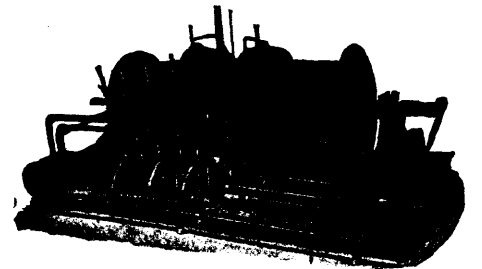
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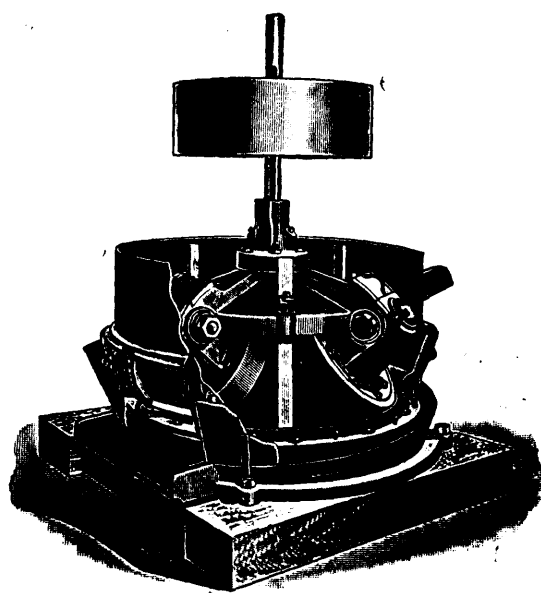
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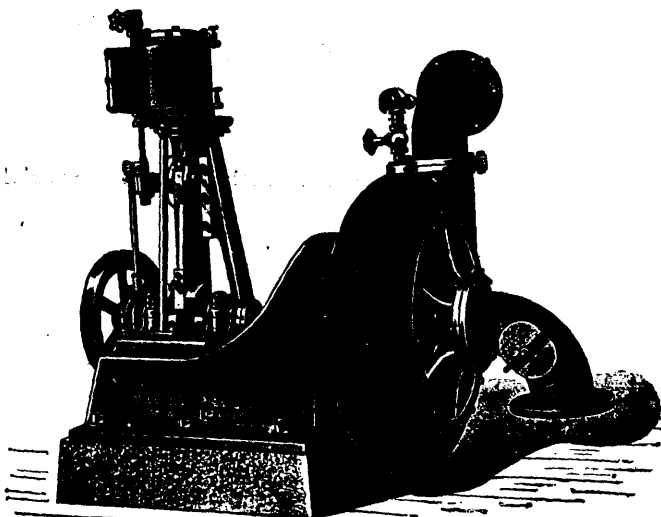


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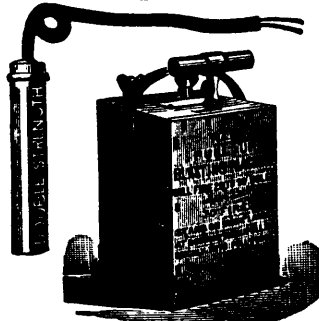
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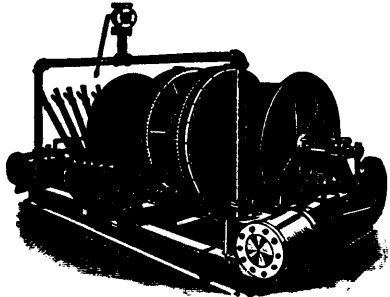
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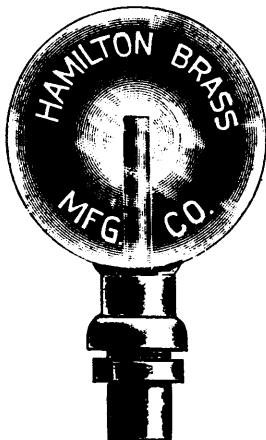
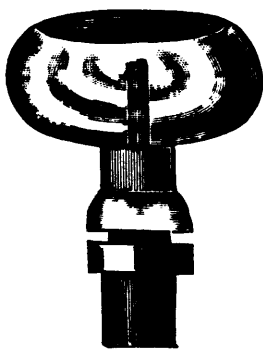
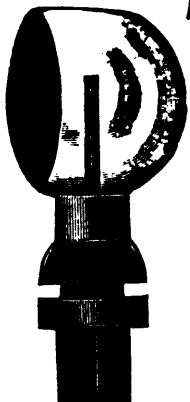
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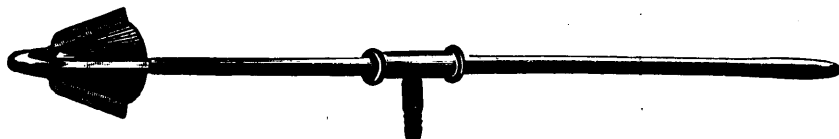
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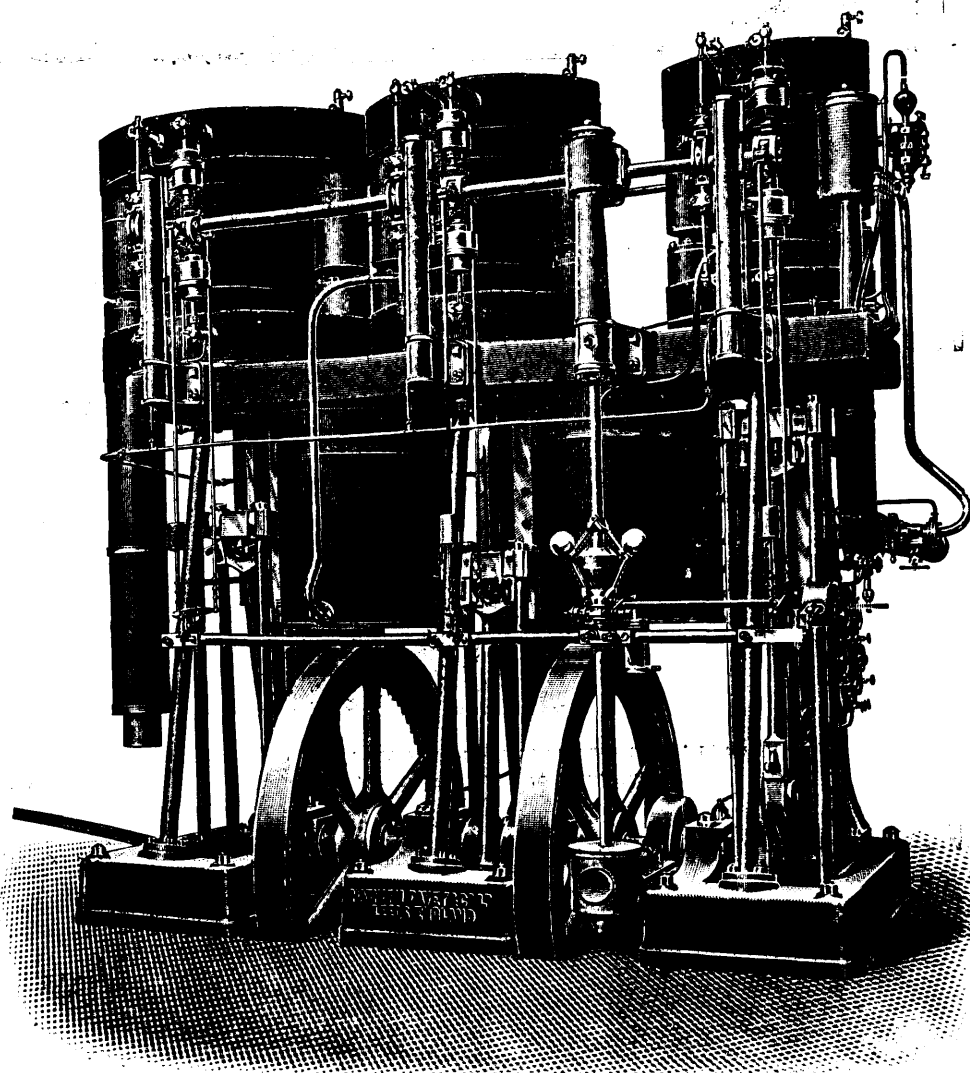
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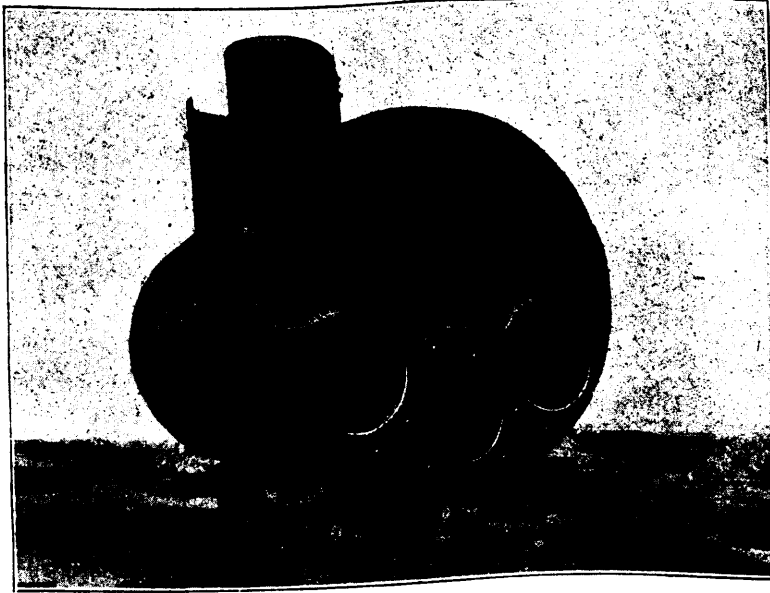
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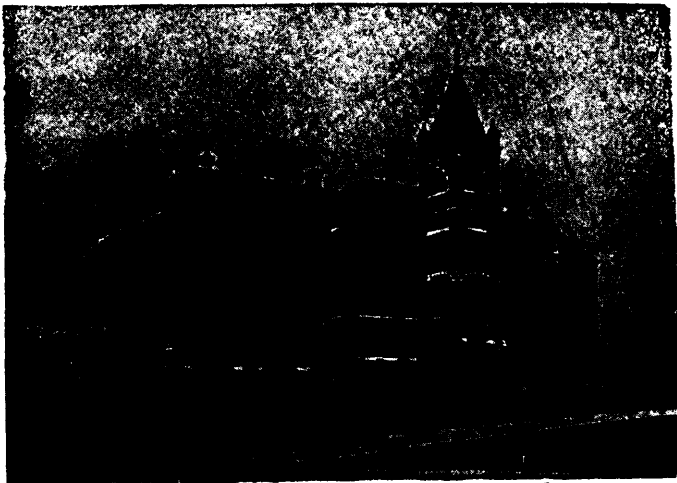
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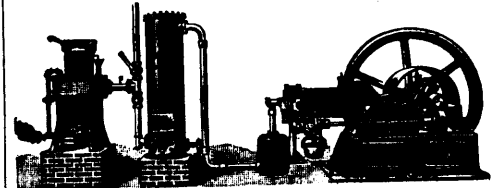
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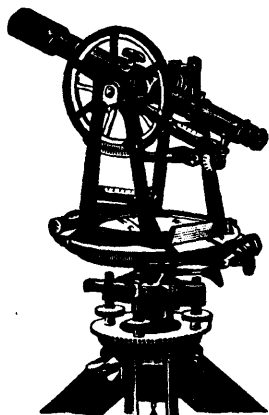
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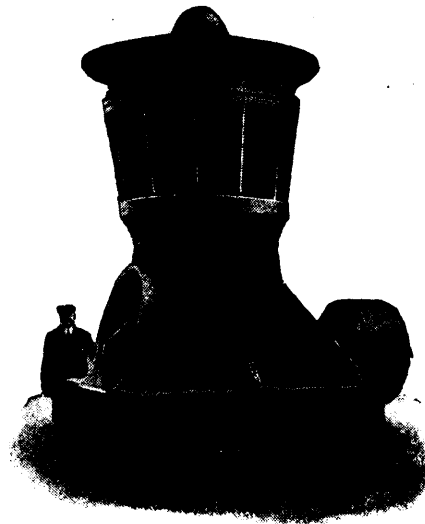
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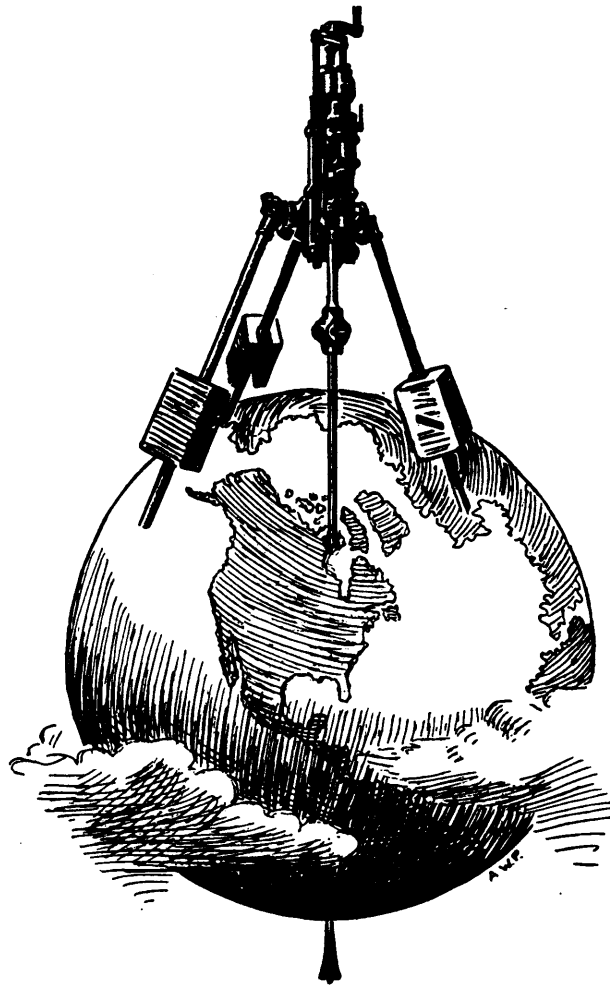
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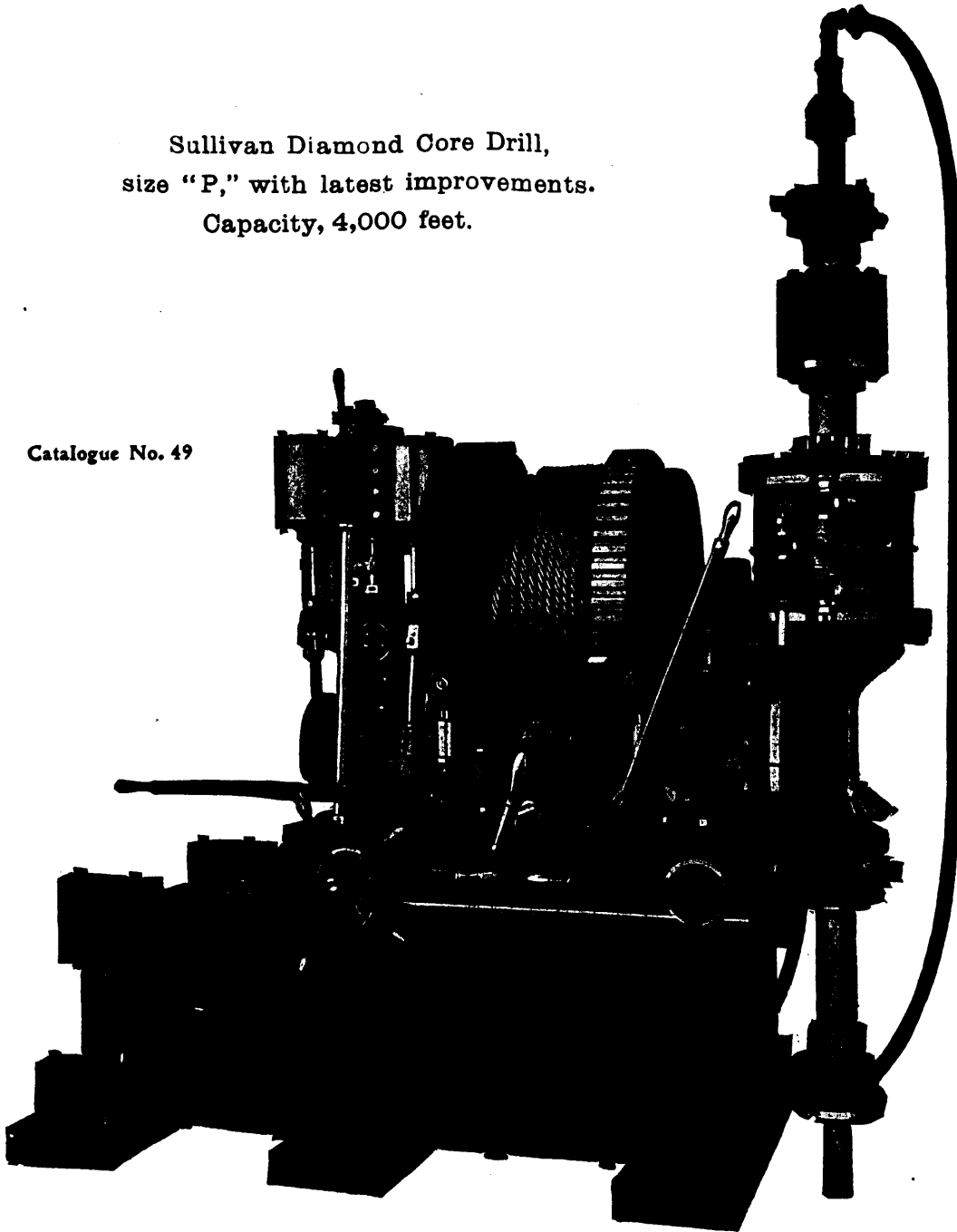
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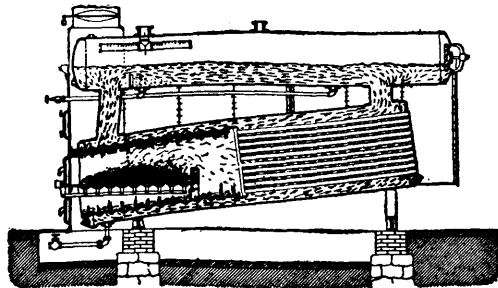
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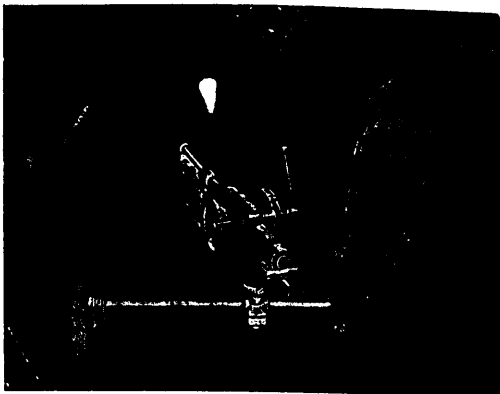
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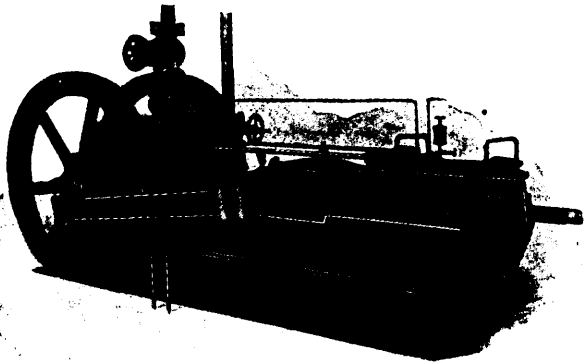
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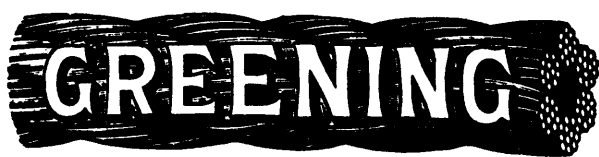
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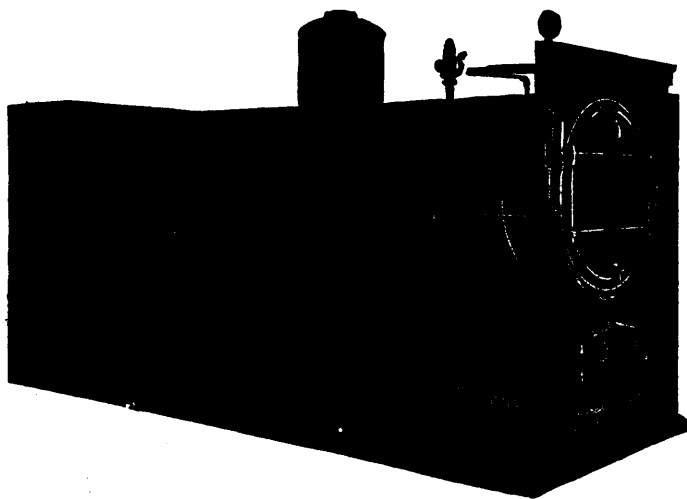
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## CONTENTS.

	PAGE
EDITORIAL NOTES.....	211
EDITORIAL :	
The Bankhead Collieries, Alberta (Illustrated).....	212
Report of the Commission on Electric Smelting.....	219
The Mining Society of Nova Scotia.....	220
The Princess Royal Mines.....	221
CORRESPONDENCE :	
A New Mineral District in Quebec, J. Obalski.....	222
PAPERS :	
The Mines of Ontario. By W. E. H. Carter (Continued)..	222
COMPANY REPORTS :	
The Hall Mining and Smelting Co.....	227
A New Type of Pulverizer.....	228
Book Notices.....	229
Mining Share Market.....	229
Electrical Notes.....	229
Personals.....	230
Industrial Notes.....	230
Mining Notes.....	231
Coal Notes.....	236
New Companies.....	236
Digest of Recent Patents: Mining and Metallurgical.....	236

The month of November has brought to notice nothing of importance concerning the proposed amalgamation of the Le Roi, War Eagle, Centre Star and Snowshoe properties, unless it be the addition of Mr. Carl R. Davis to the list of men now examining the Snowshoe mine. Mr. A. J. McMillan has made no statement and the presence of Mr. Geo. S. Waterlow on this side of the water has occasioned no public pronouncement.

In well-informed circles there is a strong belief that Mr. McMillan is not likely to remain long in the position of managing director, or general manager, of the Le Roi, and should the amalgamation become *un fait accompli*, it is not unlikely that several resignations will be asked for if they are not tendered. That a strong amalgamation of Rossland properties would be a successful undertaking is believed by all who clearly apprehend conditions in that camp, and such an amalgamation could not afford to continue the works at Northport. Either the acquisition of the Trail works or a new smelter on this side of the line would be a *sine qua non*. At any rate, matters will not drift for long as they are now doing, either the principal mines will be merged, or present options will be voided before the snow leaves.

The Senior Official Receiver in the Liquidation Court of England mentions our old acquaintance, the Sapphire Corundum Company, as "an interesting example of the inflation of capital," and gives the following figures: The company was registered with a capital of £1,000,000 stg. It bought from the promoters, Mr. E. J. Hooley and J. Carling Kelly, the property of the Crown Corundum Company for the sum of £900,000. The two gentlemen named bought what property this latter concern had for the price of £15,000 in cash, and £30,000 in shares. Thus does the modest sum of \$75,000 become magnified to the figure of \$5,000,000.

Sometime since, the mining journals of the country, and of the world, in fact, hailed the increased yield of gold due to the introduction of tube mills into the practice in South Africa as new discoveries which would revolutionize general practice and greatly increase the gold production of the world, which Mr. J. H. Curle believes to be at about its maximum, if not on the decline.

The practice of re-grinding which is the essential element of the tube mills, is not new in gold metallurgy; in its essence it has had numerous devices and machines at work for many years, from the horizontal pan with its dragging mullers, or the arrastra, to the modern long horizontally revolving cylinders filled with chilled balls or flints. It is only the device for finer grinding and not the principle that is new.

The attention of our readers is called to the letter of Mr. J. Obalski on another page. This announcement of the Provincial Inspector of Mines is authoritative and should attract prospectors and capitalists to the possibilities of that vast and little known region, Northern Quebec. The information should also be of great interest and importance to the Dominion Government and its new Railway Commission; for the location of the line of the new transcontinental railway must be made with a view to obtaining all possible traffic that may in the future exist in this northern country.

If large and workable deposits of copper ore and magnetite are shown to exist, the basis of permanent traffic is assured; if, in addition, gold, asbestos and merchantable timber are available, the line eastward, from Winnipeg to Moncton, will not be the "dead horse" which some of our Conservative friends have predicted.

Apropos of the interest taken in Canada in the appearance of the Government Commission's report on the subject of the electric smelting of iron ores, it is, perhaps, pertinent to remind our readers of the fact that Canada is already pretty well supplied with iron works. On the 30th of June, 1904, there remained unsold pig iron with Canadian manufacturers to the extent of 36,868 tons as compared with 13,585 tons on hand June 30th, 1903. Of this 36,868 tons over 32,000 were coke pig iron. On the date mentioned Canada had 15 completed stacks, of which 6 were in blast and 9 were idle; of the total of 15, only 4 were built to make charcoal iron.

The Dominion Iron and Steel Co. have four stacks at Sydney. The Londonderry Iron and Mining Co. have two at Londonderry, N.S. The Nova Scotia Steel and Coal Co. have two, one at Ferrona, N.S., and the other at Sydney Mines, C.B. The Canada Iron Furnace Co. have one at Radnor Forges, Que., and another at Midland, Ont. The Hamilton Steel and Iron Co., Hamilton, Ont., have one. The Deseronto Iron Co., at Deseronto, Ont., have one, and John McDougall & Co., of Montreal, have two stacks at Drummondville, Que. In addition we have the two stacks of the Lake Superior Corporation at Sault Ste. Marie.

What the possible output of Canada would be, were all the stacks in blast we do not know, but it would be far in excess of the demands of the country at the present time. Therefore, it does not seem to us that there is any crying need for the inception of new iron making enterprises in this country at present.

#### The Bankhead Collieries, Alberta.

Due credit is not always given to large public corporations for the possibilities which they convert into realities, and for the consequent inception of a host of minor enterprises which, but for the work of the large corporation, would have no existence. Of such a character has been much of the work of the mineral department of the Canadian Pacific Railway, especially typified in the recent rapid opening of the coal fields in the vicinity of Banff.

Residents of the west have commonly regarded the Railway as a soul-less corporation, whose only aim was to extract all possible from the miner, rancher, and farmer without causing his death or departure, and have forgotten, or have not recognized, that high tariff rates were a necessity until the volume of business guaranteed an income at least equal to the outgo. To get this volume of business is the first object of any railway through a sparsely populated region, and to induce settlement and increase population, the C. P. R. have expended millions throughout Western Canada.

The purchase and operation of the Trail smelter, with the consequent installation of a lead refinery and corroding works, was among the large earlier expenditures of this corporation; for this purpose more recently (this year, in fact) was incurred the expenditure of nearly a million dollars, and the employment of 500 men, to open up the extensive deposits of

coal which outcrop along the southeastern base of Cascade Mountain. We print below a brief description of the geological features of the section from the pen of Mr. J. M. Turnbull, B.A. Sc., and preface his notes with some data to which he has not referred.

In the autumn of 1902, some prospecting work was done on the croppings of coal seams which showed on the south and southeast sides of Cascade Mountain, some three miles northeast of the station at Banff. This work showed the existence of a score of beds of coal, varying from 4 to 16 feet in thickness, and diverse in quality. The next year, 1903, a small organized force, under technical direction, was sent into camp on the plateau which now forms the townsite of Bankhead, and the season was spent in further examination, and in opening two or three of the best seams, all of which dip westerly at an angle of about forty-five degrees into the mass of Cascade Mountain.

It was found that the lower coal beds were similar to the one at Anthracite, Alberta, the coal being semi-anthracite in nature, and having the approximate composition of eighty-four per cent. to eighty-six per cent. of fixed carbon, eight per cent. to ten per cent. of volatile matter and about six per cent. of ash; these lower beds lie between hard sandstones of Cretaceous age, they average eight feet in thickness, and ignite more freely than Pennsylvania anthracite. They resemble the coal from Anthracite, in being more friable than the American hard coal.

The upper beds were semi-bituminous, having an average composition of seventy-five per cent. to eighty per cent. of fixed carbon, fourteen per cent. of volatile matter and ten per cent. to eleven per cent. of ash. These lie usually between shale roofs and sandstone floors, and vary in width; they have not been developed to the same extent as the lower beds, and no shipments from them have yet been made. The sales of anthracite coal now run from 200 to 250 tons per day.

During 1903 the two lower seams, numbered respectively No. 1 and No. 2, were opened by gangways for a distance of about 2,000 feet. A small tippie and sorting shed, or breaker, was erected, from which coal could be transferred by wagons to the spur from the main line.

In March of this year works of a permanent character were decided upon and begun, and, under the energetic management of Mr. W. H. Aldridge and Mr. W. S. Ayres, the mining and mechanical engineer in charge, are now well advanced, but will not be completed until late in 1905.

Owing to the dip of the beds into the mass of the mountain, and to the fact that its southerly flanks are covered with large deposits of gravel (Cascade Mountain lies at the junction of the Cascade River with the Bow River), and, also, owing to the fact that the outcrops of these coal seams lie at an elevation of several hundred feet above the bottom lands of the valley, it was deemed best to reach these coal beds through a long tunnel driven through the gravels into the mountain, in order that the coal might be delivered directly to a spur of the railway, the grade of which should not exceed one per cent.

This main entry tunnel, 22 feet by 9 feet, starts a little below, and to the west of, a bench or plateau which has been selected for the site of the town of Bankhead, which now has a population of about 500, and, by the spring of 1905, will have 1,500.

The lower, or entry, bench affords ample space for side tracks, storage, machine shops, and all the plant incidental to a coal mine. Both have good drainage, are supplied with fresh water for domestic and fire purposes (by gravity) from the Cascade River, and are lighted by electricity. The plant, which is partially installed, will have its power supplied by four 150 H.P. boilers. Haulage from the rooms and on the surface will be effected by compressed air locomotives, and there is also a separate compressor for supplying air to the coal-cutting machines.

A permanent coal breaker with a capacity of 3,000 tons per diem is now being erected.

On the upper bench a model town is rapidly assuming considerable dimensions; between fifty and sixty dwelling-houses, each of different design, and painted in different colors, an office building and a "mess" house are finished, while other dwellings and two large boarding houses are now nearly completed. The townsite has an ideal location, having the mass of Cascade Mountain to the west, and the magnificent panorama of the Bow Valley to the southeast, while Mts. Rundle, Inglismaldie and other high peaks of the Rocky Mountain Park are on every side.

Much attention has been given, in the opening up and equipment of the mines, to the matter of making them as safe as possible from explosions and fires. The free circulation of air is provided for by upper levels, the main gangways are protected by 60 ft. chain pillars, and the counter by 40 ft. What is known as the "Panel" system has been adopted, i.e. rooms with 60 ft. centres are driven, the start from the gangway being 12 ft. wide, but increasing to 24 ft. and leaving pillars of 36 ft. for support; these pillars are drawn as soon as the room coal is won-out of any particular section.

No attempt has been made to estimate the available tonnage in any of the seams, but the width and extent of the outcrops assure the supply for very many years. From the point at which the level of the main entry will cut the chief seams of the measures, the average length on the rise will be about 2,000 feet, thus assuring the company of coal for many years before sinking need be considered. The market for the anthracite coal is very large, and will grow steadily and rapidly with the settlement of the grain lands to the eastward. The major share of the domestic trade as far east as Winnipeg is assured, now that the mines at Anthracite have been exhausted. There is also a large market to the westward, throughout the towns in B. C. and along the Pacific Coast. At present the coal at Bankhead is the only anthracite field of any moment in the Dominion. The chief competitors will be the lignite coal from the Galt collieries at Lethbridge, which is an excellent domestic coal but which lacks the heat units and the lasting qualities of the Banff product; and Pennsylvania anthracite, which is brought into Fort William during the

summer months in large quantities, and distributed in the late fall.

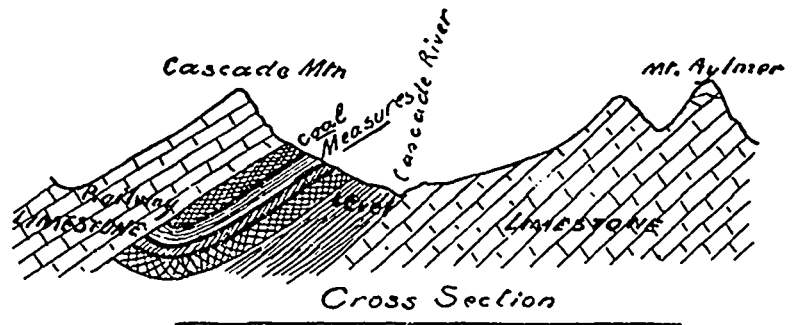
The REVIEW is indebted to the courtesy of Mr. W. H. Aldridge for the photographs from which our illustrations have been made.

**Geological Sketch of the Bankhead Coal Field.**

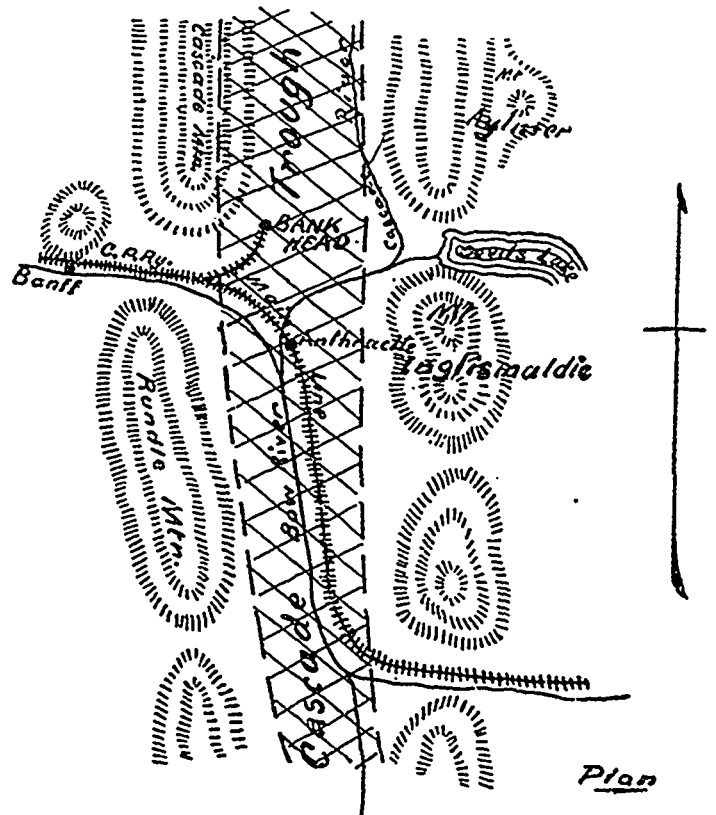
Contributed by J. M. TURNBULL, B.A.Sc.

The coal measures of the Canadian Rocky Mountains are, geologically, chiefly of cretaceous age, and, therefore, of much later origin than the coals of the carboniferous age in Pennsylvania and England.

Rocks of carboniferous age occur in these mountains, and occupy large areas; but they are chiefly composed of limestone and are not yet known to contain coal. The Rocky Mountain range in Canada is composed, in a general way, of a large number of ridges or subsidiary ranges, more or less parallel to one another, and having a general north-westerly direction. Besides the north and south trending valleys thus formed, there are a number of transverse valleys cut out by rivers which, rising in the centre of the range, flow to the eastward or westward. These break the continuity of the subsidiary ranges and form natural passes for roads and railways to cross the main range.



N. 10th. 1904. J. 7.



Within certain areas the coal measures occur as elongated basins or troughs, or modifications thereof, occupying the valleys between the above mentioned ridges, and the coal seams outcrop along the lower slopes of the ridges and parallel to them. The edges of the troughs have usually but not always a steep dip, so that it is often possible to tunnel on the seams from the lowest part of the outcrop, that is from the transverse valleys.

One of the most interesting of these occurrences is known as the Cascade trough, which has a length of fifty or more miles, and varies from one to three miles in width. This trough is flanked on the west by a high ridge formed of limestone of carboniferous age, the top of which averages nearly 10,000 feet above sea level, while the valley of the trough has an average elevation of some 4,500 feet.

Opposite Banff the Bow River comes from the west, and, flowing in a large transverse valley, cuts a gap through the ridge; then, turning towards the south, flows along the Cascade trough for ten miles when it breaks through a second gap to the east. The Cascade River, flowing southerly along the northern part of the trough, joins the Bow about the first gap. The main line of the C. P. Ry. follows along the Bow River. South of the first mentioned gap the westerly ridge is known as Rundle Mountain, and north of it as Cascade Mountain.

Where flanked by Rundle Mountain, the coal measures have been worn away to the valley level, leaving no coal above the level which can be mined by tunnelling; so that the mines at Canmore and Anthracite in this section, have been opened by sinking shafts.

Where flanked by Cascade Mountain the case is different; here the outcrops of coal rise from the valley of the Bow and run along the slope of the mountain at an average elevation of about 1,500 feet above the valley and for a distance of several miles. Some seventeen small creeks, running easterly down the slopes, have afforded a number of cross sections of the coal seams, and give an opportunity for the geologist to observe variations due to folding or other causes.

The town site of Bankhead is situated at the south end of the mountain and is connected with the main line of the railway by a spur of easy grade, about two miles long.

The different cross sections vary considerably, due to local folding, etc., as many as twenty-five seams having been found in a single section, though not all of workable size. It is practically certain, however, that six or more of the seams will prove to be workable. The general dip of the strata is about forty-five degrees to the west, or into Cascade Mountain.

The geological section would be about as follows:—

Carboniferous limestone.....	Cascade Mountain.
Dark ribbony slates.....	300 feet
Main Sandstone.....	300 " to 500 feet.
Coal measures..	{ shales..... } { coal and sandstones, } { varying in thickness }
Lower Sandstone .....	— —
Non coal-bearing measures.....	{ sandstones, slate, etc. } — —

The two lower seams now being exploited occur about two hundred feet above the lower sandstone and are semi-anthracite in character, burning with a blue flame, and constituting an excellent domestic fuel; they average about eight feet in thickness.

Near the top of the coal measures and running parallel to the semi-anthracite seams occurs a seam of coal, classed as semi-bituminous, which burns with a yellow flame and cokes to some extent in an open fire. This is an excellent steam coal of high efficiency, running from seventy-five per cent. to eighty per cent. fixed carbon, and fourteen volatile matter, with probably ten per cent. ash. It has not been opened up sufficiently as yet to permit of shipments being made.

This co-existence of bituminous above anthracite coal, in the same measures and so close together, is as unusual as it is interesting, and may, perhaps, be partly explained by the fact that the anthracite coals occur between heavy reefs of sandstones while the bituminous coals occur in the softer shales.

To attack the coal commercially, it has been found necessary to tunnel, for a distance of 1,500 feet, through the large deposits of river gravel, which occur along the southern end of the mountain. This tunnel gives an entry to the coal at a point which is accessible by a railway spur of easy grade, and where excellent facilities for yards and side tracks can be obtained. This large entry will allow of any seam in the measures being reached by crosscuts, while all the necessary machinery can be located near its mouth. One large plant will thus take the place of two or more smaller ones, with a resultant gain in economy.

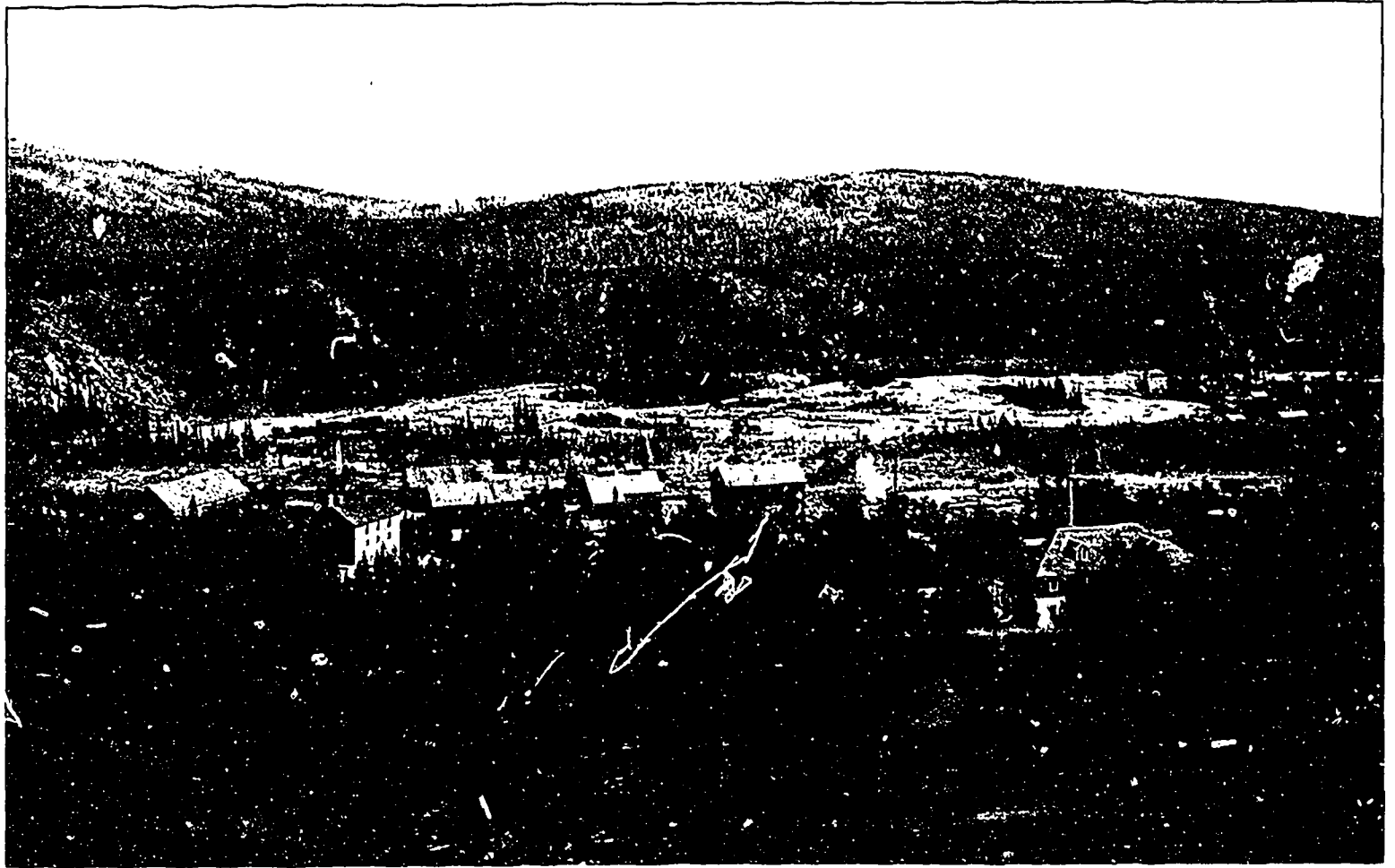
The two anthracite seams, known respectively as No. 1 and No. 2, have also had tunnels driven on them above the gravel deposit for a distance of 2,000 feet.

In working these seams they will be laid out in panels of about 1,000 feet long, each panel reaching from the main entry to the surface. Each panel will be worked separately and can be abandoned and allowed to cave in without affecting the remainder of the mine. Accidental explosions, etc., will thus be restricted to a limited area. The bituminous coal seams have not been sufficiently exploited to determine the best method of working.

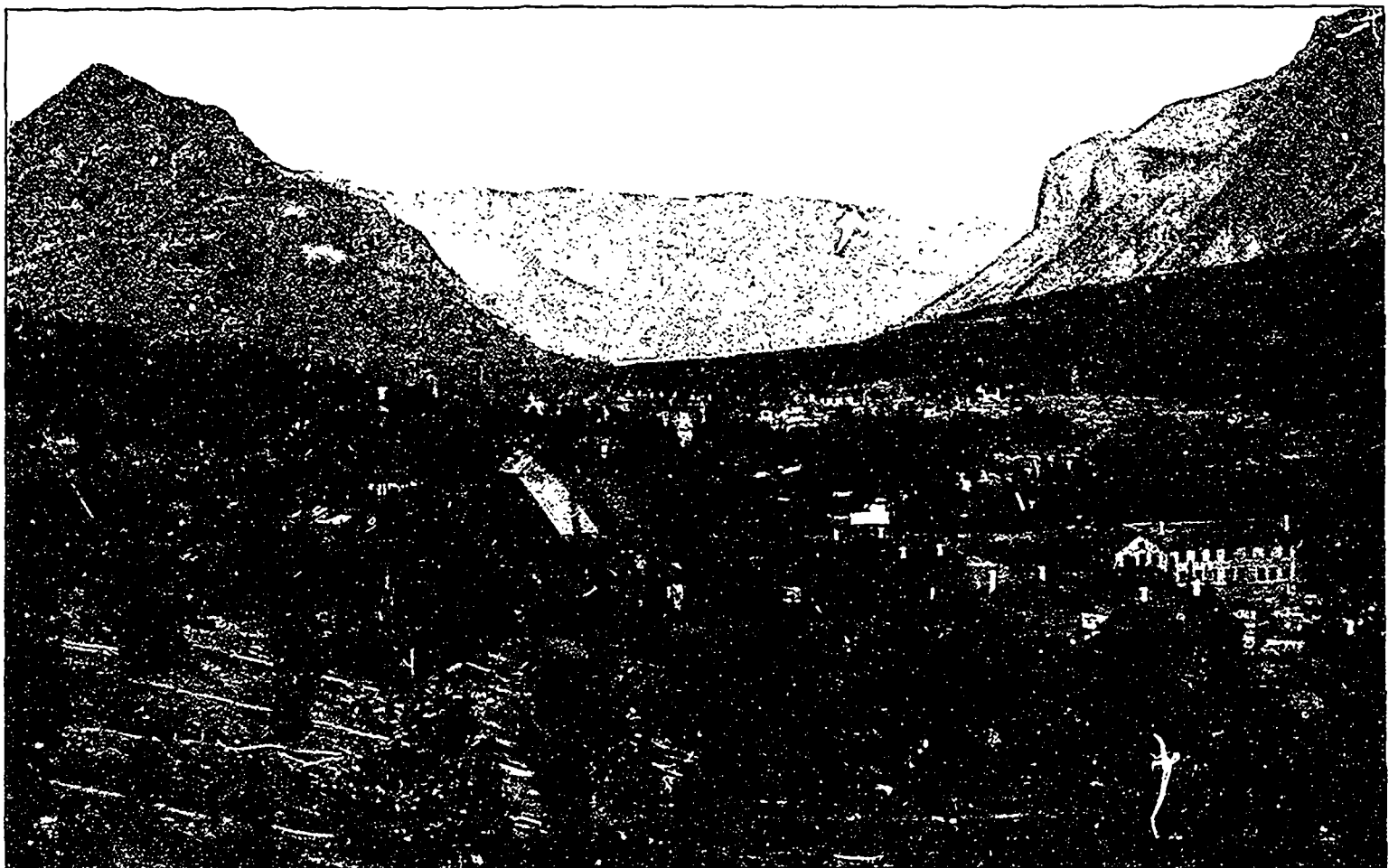
A compressed air haulage plant, with locomotives capable of handling seventy-five tons or more per trip, will ensure safe and rapid handling of the output which is expected to reach 2,000 tons per day.

The first prospecting work done in this field by the C.P.R., was begun in the autumn of 1902, and organized development work was undertaken by them one year later.

A bench above the main tunnel has been chosen as a town-site. It is small, but excellently situated and the houses now being erected on it have been laid out with such variations in design and color as to give a most artistic and pleasing effect to the whole, exhibiting at the same time nothing extravagant nor in bad taste. In appearance the town will be worthy of its beautiful surroundings.

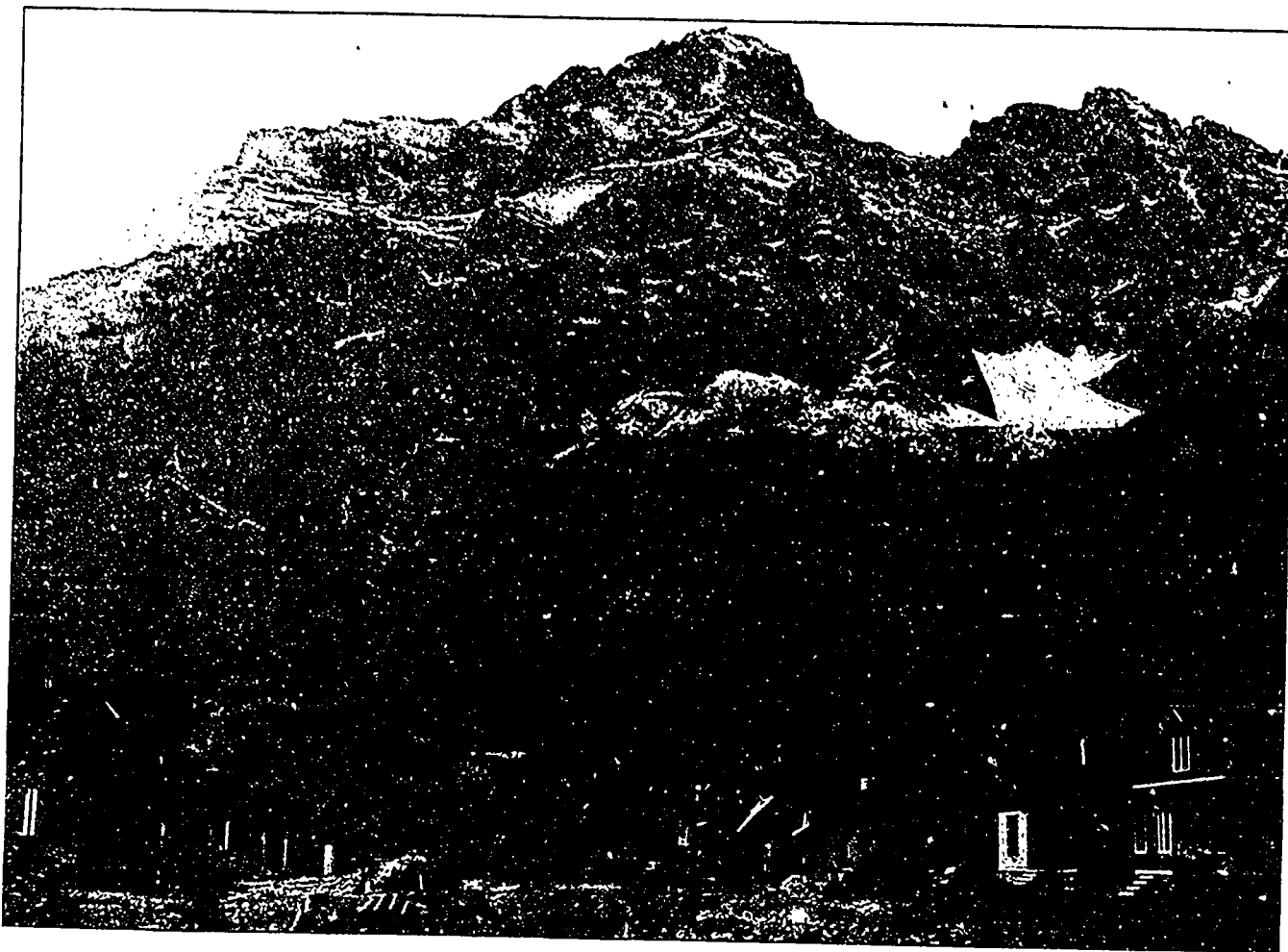


CASCADE VALLEY AND PORTION OF TOWN OF BANKHEAD, ALBERTA.

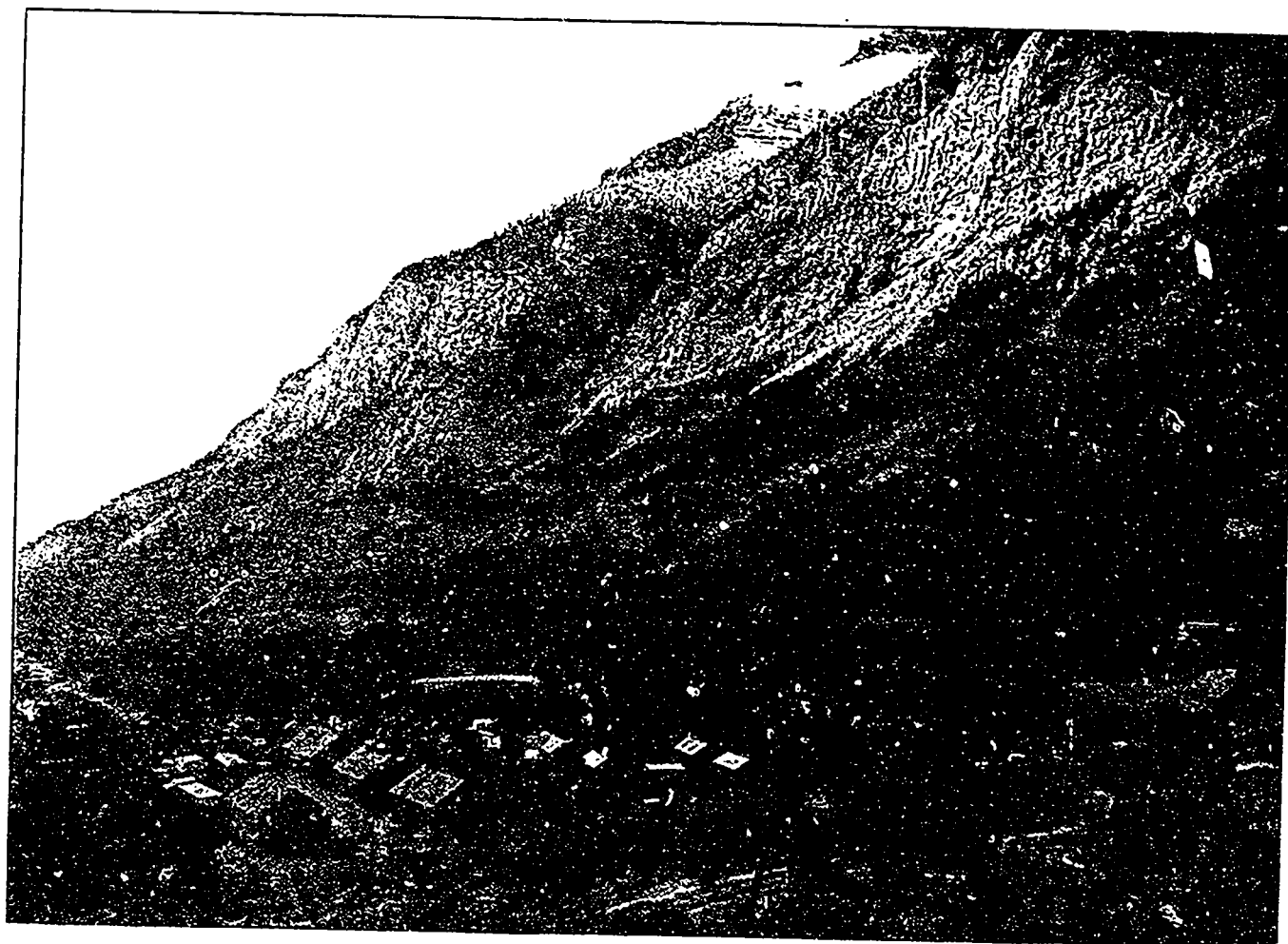


UPPER PORTION OF THE TOWN OF BANKHEAD, ALBERTA.





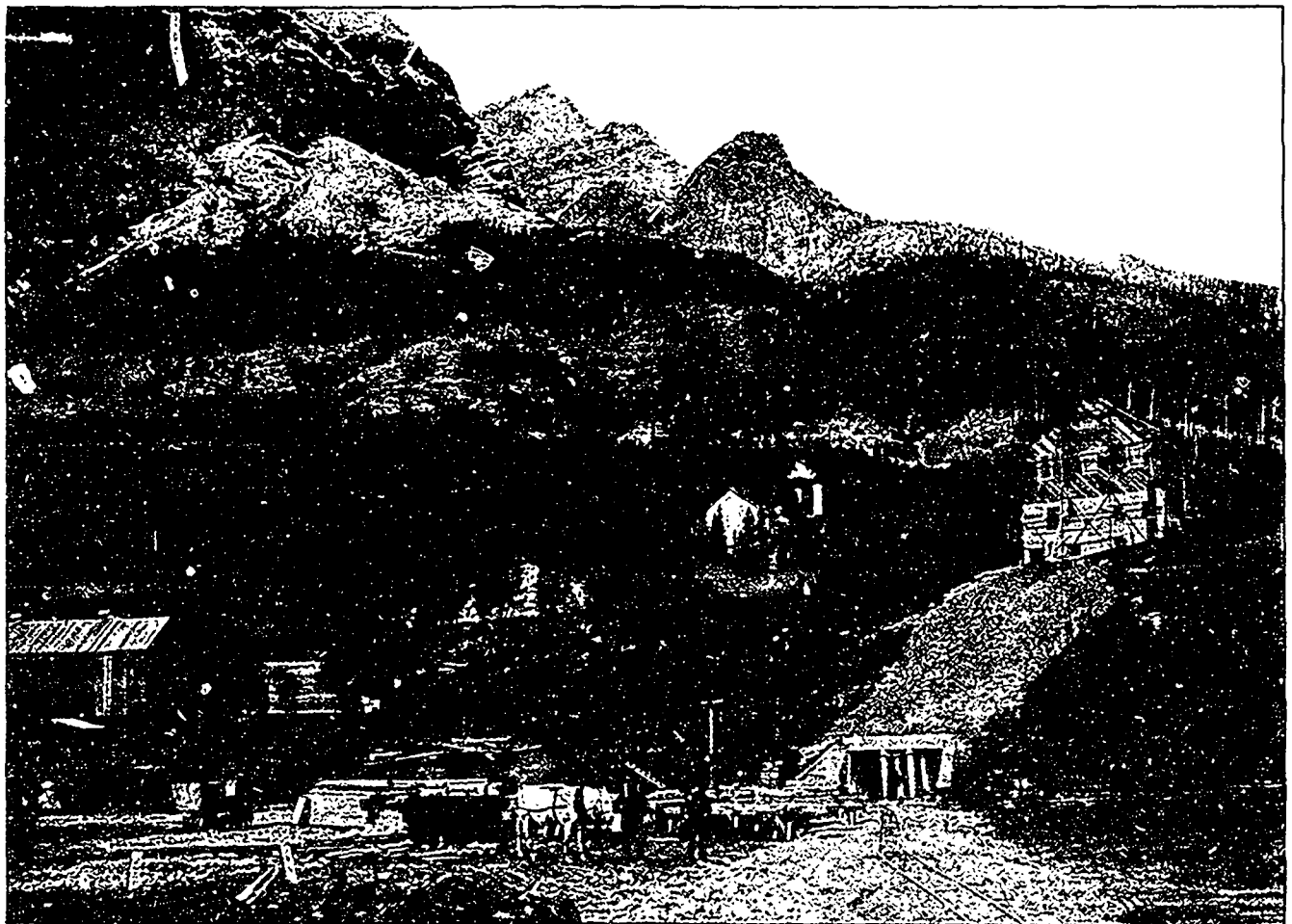
STREET IN BANKHEAD, SHOWING CASCADE MOUNTAIN.



LOWER PORTION OF THE TOWN OF BANKHEAD, ALBERTA.



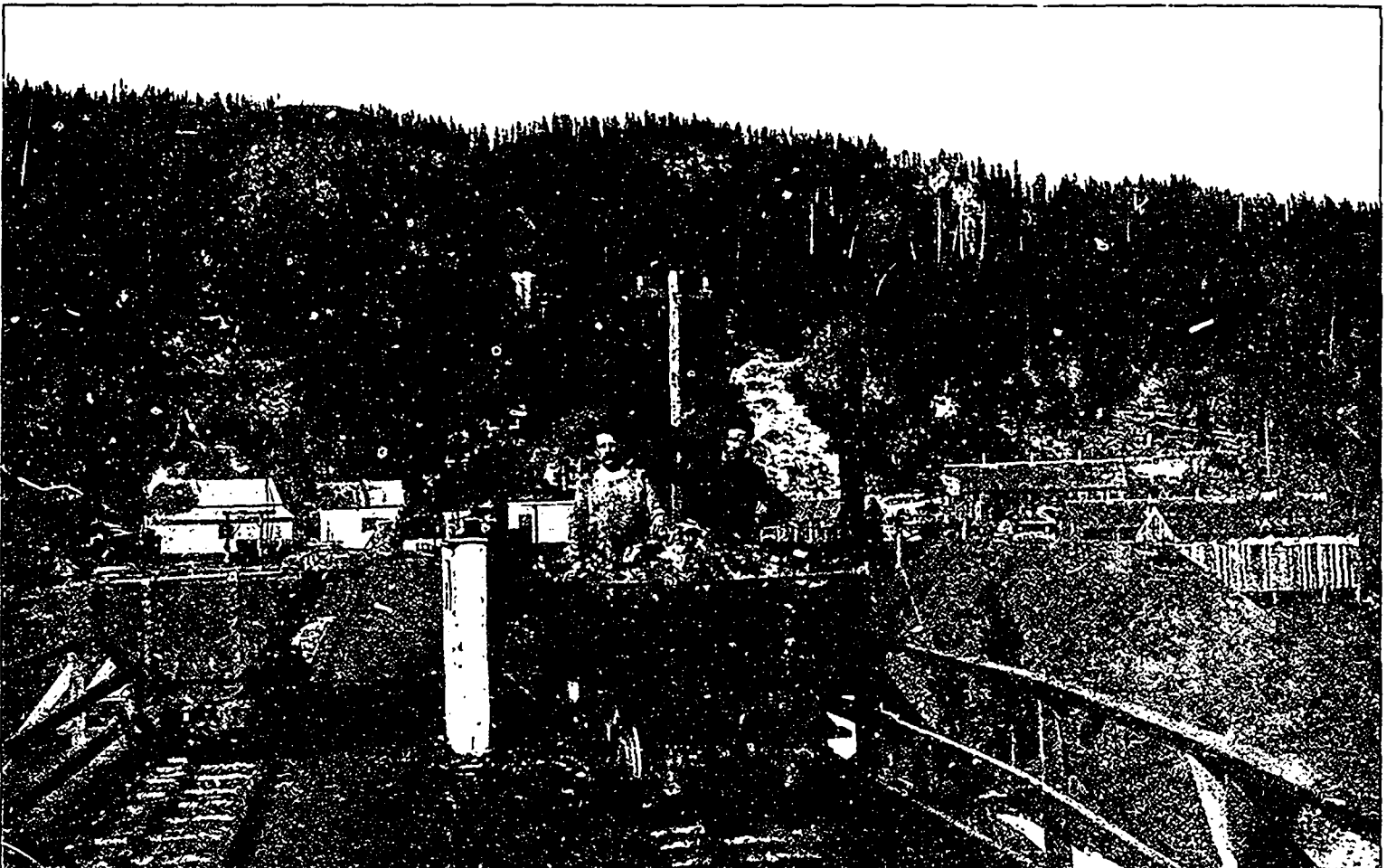
TIPPLE AND ENTRANCE TO MINE, BANKHEAD, ALBERTA.



ENTRANCE OF MAIN TUNNEL, BANKHEAD, ALBERTA.



STREET IN BANKHEAD, ALBERTA.



CARS GOING TO THE TIPPLE, BANKHEAD COLLIERIES, ALBERTA

### Report of the Commission on Electric Smelting.

The Commission appointed by the Dominion Government in December last to investigate and report upon the different electro-thermic processes employed in the smelting of iron ores and the making of steel which were then in operation in Europe, issued its report on the first day of November. The volume is a large one of 223 pages, containing 24 plates and 29 figures on folded inserts. The printing, plates and general get up are of a superior order and reflect credit on the publishers who are, we believe, Mortimer & Co., of Ottawa.

The Commission was issued to Eugene Haanel, Ph. D., Superintendent of Mines, and was specific as to (1) The determination of the cost of one ton of product; (2) the quality of such product, and (3) the cost of the machinery employed. The object of the whole inquiry was to form a judgment as to the feasibility of the successful introduction into Canada of electro-thermic processes for the commercial production of iron and steel. Associated with Dr. Haanel on this Commission were:—Mr. C. E. Brown, of the Canadian General Electric Co., as electrical engineer; Mr. F. W. Harbord, of the Royal Engineering College, England, as metallurgist; Mr. Erik Nystrom, of the Superintendent of Mines' Office, Ottawa, as draughtsman and photographer, and Mr. Thomas Cote, Montreal, as secretary.

The Commission began its active work on February 7th of this year, when it visited the Gysinge Steel Works at Gysinge, Sweden. At these works the Kjellin process is in use for melting purposes only, the mixture used being charcoal pig iron, bar scrap and silicon pig iron. Strictly speaking, the process is not a *smelting* one, but a method of *melting* metals. The product is high class tool steel.

Three experimental charges were run in this furnace by Mr. Harbord, and owing to the fact that the furnace is never emptied the exact weights of the product in relation to the weights charged could not be determined. There also appears to have been, in some cases, a deficiency of electric power, and in consequence a deficiency in heat. There was no doubt in the mind of Mr. Harbord that the quality of the steel produced was of the highest grade.

The second plant seen was at Kortfors, Sweden, which was visited on the 10th and 11th of February, 1904. This plant, having some 800 tons of electrically made steel on hand, and unsold, was not in operation, but was started up out of courtesy to the Commission. The corporation operating is known as the Heroult Electric Steel Company and here, as at Gysinge, the charge is entirely of metals—miscellaneous steel scrap being used—this also is a melting process. As this same process is in daily use at La Praz, under the supervision of the patentee, the Commission reserved its investigations until the La Praz plant was reached.

The furnace at La Praz, France, is practically identical with that at Kortfors, being slightly smaller, and the electrodes being used without water-jackets. Here was found the first introduction of ore into the charge, between eight per cent and nine per cent of the total weight being a pure iron

ore. In a subsequent charge the percentage of ore was reduced to between six per cent. and seven per cent. when a high carbon steel was contemplated.

Special care seemed to be taken at these works to remove the first slag and to form a second slag (of lime, sand and fluor spar) and to leave this slag for some time in contact with the molten metal, when, in its turn, it was carefully removed and a third slag of similar composition was again put on; the object of these slags, was stated to be the removal of the last trace of impurity. Recarburization of the metal charged was effected by adding "Carburite," a mixture of pure iron and carbon until the metal showed the percentage of carbon required.

The most important works visited were those of Messrs. Keller, Leleux & Cie, situated at Livet, France, where the Commission began its work on the 28th of March. These works are not manufacturing steel commercially, nor has the furnace used been designed specially for steel, but rather for general experimental work, not only on iron but also on copper, nickel and other metals.

The Commission only saw one charge of steel made from scrap, but witnessed the reduction of iron ore into the different classes of grey, white, and mottled pig iron.

Two or more furnaces, equipped with vertical electrodes, are connected with a central well, if necessary four hearths or furnaces can be so connected, and the resulting metal tapped into pig-beds, or into a ladle. All the materials charged, ore, flux and coke, were broken to pass an inch and a half ring, mixed on a floor and then charged into the furnace. The special points to which attention was directed were, (1) The output of pig iron for a given consumption of electric energy, (2) the yield of metal per ton of ore charged, (3) The amount of coke required for reducing purposes, (4) The quality of the pig iron obtained, i.e., whether suitable for steel manufacture by either acid or basic process, or pig iron suitable for foundry purposes.

The quality of the iron obtained from the first run was No. 3 grey and Nos. 4 and 5 white iron, having total carbon of 3.93 per cent., 4.05 per cent. and 4.14 per cent. respectively with silicon running 1.42 per cent., 70 per cent. and 56 per cent. The average of the slag for the three days' run contained 0.80 per cent. of metallic iron.

The weight of iron in the charge was 8,625 kgs., but the weight of the pigs obtained aggregated 9,868 kgs.; taking the average analysis of the pig at

Carbon . . . . .	4.1 per cent.
Silicon . . . . .	2.5 "
Manganese . . . . .	4.3 "

there would be 11 per cent. of impurities; with this correction the ore should have given 9,691 kgs. of pig iron, and, therefore, 177 more kgs. of iron were produced than the charge contained.

The second experimental run lasted 48 hours: 7,000 kgs. of iron in the ore were charged, and 6,692 kgs. of pig metal were produced; making correction for C, Si, and Mn as before, the theoretical pig iron possible was 7,384 kgs., leaving 662 kgs.

unaccounted for (30 kgs. being in the slag). These figures are not, and under the circumstances *could* not be accepted as accurate, and Mr. Harbord considers that it would be necessary to make a run of several weeks continuously, to distribute and minimize the error.

When a few charges were run with charcoal replacing the coke, the results were not satisfactory since the charcoal burnt away on top long before it got to the reduction zone of the furnace.

In the results, 9,868 kgs. of pig required 5.15 E.H.P. years or .475 E.H.P. year per short ton; at \$10 per E.H.P. year the cost of electric energy was \$4.75 per ton. 6,692 kgs. of pig in the second run consumed 1.66 E.H.P. years, or .226 E.H.P. year per ton of iron; at \$10 per year the cost would be \$2.26 per ton of iron produced.

(2) The metal accounted for appeared to be about 97 per cent. of that charged. (3) The amount of coke required varied from 685 lbs. per 2,000 lbs. of metal produced in the first run, to 820 lbs. per short ton in the second run. (4) The quality of the pig metal obtained is shown by many analyses in the report; in the first run it was very grey, containing large amounts of both silicon and manganese, and making a suitable acid iron for Bessemer or Siemens process but for the high manganese.

The second experiment, undertaken with the view of making all grades, did not clearly show that variations from acid to basic irons could be made, although some samples show that low silicon iron occurred at times. In the matter of labor required Mr. Harbord's figures give (at \$1.50 per day for labor) the average cost in England per ton for labor at \$1.00, in United States at \$0.42 and with the Livet furnace \$0.94; this would make the electric furnace slightly cheaper than the English practice but more than twice as expensive as the American practice.

So, as far as costs go, Mr. Harbord's figures average about as follows :—

	Per ton of 2,000 lbs.
For Electric energy . . . . .	\$ 3.50
" Electrodes . . . . .	.77
" Coke . . . . .	2.38
" Fluxes . . . . .	.40
" Labor . . . . .	.94
" Ore . . . . .	2.76
" Repairs, maintenance, etc. . . . .	1.30
Total . . . . .	\$12.05

Mr. Harbord's comments are instructive, e.g., "With fuel at anything below \$7.00 per ton, the electric furnace cannot hold its own." "When allowance is made for a reasonable royalty (on the process) there is little margin on the side of the electric furnace." "In its present stage of development, the electric furnace is not suitable for the manufacture of other than high-class special steels." Among his specific conclusions are the following :—

"At present, structural steel, to compete with Siemens or

Bessemer, cannot be economically produced in electric furnaces."

"Pig iron can be produced on a commercial scale at a price to compete with the blast furnace only when *electric energy is very cheap and fuel very dear.*"

"Under ordinary conditions, where blast furnaces are an established industry, electric smelting cannot compete."

The report is full, lucid, admirably illustrated, and a work which will add to the already high reputation of the Commissioner, Dr. Haanel. It is of the type of monograph for which the Canadian Mining Institute and the profession in Canada have been clamoring, and the REVIEW hails its appearance as the forerunner of many such which the Superintendent of Mines will give us if granted health and funds. Similar, but less costly, pamphlets on several of the metals, minerals and processes will be the best investment the Department of the Interior can make.

We hail this report as an earnest of the quality and character of what the suggested Department of Mines would do, if once created, under its distinguished, able and learned head, Dr. Eugene Haanel.

As to the conclusions drawn it seems to the REVIEW to be manifest that, the electric smelting of iron ores need not trouble our iron masters for the present; that its field, under its present development, is solely in the manufacture of high grade steels and of the many ferro-compounds such as ferro-manganese, ferro-silicon, etc., which are used in comparatively small quantities and can stand high prices; that it is, and will be, more profitable to sell electric power for other purposes than the smelting of iron ores; that a possible field may be the utilization of iron ores which carry such large amounts of the titanium group of elements as to require a greater heat than is usually permissible or obtainable in a blast furnace, and that the electric furnace may find a quicker field for usefulness in the smelting of ores of the more costly metals, such as copper and nickel, than it will with ores of iron.

Negative results are fully as valuable as positive ones, from the investigators' standpoint, and, as we remarked before, this volume contains *unquestionable* results.

#### The Mining Society of Nova Scotia.

The semi-annual meeting of the Mining Society of Nova Scotia was held at the City Hall in Halifax on Wednesday, the 9th of November. Between twenty and thirty members were present, and several papers of importance were presented. The Society had for a guest the distinguished Dominion Superintendent of Mines, Dr. Eugene Haanel, who exhibited specimens of pig iron and of steel, which had been made in Europe by various electro-thermic processes, and who addressed the Society in the evening on the work of the Canadian Commission which had been appointed to investigate the subject of the electric smelting of iron ores.

The technical paper of the session was that by W. L. Libbey on "The Cost of a Plant for Shaft-sinking and Level-

driving at the deepest level yet reached in the Gold Mines of Nova Scotia."

Mr. Libbey began by noting the impossibility of any figures given being taken as an absolute guide for any other mine in a different locality, but was confident that his figures would be found correct for narrow fissure veins contained in quartzite of the character which is known in Nova Scotia as "whin" rock (a hard, indurated quartzite). He alluded to the increase of costs necessitated by small fissure veins over costs for veins of the intercalated or contact type, known as "main leads."

He then gave the figures below as showing the installation cost of the plant which he had erected at North Brookfield, and which was in use for a depth of 2,000 feet, and capable of going deeper.

Labor, at foundations.. . . .	\$ 778.00
Supplies, for foundations.. . . .	1,267.95
Lumber.. . . .	401.12
Carpenters' labor.. . . .	350.00
Masons' labor.. . . .	220.00
Boilers and fittings.. . . .	2,517.00
Air compressor.. . . .	3,000.00
Air receivers.. . . .	264.00
Freight and haulage.. . . .	181.69
Air pipe line and labor.. . . .	998.33
Accessories.. . . .	90.20
Hoisting engine.. . . .	950.00
Wire rope.. . . .	213.15
Skip.. . . .	125.00
3 Slugger drills.. . . .	650.00
Air hose, pumps, and duty.. . . .	864.40
Sundries.. . . .	155.35
Total.. . . .	\$13,076.19

The fuel used was run-of-mine coal, costing \$5.00 per ton delivered.

Mr. D. W. Robb, the well-known mechanical engineer, read a paper on "Captains of Industry," which was a clever presentation of the lack of technical education in Nova Scotia, and a plea for its development.

As reading for a father of growing sons the paper is most valuable, and the REVIEW hopes to find space in which to print it in full.

The meeting adjourned after voting thanks to Dr. Haanel for his courtesy and lecture.

#### The Princess Royal Mines.

Our esteemed and vivacious London contemporary, *The Rialto*, in one of its recent issues devotes a page to the attempted flotation on the other side of the Princess Royal Mines, situated on the coast of Northern British Columbia, and, incidentally pays attention to a Mr. A. R. Harvey, of

Liverpool, and the Hon. Wm. Pugsley, of St. John, N.B. We excerpt some interesting extracts:—

"Mr. A. R. Harvey, a Liverpool financier of incorrigible energy, is just now busy endeavouring to float a company to acquire and work the Princess Royal group of mineral areas in Northern British Columbia, and he purposes forming a company to be called the Princess Royal Gold Mines, with a capital of £500,000. Mr. Harvey will be known in connection with the ill-fated Commercial Development Company, Bischoff's White Lead, and other ventures that have not earned a European reputation as dividend-payers. But "nothing venture nothing win" is evidently Mr. Harvey's motto, and he now proposes, as before stated, to attack British Columbia. The name of British Columbia leaves a very nasty taste in the mouths of investors on this side of the Atlantic, seeing that we have had so many mining fizzles sent over from that country. Judging by the papers in our possession, we gather that the Princess Royal venture is being promoted by an enterprising group of New Brunswick speculators, headed by Mr. Pugsley, the Attorney-General of New Brunswick. This gentleman is, unless we are mistaken, a friend of the celebrated Mr. J. Carling Kelly, of Sapphire Corundum renown, and it may be that Mr. Kelly is interested in the Princess Royal. But, notwithstanding that so high an official as the Attorney-General of New Brunswick is assisting in the promotion, and has agreed to become a director of the company, there seems to be a lack of funds for paying the necessary registration and promotion expenses, and Mr. Harvey has consequently hit upon a scheme for "raising the wind," which he hopes may successfully work the oracle. Here is Mr. Harvey's scheme:—

[Memo.]

£5,000 is required to pay the stamp duty, solicitors' expenses, printing and advertising, and the general preliminary expenses in bringing out the Princess Royal Gold Mines, Limited.

The property has been reported on by Mr. Philip Gilman, A.R.S.M., Vancouver, British Columbia, of the eminent firm of Pellew-Harvey, Bryant and Gilman. It is being worked at the present time, and is showing a profit of over 50 per cent. upon every ton of ore taken out, without proper transport facilities.

A copy of the sworn affidavit of the Hon. William Pugsley, His Majesty Attorney-General for New Brunswick, and smelter returns attached.

It is proposed to bring out a company with a capital of £200,000 in Preference shares and £300,000 in Ordinary shares during October or November, with £60,000 Preference shares underwritten to cover the working capital and the expenses of bringing out the company.

The contractor proposes to raise the aforesaid £5,000 to cover preliminary expenses by issuing an interest in this undertaking to the extent of £5,000 in cash and £10,000 in Ordinary shares, each participator of £1,000 receiving his money back as soon as the company goes to allotment, and a bonus of 2,000 fully-paid shares.

Now, we cannot say that Mr. Harvey's offer is particularly tempting. To suggest that the mines would ever pay on the

inflated capital suggested is an insult to one's common sense; but this is a matter that would not concern Mr. Harvey, or perhaps his New Brunswick friends. We happen to know something about the Princess Royal Mines, and we have no hesitation in saying that they would never pay their working expenses, let alone a dividend, on any capital at all. We say this deliberately, in face of the opinions of the eminent experts who have reported favourably, and also in face of the supreme optimism of the Attorney-General and his friends, whose only idea is to make a profit by promoting the company."

The REVIEW is in no position to controvert the soundness of the statement that £500,000 is altogether too large a capitalization, but it is in a position to affirm the high grade character of the ore, and to confirm the average value of the ore which has been shipped at \$80.00 per ton. There is, however, no assurance as yet that this character of ore will continue indefinitely, and we should prefer to attack the scheme (if we attacked it at all) on the ground that the property is yet in the "prospect" stage, and the proposed capital entirely unjustified.

#### A New Mineral District in Quebec.

Sir:—

Having been out in the field for the most part of the season, it may be interesting for the readers of the REVIEW to know some results of a two months' exploration of the region to the south-west of Lake Mistassini, and to learn that a new mining district has been discovered which, so far, appears to be very promising.

This district lies near Lake Chebogamoo, which is about 200 miles north-west of Lake St. John. It covers an area of about 20 by 40 miles, in which the geological formation is the Huronian (as determined by the Canadian Geological Survey) and which is comparable with that of our Eastern Townships. I went to explore this region on account of discoveries of asbestos and copper ore which were made there last year by Mr. P. McKenzie, of Montreal, and I have ascertained that there exists in the district a large belt of serpentine rock, which, at one point specially prospected, shows a quantity of good asbestos with fibre varying from one inch to three inches in length.

There are also veins of copper ore (chal-copyrite carrying bornite), iron pyrite and magnetic iron oxide; the latter is probably abundant, if one may judge from the strength with which the needle is attracted in certain parts of this new region.

I also discovered gold, which was easily visible to the eye in one quartz vein, which measured over 30 feet in width and which I traced for 2,000 feet. In the vicinity of this vein, but at a considerable distance from it, I found colors of gold, which leads me to suppose that there may be a section which will be gold bearing.

I regard the region as a very important one, from a mining standpoint, and one which can be quickly developed when traversed by a railway. The construction of such would be an easy matter as grades are good; the altitude is only 1,200 feet above sea level.

I have also recently visited a region in the valley of the St. Lawrence where, many years ago, the occurrence of natural gas was noted.

The people of the villages of Ste. Genevieve, Yamachiche, and St. Barnabé are now using this gas for domestic uses, and a company is boring in the vicinity of St. Gregoire with the expectation of finding gas in larger quantities.

Yours truly,

J. OBALSKI.

Quebec, Nov. 18th.

#### The Mines of Ontario.

By W. E. H. CARTER, B.A.Sc.\*  
(Continued.)

"As a usual thing the so-called Laurentian rocks, consisting chiefly of granite, granite gneiss and syenite gneiss, form rounded areas half a mile to a number of miles in width; and enclosing them are great meshes of Keewatin (Huronian) schists and eruptives, generally green in color and basic in character, but sometimes pale and silicious. Lawson has proved that the granitoid rocks push up as eruptive masses through the schists, nipping in the latter as synclinal folds with bedding having a steep dip away from the Laurentian. The Huronian rocks are chiefly eruptive flows and metamorphosed volcanic ashes, but sometimes water-worn conglomerates. At the junction of Laurentian and Huronian there is generally a strip of greatly disturbed territory where the granite or gneiss has floated off small or large blocks of the green rocks, or has pushed dikes of granite or felsite into fissures of the Huronian. Eruptive bosses of a later granite in many places penetrate both Laurentian and Huronian, and likewise send dikes into the adjoining rock.

" . . . . It is evident from the sketch just given that the region was one of great disturbance during Archean times, mountain building, earthquakes and volcanic eruptions having been active, not alone in causing the general geological relationships which we now find, but also in opening up innumerable fissures to be filled with quartz and other minerals by circulating heated waters, thus forming the present ore deposits.

"At a much later age the region, mountainous at the close of the Archean, was worn down to an approximate plain, disclosing on an ice-smoothed surface the complicated arrangement of rocks and veins now so interesting to the geologist and prospector.

"A more complete description of the geology may be found in the reports of the Geological Survey of Canada, and in previous reports of the Bureau of Mines." (5)

On account of the generally flat nature of the country the gold mines, and, in fact, practically all the deep mines with one or two unimportant exceptions, have to be opened up by shaft, instead of by tunnel, as in more mountainous districts. This makes development of the ore bodies somewhat more expensive, especially during the initial prospecting stage, than in such countries as British Columbia.

Out of the great number of auriferous veins or reefs which have undergone exploration in this western Ontario field a few have attained importance by the extent of the mining done thereon and by the gold produced, the percentage of suc-

\*Paper read at the Sixth Annual Meeting of the Canadian Mining Institute.

(5) Lake of the Woods. A. C. Lawson; Geol. Sur. Can., 1885, Part CC; Rainy Lake Region, 1887, Part F; Bur. Mines, Vol. IV., p. 45, etc., and Vol. VI., pp. 71-124.

cesses being probably as great as in any other gold area in Canada. But certain serious difficulties peculiar to this part, and more or less to all of Ontario except the few big mining camps, have obtained from the start, and still exist to an important degree, which re-act to the detriment of the area. Chief of these is the almost universal disregard by the operators of the first principle of any business undertaking which is to place in charge of the work from the start a man of the necessary experience and ability. A mining enterprise need have but little more uncertainty about it than any other industry, if entered into with a full knowledge and appreciation of the risks, and with a technically qualified engineer in charge who can properly value these risks and govern operations accordingly. This constitutes the key to most successful mining ventures. The "practical" miner, perfectly fitted to hold the position of foreman, has not the scientific training necessary for a correct interpretation of the circumstantial evidence on the value of an ore body arising during development. What is the cause of this negligence of the common-sense way to mine? It is that the mining companies found there do not realize the necessity for such men. Usually these corporations are composed of many shareholders ignorant of everything connected with mining, and therefore led to believe that because other mines in the neighborhood are run by practical miners so can theirs be, particularly since such practical miners may be had at a much cheaper wage than the higher-priced engineer. They do not realize that the latter may save his salary many times over by his superior knowledge and ability.

The specimen character of the auriferous deposits no doubt accounts for the ease with which these small companies are floated amongst this class of investor. Veins which may be unimportant in size and average value produce occasionally remarkably enticing free gold samples and high (but unrepresentative) assay values, on the strength of which the properties may readily be disposed of. Following the history of such concerns to the end, we find that one class, after doing considerable mining and exposing some vein or rock, has spent all the working capital, with nothing to show for it, because of not having adopted from the start a comprehensive plan of development; and the other, having a little more cash, goes further and erects a mill, to appease the unceasing cry of the shareholders for dividends, after which its funds also are exhausted, and with no ore in sight, ready for stopping from the undeveloped vein, the mill stands idle. The close down of the mine is in each case certain, if not for good, for an indefinite period,—for as the investing public generally look at it—who is going to put more money in a property on which so much has already been spent with nothing to show for it?

This state of affairs accounts in large part for the apparent failure of this gold area to become generally productive. The extreme case of misdirected energies occurs where mining has been done in country rock in which absolutely no *ore body* can be seen or is indicated. Such instances are by no means rare. The most prevalent mistake, however, consists in devoting time and money to veins which are too small or narrow to warrant the expectation of ever making a paying mine of them, although they are possibly quite rich in gold. There is no excuse for taking up such properties, except it be that the operator would not employ someone who could and would properly value them for him, that he might be induced to try a better showing elsewhere.

Plenty of other deposits may, on the other hand, be found which at least have the necessary qualifications of size, and of

these quite a number, which gave reasonable promise of success on the surface, have developed into productive mines. Just at present, however, a wave of abnormal activity has struck many of them, due in most cases to causes quite outside the merchantable character of the ore.

Observations made during the past several years, while in close touch with the industry, have led to the above conclusion and to the belief that the area as a gold producer is not as hopeless as it appears. Let the energy and capital of the gold mining investor be directed with caution, common sense and patience to where just chance of success exists, and then at least will satisfactory proof, one way or the other, as to the value of these auriferous deposits, be given.

Proof of the seriousness of the situation for this western gold area, should inexperienced management continue, is furnished by the fact that out of a total of 50 gold milling plants (all stamp mills but three), with the total equivalent of 558 gravity stamps, which are being or have been erected there since the start, only seven mills ran at all during the past year or so, and of them but 3, with their total of 33 stamps, attempted steady operation on what the mines produced. These plants range in size from the 1 or 2 stamp test-mill to the 40-stamp battery.

The corresponding figures for the whole Province are also worth noting, since much the same conditions exist throughout. As nearly as can now be discovered there are or were in all 74 gold mills, of which 5 were Crawfords, a few the Tremaine steam stamp, one a Krupp ball, and the rest the ordinary gravity stamp mill, having a total equivalent of about 787 gravity stamps. During the past year or so only 12 of these mills, with a total of 146 stamps, operated at all, and of them but 8, with 113 stamps, attempted continuous production, and generally only for intermittent and limited periods.

It would be unfair to let the above statement go unqualified by the greater and more normal activity of the years just previous, when the old standbys, such as the Sultana, Mikado, Deloro and others, were in full swing. During the past two years or so 22 of these mills were in operation, some continuously and the rest intermittently, with a total of 362 stamps dropping. To various financial or managerial difficulties, as well as to the state of the ore bodies, may be ascribed the present close-down of these important mines, which causes may disappear and operations be resumed at any time.

In the western Ontario area amongst the important mines may be included the Sultana, the Mikado, the Regina or Black Eagle, the Golden Star, Sakoose, Big Master and Huronian. It is not possible to give here the total output in gold of all these mines, interesting as it would be, but as an indication of the same, the amount of development may be summarized. The Sultana mine has reached a depth of between 600 and 700 feet, with lateral workings over a quarter of a mile in length, one of the stopes (the main) having a minimum cross-section of about 25 feet by 25 feet and a maximum of about 60 feet by 120 feet and extending from the first down to the seventh level, where a fault cuts it off. A 30-stamp mill, with a chlorination plant for the concentrates, has treated this ore for a number of years past, during which operations were fairly continuous. Recently the use of the Frue vanners was discontinued, and on the plates alone an extraction of 83 per cent. of the value was made. The gold bullion here has averaged a fineness of 840, typical of the gold in these non-argentiferous ore bodies of western Ontario. Mr. J. F. Caldwell, who has been closely connected with the mine since the start, states that the total production of the mine has amounted to about



\$500,000, and that the average value of the ore was about \$8.00 per ton. An energetic effort is now being made to locate the faulted portion of the ore body.

The workings of the Mikado are even more extensive, having attained a depth of between 1,300 and 1,400 feet along the vein on the incline. The ore shoot continues down in the lower levels, but there the vein passes entirely out of the granite country, which in the upper levels it either cut through or was in contact with, and enters the trap. A drop in values accompanied the change, so that latterly ore running \$5.00 or less per ton was the best obtainable. Whether a change for the better exists at still greater depths, where the vein and granite may again come in contact and values increase, remains now for others to find out, the present company having decided to cease work. The last year's operation of this mine furnishes some interesting figures of what can be done in this direction with an averagely well equipped gold property. During 1901, for a period of eight months, the ore milled averaged in value \$3.14 per ton, the total extraction by amalgamation, followed by cyanidation of the tailings, amounting to 87 per cent. For the next three months the ore ran \$5.07 per ton, and extraction increased to 91 per cent. This latter figure (91 per cent.) is made up of an extraction of about 65 per cent. by amalgamation and 20 per cent. by cyanidation of the tailings. About the same proportion was obtained on ore of different values. To quote from the manager's report: "Of course, it was quite impossible to meet all expenses during the first period under comparison, but our total costs, including development, maintenance and fuel have been fully covered during the last four months and, indeed, a clear profit of about \$600 has been made in the month of December; thus showing that with a small plant (30 stamps) and a narrow vein in a small ore shoot, it is possible to make a fair profit on ore that averages \$5.00 to the ton." The Mikado mine has produced something over \$500,000 in gold.

In the Black Eagle mine the bottom levels, at about 550 feet depth, disclose a vein from 6 feet to 8 feet wide. This vein fills a true fissure and extends without interruption throughout the extensive workings, but at a somewhat less average width than this. The pay ore lies in separated shoots. A new 30-stamp mill recently erected replaced the original 7 Tremaine steam stamp batteries, which, both here and elsewhere in the area, have proved unsuitable to fine crushing, besides prohibiting inside amalgamation. This mine, originally called the Regina, was found in 1894, and in 1895 a 10-stamp mill was erected and operated. Later this milling plant was replaced by the above-mentioned 7 Tremaine batteries of 2 stamps each; but as they could not be operated successfully the present new equivalent 30 gravity stamp mill was put up in 1902. Since the beginning the ore milled has returned a little over \$200,000 in gold. The ore is low grade, averaging probably between \$4.00 and \$5.00 per ton.

The Golden Star mine, near Mine Centre, has had rather a checkered career since 1898, the year of its first operation, and finally has been closed indefinitely. The trouble does not, I believe, lie so much with the condition of the ore in the vein as with the methods of development. The ore was "guttled," and after that, although the pay shoots in the bottom levels are reported to show ore well worth following, no more money could be raised to again undertake the necessary unremunerative work of opening the vein to greater depth and blocking out more ore. Mr. H. H. Wood, late manager of the mine, has kindly given me the following interesting statistics of that mine's operations, to supplement accounts already publish-

ed (6). The shaft reached a depth of 530 feet along the vein on its incline of 80 degrees and is timbered with a skiproad. The drifting on the seven levels aggregates 1,894 feet, the shortest drift measuring 58 feet, and the longest, the sixth, 567 feet. The stopes exhibited a maximum width of 14 feet of ore, at which points the richest portions occurred, and a safe average of 3½ feet, and from them and the drifts there were raised and milled 19,823 tons of ore, which produced bullion valued at \$160,876.35. The value saved per ton was \$8.11, and that lost in the tailings \$2.50, which makes the total average value of the ore amount to \$10.61 per ton. An appreciable tonnage of lean ore from the last development work is included in the above total tonnage milled, which lowers the average value somewhat more than need be. The ore was crushed in a 10-stamp mill and concentrated on Frue vanners, but no attempt was made to save the values in the tailings. The ore was free milling to a varying degree, according to the part of the mine the quartz came from, the per cent. extraction by amalgamation ranging from 65 to 80. During the last operations mining and milling together were done for \$3.44 per ton; but now that living, labor and transportation costs are cheaper, with the advent of a railway, the Canadian Northern, this figure should be considerably reduced.

The Sakoose mine, near Dymont, produced a good deal of gold bullion, but the attempt to carry the ore some 130 miles by rail to the stamp mill at Keewatin was found (since the ore was not unusually rich) to be unprofitable. The ore body stands ready for a more economic mode of development and treatment.

The development of the Big Master mine in the Manitou area gives interesting data on the character of similar veins traversing the green hornblende and chloritic schists common to the country. The pay ore lies in certain well defined shoots, and when more than one occurs in the same vein they are all, as a rule, parallel in their dip. There may be one or two more or less extensive shoots or again a number of short ones separated by similarly short stretches of barren vein, as is the case I believe at the AL282 or Sunbeam mine, near Island Falls, Seine River. Also, the values do not extend into the false walls of soft altered schist, but are closely confined to the main quartz body or vein. The 10-stamp mill at this mine has made a number of runs on the ore and produced considerable bullion; but the development of the ore body has never been sufficiently in advance of stoping to furnish a steady or continuous supply.

The gold ores of Ontario are of low grade, averaging probably less than \$10.00 per ton. Continuity of the pay shoots both in size and value may be expected to reasonable depths, as shown by the development of the few deep mines above mentioned.

Some of the mining companies in this western area seem to be consumed with the desire to get hold of as much of the earth in the vicinity of their mine as possible, and according as they succeed in this so do they squander the available treasury funds. Better devote the money to developing one paying mine than to feeling rich in the possession of many idle locations. Out of over 50 companies mining on properties of various kinds during the past year or so in this area more than half held on the average between seven and eight times more mining land than necessary, i.e., more than the area of the one or more locations of forty acres or so to which all mining is

(6) Bur. Mines, Vol. VIII., pp. 45-46, 76-79, 263, et seq.; Vol. IX., pp. 66-68; and Vol. X., pp. 79-80.

confined. Some of them hold twenty times more than the area of that under development. This practice of so loading the company down has, in most cases, no advantages either for the company or for the one mine worked, but, on the other hand, uses up much of the precious working capital which should be devoted to making the one mine a paying proposition.

#### SILVER MINES.

In the same year in which gold was discovered in the eastern townships, 1866, the first important find of silver was made on Thunder Bay, Lake Superior, at what was afterwards known as the Thunder Bay mine. The discovery of numerous other silver-bearing veins followed in the next few years in the same immediate area, along or near the north shore of the lake, chief of which was the Silver Islet, found two years later, in 1868. This islet was in reality merely a rock of about eighty feet square, rising a few feet above the surface of the water a mile or so from the shore. Not until 1881 did the occurrence of the same precious metal in the Rabbit and Silver Mountain areas, twenty and thirty miles southwest of Port Arthur, also become known.

The formation in which these ores occur consists of the Animikie, the earliest of the Cambrian system. The Animikie and Nipigon rocks combine to cover a considerable area, nearly surrounding Nipigon Lake, and from there south to the shores, peninsulas and islands of Lake Superior in the same vicinity, and southwest to the international boundary line. Nearly all the veins cutting these rocks closely resemble one another in the nature of the gangue which fills them. They are formed either entirely of quartz more or less amethystine and locally open or drusy, or entirely of white crystalline calcite with pockets of amethystine quartz, or of a general mixture of this quartz and calcite. Fragments of the wall rock are also usually included, together with scattered green and purple fluor spar. The more common metallic minerals consist of pyrite, blende, galena and chalcopryite, while the silver occurs both as the sulphide (argentite) in leaves, masses or crystalline, and in the native state in leaves, grains and threads. Quite common widths for these veins are twenty to thirty feet, though the average is less than this. The tendency also is for the ore to run in narrower bands along one or the other side of the vein, particularly in the wide veins.

The distribution of the silver through the lodes is irregular, with no apparent connection between the different pay shoots. In all the mining so far done no law seems to have been discovered governing these conditions, or the mode of occurrence of the silver, which makes extensive development underground necessary. This, in turn, has caused the close-down sooner or later of all the silver mines not now in operation. The main bonanza at the Silver Islet, for instance, produced about \$2,000,000 worth of silver, and it consisted of two parallel pay shoots on adjacent branches of the lode, each measuring about one hundred feet along the hanging wall, about three hundred feet in depth from top to bottom, that is, down to the sixth level, and from six inches to two feet in width. During two different years at the start the silver output at this mine amounted to over \$640,000. At other mines similarly rich, but limited, shoots were worked out. After the Silver Islet mine reached a depth of 1,230 feet, from the year 1870 until 1884, when it closed down, local conditions, mainly heavy inflow of water from the overlying lake and heavy charges for maintenance, forbade further development. The other bodies of ore struck in the extensive exploratory work by both mining and diamond drill during the last year or so of

operation determined, however, that such veins may reasonably be expected to contain more than the original find or shoot of ore.

The Silver Islet mine produced in all about \$3,250,000 in silver, most of which resulted from the smelting of the hand-cobbed ore; but subsequently a 50-stamp mill and concentrating plant was erected on the mainland opposite the island and the leaner ore run through. It was in this mill under the superintendence of Capt. Frue that the present Frue vanner of world-wide fame was invented.

The mines in the Port Arthur area produced silver more or less steadily, by the smelting of shipping ore, or of the concentrates after milling, until about 1892, when the sudden severe drop in the price of this metal caused most of them to close down. Since then the West End mine alone has operated at all extensively, and the success attained there will no doubt sooner or later lead to the re-opening of some of the other old mines. In fact a year or so ago a number of these properties, consisting of the Porcupine, Badger, Keystone and the West and East End Silver Mountain Mines, were consolidated under one ownership, with a view of working several or all on a collective plan, thereby reducing cost and increasing profits from these irregular ore bodies.

The practice at the West End mine, where operations are for the present concentrated, involves hand-sorting underground of shipping ore, that is, ore rich enough in silver to allow of direct shipment to the nearest custom smelters in the United States, and concentrating the remaining lower grade material by fairly coarse (20 mesh) wet crushing in a 20-stamp battery followed directly by hydraulic sizing and concentration on 9 Frue vanners. The mill will treat 80 tons of ore per day, or 4 tons per stamp.

There is under serious consideration the project to erect a smelter somewhere in this Port Arthur district primarily to treat copper ores. If built it will give further inducement to mining for silver, since all these ores could also be smelted there; probably those lean in silver as well as the rich, since the gangue of calcite would serve for fluxing other ores.

The other occurrences of silver in the Province, with the exception of the recently discovered veins in the Temiscaming area, are all in connection with other minerals of equal or greater importance, namely with gold ores, lead ores, and with gold in the copper ores of the Parry Sound district, as at the Wilcox and McGown mines. Of the argentiferous galena veins that of the Victoria mine north of Garden River station, traversing Huronian trap schists simply as a mineralized belt of the same in close proximity to the Laurentian granites, is a prominent example. Large quantities of galena have been shipped from it, and some from the Cascade mine in the same vicinity, the silver content running from a few ounces to 168 ounces per ton.

Earlier than 1890 records exist of the finding and exploration of gold and galena bearing veins carrying silver in the Temagami and Temiscaming country. Two references speak of veins 10 feet or so in width in which the galena contained from 6 to 64 ounces of silver, the lodes traversing trap and slate. None of the ores were mined on a commercial scale, however, possibly because so far away from lines of transportation. With the advent of the new Temiscaming and Northern Ontario Railway prospecting began again with renewed vigor, and amongst other important minerals the argentiferous cobalt-nickel-arsenic ores were found near Haileybury. These are now being mined in a hurried attempt to ship some of the ore to the railroad while the sleighing re-

mains. During the coming season we may expect not only extensive surface prospecting but some systematic mining of the known veins; and interest may become active again in the older fields above referred to. As official descriptions of these new ores have issued in several prominent mining journals and also in pamphlet form from the Bureau of Mines the only reference here will be to their silver content. The best specimens of the western Ontario silver ores do not compare with these new finds, so great is the percentage present in some of the veins. The silver occurs almost entirely in the bright native state interwoven throughout the vein. In one vein 8 inches in width the silver content ranges from about 16 per cent. to 20 per cent. Some drift boulders of 10 to 50 lbs. weight found in the vicinity of the veins carry as high as 70 per cent. silver, the ore in place in the veins from which these masses presumably broke off locally approaching in silver content the same high figure. A carload of such ore as this is about all a man needs "to live happily ever after."

The galena ores of the eastern counties of Peterborough, Hastings, Addington, Frontenac, etc., are for the most part almost free from silver. The eastern end of the Province is not a silver area.

#### COPPER MINES.

The present most important copper-bearing area comprises that portion of the Province bordering the north shore of Lake Huron from Lake Superior on the west to Wahnapitae Lake on the east, and probably still farther northeasterly, since the same Huronian formation extends on to the Provincial boundary; but at that end it has not been much explored. Copper was known to exist in this region several centuries ago, the Jesuit missionaries being amongst the first to bring specimens and reports of finds back to the land of the white man. Not until 1770, however, was any attempt made to explore for the ore with the idea of mining. That year a party was sent out by English capitalists to the area in the vicinity of Sault Ste. Marie; but no success attended their efforts, doubtless for many reasons not hard to imagine in such a wild, unknown land so distant from home and supplies. Until the middle of the next century we are without record of any further attempts at mining; and then the spell was broken only by the sudden exploitation of the copper areas on the south side of the lake in Michigan. That was in 1843, and it proved sufficient to rouse an interest again in our own areas and in the possibility of finding rich copper ores here also.

Reports of the same at that time were frequent, and after examining many areas along the north shore of Lake Huron the locations now known as the Bruce mines were, in 1846, taken up as the most promising, and active development begun. There was then but one company operating in the field. Other mines, the Wellington and the Huron Copper Bay, were subsequently opened up on the extension of the same lode in a distance of about two miles, all showing the veins to be rich in the copper sulphide, chalcopyrite. Of the success of these mines, in spite of the great difficulties in the way of transportation, much has already been recorded and need not again be gone into here. It appears that the ore as mined contained at the start about five per cent. copper, the chalcopyrite being disseminated through a matrix of quartz. The veins, of which there were several roughly parallel to, as well as off-shoots from, the main bodies, fill true fissures in a dike of diabase traversing the Huronian rocks of the area. A concentrator was erected and all ore raised to a 20 per cent. copper content prior to shipment to both England and the United States for complete reduction. Later, to avoid the

heavy charges for transportation, smelting and the lixiviation and cementation processes were tried at the mines, but without much success. The ruins of many of the old stone buildings may still be seen. It has been ascertained that copper concentrates, precipitates, ingots (presumably of blister copper) and slags amounting to about 40,515 tons and realizing about \$3,300,000 were shipped from these mines in this period of thirty years, from 1846 to 1875, during which they were worked. No other mine in Ontario, purely a copper proposition, has yet approached the output of this first copper mine.

Practically the same state of affairs exists in the silver district at the west end of Lake Superior, where the Silver Islet mine, one of the first found, produced during its lifetime much more silver than has any other mine to date.

Of course, prospecting and mining covered, necessarily, very limited areas during these early years, and not until latterly is the country receiving the attention it merits either from prospector or capitalist. The lowest workings in the Bruce group are at about 550 feet; but stoping has not been carried quite so deep. It was found in the bottom levels that the copper content had decreased somewhat. In fact, according to the reports of two eminent engineers who examined the mine a few years ago, an average of about 3.5 per cent. is what the ore now shows, which made it impossible to profitably operate at that time when the ore had to be shipped as far as England. Just about the same time also the United States cut off the remaining market in that country by declaring an import duty on the concentrates of five cents per pound copper. This was no doubt the main reason for closing down in 1875. In 1899, on the strength of the above mentioned reports, the mine was taken over by another English company, put in shape for mining, and a concentrator erected of the most approved design to have a daily capacity of between 400 and 500 tons of rock. Provided the mine can show the quantity, it should be possible to now treat such ore profitably.

The Massey Station mine is one of the most promising in the area. The ore body, chalcopyrite in a silicious gangue, occurs in a wide dike of greenstone, probably a diorite, and either in or close to its contact with the quartzite country. It has a width of from six to eight feet. It has been opened out to below the 600-foot level, and throughout will average about four per cent. copper. Some four thousand tons of such ore was raised during the past year from the development work alone. Not until now, however, after first definitely satisfying themselves by this extensive preliminary development that the ore exists in merchantable quantity and of a quality requiring certain means of reduction, has the company given the question of treatment active consideration. This commendatory example of judicious mining might well be followed by other operators in the Province. For a month or so this spring experimental runs have been made on this ore at the Victoria mine smelter, temporarily leased for the purpose, and some blister copper produced. A 50-ton Elmore oil concentrator is now being erected at the mine, more as an experiment on this class of copper ore than with the intention of permanent adoption.

The Rock Lane mine, on the other hand, stands out in the district as a regrettable case of energy misdirected from the start. There, extensive surface plant, including mining machinery, railways and finally a 22-ton concentrator, was installed and built before practically anything was known of the size, value and character of the ore body. The stockholders did all this on their own account without technical advice, considering, in their excited ignorance of such things that the

mere fact of having fine surface showings of ore was reason enough for their way of mining. Fortunately the ore body was large, and although opened out only to the second or 200-foot level, furnished sufficient ore at this one point of underground development to keep the concentrator running a year or more. With the workings gouged clean of ore, large additional working capital now became necessary; but this the stockholders would not put up and the property had to be closed. It is not fair to lay the blame to the ore body of which so little is known, especially when it is understood that the vein can be clearly traced for considerably more than two miles over the surface. The ore stopped from the vein ran in width from ten to twenty-five feet, with an average copper content of about three per cent. It consists of quartz intermixed with more or less trap, the whole impregnated with the chalcoppyrite and with some of the secondary copper oxides, and fills a fault fissure in the brecciated trap of this area near the contact with the Huronian quartzites.

There are a number of other promising mines in the area, amongst which may be mentioned the Superior, which has been under active exploratory mining for the last two or more years, as a result of which some remarkably rich chalcoppyrite ore has been produced. On Lake Wahnapiatae also some copper-bearing veins have recently been opened up.

In the Parry Sound area, surrounding the town of that name, only two mines, the McGown and Wilcox, have produced and marketed any ore, and that only in limited quantities. Development throughout the area is superficial and accomplished without much system or energy. The Wilcox during the latter months of last year re-opened and raised about 2,000 tons of four per cent. chalcoppyrite ore. The copper in the area occurs usually as chalcoppyrite segregated through mineralized bands of the gneiss country; massive bornite veins up to three feet wide were found on the McGown intersecting these other mineralized bands.

(To be continued.)

### The Hall Mining and Smelting Company, Limited.

The fifth annual report of the Hall Mining and Smelting Company, which was presented to the shareholders on the 31st of October, is of interest to a sufficient number of our subscribers to justify its insertion in full, did our space permit. We regret that we are unable to find the space, but we insert in full the chairman's address, and give a summary of the reports of the business manager and of the manager of the smelter.

The fifth ordinary general meeting of the Hall Mining and Smelting Company, Limited (British Columbia), was held on Monday at River Plate House, Finsbury Circus, Lord Ernest Hamilton (the chairman) presiding.

The Secretary (Mr. A. E. Ashley) having read the notice calling the meeting, and the auditors' report having been also read,

The Chairman said the item of interest which will first strike any shareholders who have looked at the accounts for the past year will be the fact that this year we have made a profit, as against a loss made last year. I do not want to dwell particularly on the profit we have made, because it is a very small profit. It is hardly worth talking about, except as an indication, and I think, as an indication it is of considerable value, because since the company has ceased to depend on the Silver King mine as its chief source of revenue, we have rather got into the habit of looking upon the smelting business as being very little more than self-supporting. However, in this past year that smelting business has shown a profit. That is an indication of possibilities to come, and, as such, I think it very interesting. Now, the reasons that have enabled the smelting business this year to show a profit are set forth in the report. You will see that there have been two causes; one has been the bounty on lead announced by the Canadian Government, and this bounty gave a very distinct stimulus to the lead-mining industry in British Columbia during the latter half of the period under consideration. During the first six months of the past year this did not take effect,

and, therefore, the benefits arising from it were not felt by this company; but during the last six months they were felt to a very appreciable amount. That is one of the causes, and the other is the possession, which we have had during this period of a one-fourth interest in the Emma mine, which has enabled us to supply our smelter with fluxing ore of a very suitable quality, and without experiencing the difficulty we have always had in former years of obtaining a constant supply of good fluxing ore, because, unless the supply of fluxing ore is constant, it is of no value at all. You must have a supply that you can absolutely depend upon, and that we have got in the Emma mine. I will refer later to the Emma mine; but at present I want to confine my remarks to the smelter. I said that this small profit we had made this year is an indication, and I think it is an indication, because it is the result of certain conditions, which have existed during that time, but which have not existed in previous years. These conditions are still with us, and there is no reason why they should not remain. Thus the profit we have made will, as far as one can see, in all probability be a permanent profit; and it is probably a profit which will be on the increase from year to year, both on account of the gradual improvement in all British Columbian affairs, and also on account of the gradual improvements we are from time to time making in our smelting plant.

You have had explained to you on former occasions that our smelting plant is not everything which could be desired; it is rather an obsolete plant, and it is not built on good economical lines. This entails a great deal of hard labor, and consequently a great deal of expense in working. That might be altered if we were in a position to make a large outlay on the improvement of our smelting plant; but we are not. We have not sufficient capital to do this in one year; therefore we have to be content with doing it by degrees. We have done a little every year, and during the past year we have instituted several distinct improvements in the smelting plant, which will have an effect upon its economical working. At the present moment we have in contemplation, as you will see by the report, a new process. We say the Board have in contemplation a new process, but we say that we cannot state more than that we have our eye on a certain process, which claims to greatly reduce the cost of smelting and to greatly increase the material results. The shareholders will agree with the Board that it is not the province of this company, with its limited capital, to experiment with any new process, and it is not our intention to make any experiment whatever with regard to a new process. Many of us have had experience of new processes, and I think the experience of everybody is that in 999 cases out of 1,000 they are valueless, however much may be claimed by the inventors. What we intend to do is to assure ourselves that this process, which is in active operation on several smelting plants, is a success, and if we are absolutely confident that the process is a success on the smelters where it is in operation at the present moment, we may possibly consider its adoption. That is all that is meant by the paragraph.

### The Emma Mine.

Now, I will pass away from the smelter, and say a word about the Emma mine. I do not want to go into any figures with regard to it, because the figures are small. I said a little about it last year when I addressed you. I said then that we anticipated this Emma mine would turn out a profitable investment, and there is no doubt it has turned out an exceedingly good investment. The benefits arising from that investment can never be set out quite clearly in any balance-sheet, because the greater part of these benefits appear in the smelting profits, and are not directly put down to the credit of the Emma mine. The chief benefit to us is from the supply of fluxing ore, which goes to our own smelter; but we have every reason to believe that the Emma mine will turn out quite a profitable investment, apart from the benefit which it confers on the smelter by the supply of fluxing ore. I do not want to make too much of it, but as far as it goes it is good, and from every promise it will be good in the future.

### The Silver King Mine.

As to the Silver King mine, our agreement with Mr. Davys expired on 6th August last, and since that time the mine has simply been kept alive by a man, to whom we leased it, and whose operations have been on a very small scale. As you will see, however, we have made an arrangement with Mr. Davys, and I think it is a good arrangement. Mr. Davys, during the term of his lease, worked the mine down to the floor of the fifth level. The fifth level is the drainage pipe; if the water is not pumped out, it stands in the mine up to the fifth level. Mr. Davys is confident in his own mind that under the floor of the fifth level is a very considerable body of good grade ore. We have had several interviews with Mr. Davys during the last six weeks, and it occurred to us that, if he was so very confident of the existence of this body of ore, he would be willing to share with the company the expense of unwatering the mine, and to this he agreed. The position, therefore, is that Mr. Davys and the company are partners in the expense necessary for unwatering the mine down to the seventh level, and that the proceeds of any ore extracted between the seventh and fifth levels will be divided

equally between Mr. Davys and the company. The advantage of this arrangement to the company is that, in the first place, we are saved the expense of a mine manager, because Mr. Davys, being a partner, naturally expects no salary, and also there is the fact that the man who will be watching and directing the operations, is the man who is personally financially interested in the results. When that is the case, it is beyond all question that a man devotes greater energy to his work and is more careful in promoting economies than when he is simply the paid servant of a company several thousand miles off. If the unwatering process and the development consequent upon that process give indications of any body of ore below the seventh level, that body of ore will be absolutely outside of this arrangement. It will be the property of the company, and the company will be at liberty to make a fresh arrangement or to do anything that seems proper with regard to that ore. That is another direction in which this unwatering arrangement will benefit the company, because it will enable them to exploit the ground below the seventh level, which, at the present moment, they are unable to do. I may mention that the business of the company, since the closing of the accounts, has been extremely successful, if I may use such a word. Thus the small success shown in the balance-sheet has been certainly exceeded by the three months following the 30th June. All the transactions that have come to us are quite good. You will see that the item on both sides of the smelting account amount to over £200,000 in money. It must, therefore, be clear to you that when figures are as large as that, a very small reduction in the working expenses, and a very small improvement in the methods of smelting, may turn the small profit we have this year into a profit which is worth talking about—that is to say, a profit which may come within the range of dividend paying. I do not want to be too optimistic, but I think, generally speaking, that the whole of the business looks healthier at the present moment than it has done for some years past. Before I sit down I must take this opportunity of expressing the appreciation of the Board of the services of our excellent representatives on the other side. We think they have worked extremely well over there, and they have served the company in a manner of which I can hardly speak too highly. I will now formally move the adoption of the report and balance-sheet. (Applause.)

Mr. George Freeman seconded the motion, and congratulated the shareholders on the company having, as he believed, turned the corner, so that they might look forward to a very fair measure of success in the future. (Applause.)

The resolution was then put and carried unanimously.

On the motion of Mr. Freeman, seconded by Mr. Stratten Boulnois, Lord Ernest Hamilton was re-elected a director.

The auditor, Mr. Harry Barker, was also re-appointed.

On the motion of Mr. Ellis, seconded by Mr. Christie, a cordial vote of thanks was passed to the chairman, directors and staff, and the meeting separated.

In the report of Mr. J. J. Campbell, the business manager, it is noted that the tonnage obtained by Mr. Davys, the lessee of the mine, amounted to 4,341 tons, which contained an average of 3.66 per cent of copper and 21.4 ounces of silver. Mr. Davys' work was confined to the workings above No. 5 tunnel, and an attempt was made to get below No. 5 by syphoning out some of the water, but it was unsuccessful. Investigation of concentration methods has not yet led to satisfactory results. The development of the Emma mine produced 29,975 tons of iron ore for flux, of which 9,057 tons were used by the company and the balance sold to other smelters. The development of the Emma mine shows large reserves.

The stimulating effects of the Lead Bounty Act were not felt until February, 1904, and a considerable amount of the bounty due had not been paid at the date of the report. There has been no improvement in the market supply of profitable silicious ores, but since February the Hunter V. mine has supplied an ample amount of high grade limestone.

Mr. Robert R. Hedley, the smelter manager, reports that No. 1 blast furnace was operated for 204 days, and No. 2 furnace for 324 days, yielding bullion which contained 1,096,415 ozs. silver and 9,201 ozs. of gold. The copper matte carried 41,294 ozs. of silver, 130 ozs. of gold and 130,800 of copper, making the total gross value of the product for the year about \$1,600,000. The maintenance of the plant has been heavy, amounting to \$22,000, the chief item of which is the new method of connection between the railway cars and the gravity bins, whereby the labor cost of handling the ore, fuel and fluxes has been much reduced, aggregating a saving of over \$12 a day. The balance sheet of the mine is as follows:—

**.BALANCE SHEET.**

	Dr.	£	s.	d.
To Balance Forward .....		299,557	0	0
To Creditors:—				
Bank—on Loan Notes secured by charge on Company's stock, supplies, etc., etc.....		40,588	9	6
In London .....		422	19	11
In British Columbia .....		5,922	18	2
		£346,441	7	7

	Cr.	£	s.	d.
By Balance Forward .....		203,932	19	7
By stock of supplies, etc .....		7,177	12	7
" fuel, fluxes, ores, etc .....		17,160	19	4
Bullion and shipments .....		23,446	3	8
Debtors:—				
In London .....		50	0	0
In British Columbia .....		995	6	1
Cash—London and British Columbia .....		11,015	19	2
Profit and Loss .....		22,662	16	2
		£346,441	7	7

The General Account of the Company is given in the Report as follows:—

	Dr.	£	s.	d.
To general expenses of the Company—in British Columbia and London .....		1,787	6	9
Debiture interest .....		1,473	12	0
Exchange .....		15	0	5
Balance, being profit (subject to charges of £4,550 13s. 2d., for maintenance of smelter, buildings, plant and machinery, and of £10 13s. 8d., for depreciation of office furniture in London) carried to balance sheet .....		6,258	7	11
		£9,534	7	1

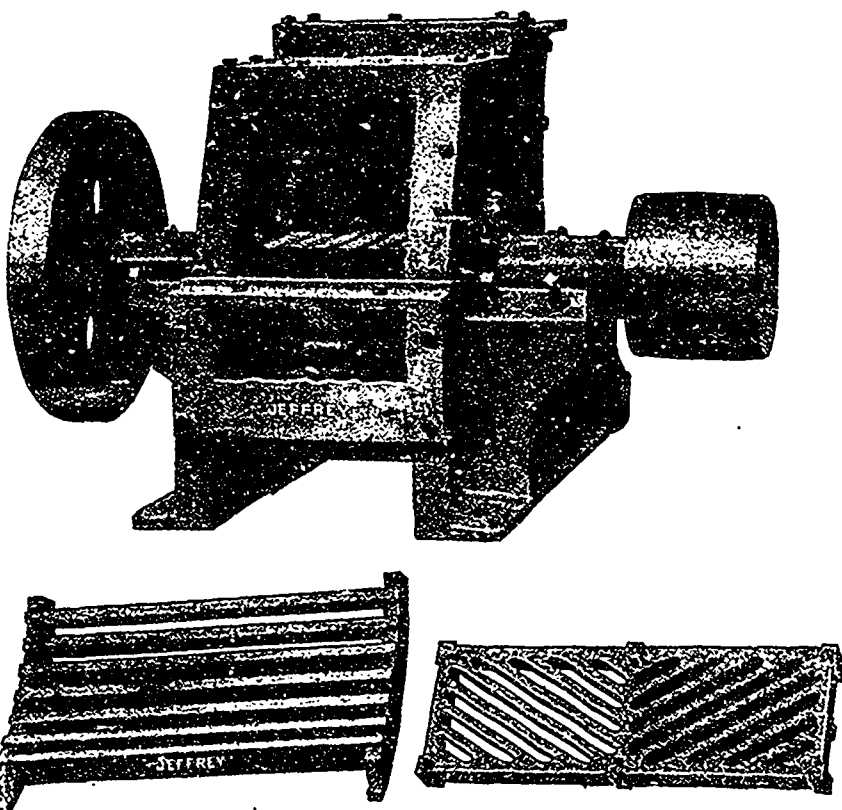
	Cr.	£	s.	d.
By profit on mine account—Brought down .....		1,042	12	1
Profit on smelter account (subject to charges for maintenance, as above)—Brought down.....		8,394	8	6
Sundry receipts, including rents and other receipts in British Columbia, and transfer fees and interest in London .....		97	6	6
		£9,534	7	1

**A New Type of Pulverizer.**

The accompanying illustrations show a type of pulverizer which is designed for crushing or pulverizing materials such as coal, clay, shale, etc. The claim made for the type is that it is the simplest made, the action being similar to that of a hammer.

Its features are the "beater" hammer, the V-shaped screening bars, and the simple method of adjusting the beater arms to accommodate the wear of the hammer faces. The accessibility of the inner parts of the machine is one that will be appreciated.

The manufacture of this machine has been taken up by the well-known Jeffrey Mfg. Co., of Columbus, Ohio, who announce that they are prepared to make free crushing tests for interested people. The machine is no experiment, as many of them are now in successful use.



## BOOK NOTICES.

The Sullivan Machinery Co. have just issued a very handsome and attractive booklet on Modern Practice in Air Compression. It is a trade catalogue, to be sure, but it is so well printed and the illustrations are so well executed that customers will have pleasure in consulting it.

Fraser & Chalmers, Ltd., of London, England, have issued a series of catalogues similar to those which the old American firm used to issue before it was merged into the Allis-Chalmers corporation. The general or index catalogue is of value as listing briefly the machinery supplied. The Canadian representative, Mr. W. Stanley Lecky, Montreal, can supply the detailed catalogues to inquirers.

The Engineering and Mining Journal have just published a volume by J. E. Clennel, B.Sc., on "The Chemistry of Cyanide Solutions resulting from the treatment of Ores," which will be welcomed by chemists having to do with the cyanide process. Methods for the determination of Free K Cy, total K Cy, H Cy and available K Cy take up about one-half of the book, and the various processes are commented on. The rest of the book is devoted to the estimation and action of Alkaline constituents, Reducing agents and inactive bodies.

The various complexities and ramifications of the subject are dealt with minutely and clearly, and the book is a necessity for the shelves of the metallurgical chemist.

The Mining Magazine for October is called its "Power Number," by reason of its descriptions of various applications of power to mining work. Beginning with a description of hoisting means and methods in the Joplin zinc district of Missouri, the reader is taken through hoisting in the coal fields of Indiana and Illinois, treated to dissertations on Electric Mine Haulage and Compressor Air Haulage, to conclude with descriptions of various gas engine plants.

As usual, the Mining Magazine is well dressed, and the articles well written as a whole, and the department called "The Mining Digest" is becoming more and more comprehensive and valuable each month. We know of no publication giving equal value for the low cost.

Through the courtesy of the secretary of the Montreal Board of Trade, a copy of "Official Bulletin, No. 12," issued by the Bureau of Provincial Information of the Province of British Columbia, has been received by the Review. The bulletin has been printed in the size of a handbook, which adds to its acceptability, but the putting of the Table of Contents at the end, rather than at the beginning of the book, is a matter of taste to which exception may be made by some users. To the Review, the book appears most admirable: the early mineral history of the Province is clearly and succinctly related, and the chapter on "Outlook on Zinc Mining," is of the greatest importance at the present time. The possibilities of platinum, cinabar and iron are discussed briefly.

The chapter on "Smelting Works, etc.," by Mr. Ernest Jacobs, is a careful compilation of existing data regarding the present smelters of the Province, and of those other works, such as concentrating plants, which are of special interest in connection with the output of the Province. The book was specially gotten up for the St. Louis Exhibition, but it forms a valuable and permanent record.

### Mining Share Market.

Outside of three or four stocks, there is but little change in prices, the most active being Granby Consolidated, which has advanced in sympathy with other copper stocks and become quite active in the Boston market.

The dividends on St. Eugene and Canadian Gold Fields have had a beneficial effect on the market generally, and very few shares of any British Columbia companies are offering, but the public has not yet become sufficiently interested to create any demand.

The industrial stocks have all been fairly active, and show material advances for the month. This is due to the continued improved trade outlook and an increasing speculative demand, following the movement in the similar class of securities in the New York market, and the plentiful supply of money available for loans.

The following list shows the quotations for the month ending Saturday, November 26th, 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.....	.07½	06½
5.00 Cariboo Hydraulic .....	.75	—
1.00 Centre Star .....	.25	.24½
1.00 Deer Trail Consolidated.....	.02	—
1.00 Giant .....	.03½	.01
10.00 Granby Consolidated .....	5.50	5.25
10.00 Montreal and Boston .....	1.00	—
1.00 North Star .....	.02	—
1.00 Payne .....	.04	.02
1.00 Rambler Cariboo .....	.17	.16
1.00 Republic .....	.03½	—
1.00 St. Eugene .....	.50	.47½
1.00 War Eagle .....	.12½	.11
1.00 White Bear .....	.04½	.04½
100.00 Nova Scotia Steel (common).....	.66	.65½
100.00 Ditto ditto (preferred).....	—	1.05
100.00 Dominion Coal (common).....	.62½	.61½
100.00 Ditto ditto (preferred).....	1.16	1.15
100.00 Dominion Iron and Steel (common)....	.17½	.17½
100.00 Ditto ditto ditto (preferred)....	.48	.47
— Ditto ditto ditto (bonds).....	.77	.76½

## ELECTRICAL NOTES.

Three Westinghouse 62½ kilowatt engine type generators, which have been in service in the basement of the New England Building, in Cleveland, Ohio, have recently been subjected to a severe test. A fire occurred in the basement where the generators were installed, and completely burned away the insulation on the outside of the field coils; the fire department played on these machines for over one hour. Within one hour from the time the water was turned away from the machines, one of them was in operation and carrying its full rated load. The second machine was put in operation later, and at the present time these two machines are operating under the load normally carried by all three of them.

The fire-proof insulation of the field coils withstood the fire perfectly, even though the outer protected coverings were entirely consumed. Electrical machinery, as usually constructed, is scarcely expected to stand a fire and water test, but it appears that such a guarantee might have been made on these generators.

A somewhat unique departure from established methods in electric traction has recently been undertaken at Warren, Pa. The Warren & Jamestown Street Railway Company is equipping an A. C. single-phase electric railway system to operate between Warren, Pa., and Jamestown, N.Y., for which power will be supplied by gas engines operating upon natural gas. The equipment is now being constructed by the Westinghouse Companies at East Pittsburg, Pa.

The power station will be located at Stoneham, Pa., two miles from Warren. The initial equipment will consist of two Westinghouse gas engines, each of 500 brake horse power capacity. They will be of the horizontal, single-crank, double-acting type, direct connected to two 260 kw. Westinghouse generators, furnishing current at a voltage sufficient for direct use upon the high tension transmission line. The power equipment also comprises a 55 h.p. Westinghouse gas engine for operating air compressor and exciter unit. Natural gas will be used, furnished by the local distributing company. In this district the gas has a calorific value of about 1,000 B. T. U. per cubic foot.

Transformer substations, five in number, will be located along the right of way. These will receive the high tension current from the transmission line and reduce the voltage to such an extent as to render it more suitable for use in single-phase motors. The present motive power equipment will comprise four quadruple sets of Westinghouse single-phase motors, each approximately 50 h.p. capacity.

An interesting feature of the system is the arrangement for operating the alternating current motors upon the direct current trolley lines within the city limits of the termini.

The Warren & Jamestown Street Railway is not a newly organized system, as it has operated part of the present lines for a period of eleven years. Three years ago the company began experimenting with the use of gas power, with sufficient success to influence them in the now exclusive adoption of gas engines for their entire power generation. The operation of the new system will be watched with much interest by the engineering public, and its success will mark an important advancement in modern electric railroading.

## PERSONALS.

Mr. R. A. Hadfield, head of the important Sheffield firm of steel manufacturers, has been elected to the presidency of the Iron and Steel Institute.

Vice-president Wood, of the International Nickel Co., was in Ontario during the month and inspected the works at Copper Cliff and the properties of the company.

Mr. W. Shoemaker, superintendent of construction work at the furnaces of the Nova Scotia Steel and Coal Co., at Sydney, has resigned, and will return to Pennsylvania.

Mr. F. L. Wanklyn, vice-president of the Dominion Coal Co., has been acting as general sales agent of the Dominion Coal Co. since the resignation of Mr. Abner Klingman.

Mr. F. T. Finucane, for many years connected with the Bank of Montreal, both in Eastern and Western Canada, has resigned, and will enter into business with Mr. Charles Sweeny.

Mr. John Hays Hammond, the well-known American mining engineer, has been very ill at his summer home, near Gloucester, Mass. He is now reported out of danger and on the way to recovery.

Mr. Patrick J. Dermody who, for years, has been the reliable and efficient foreman at the Granby mines, has accepted a similar position with the Providence Mining Company on November 1st.

Mr. Willard N. Sawyer, of the Wellman-Seaver-Morgan Company, of Cleveland, Ohio, has been appointed to succeed the late Cornelius Shields as general manager of the Lake Superior Corporation.

Mr. Hugh Fletcher, of the Geological Survey, is still in the field in Cumberland County, N. S. Mr. Fletcher enjoys the reputation of being the first of the staff to leave in the spring, and the last to return in the fall.

Mr. J. Obalski, Inspector of Mines for the Province of Quebec, has been awarded a gold medal from the St. Louis Fair for the completeness and informing character of his annual reports to the Quebec Government.

R. S. Dahl, of the Central Technical School, London, Eng., has been appointed Professor of Engineering in King's College, Windsor, Nova Scotia. Prof. Dahl has achieved success and reputation in the line of original research work in electricity.

Mr. Charles H. Wilkinson, of London, England, arrived in Canada early in the month, and has been looking into Kettle River Railway matters. Mr. Wilkinson will be remembered as one of the early promoters of the White Pass and Yukon Railway.

Mr. Henry M. Whitney, of Boston, was recently in Newfoundland with Mr. B. F. Pearson, of Halifax, where the two gentlemen arranged to transfer to representatives of the Messrs Harmsworth, the big London firm of publishers, the large and valuable pulp lands now owned by Mr. Whitney.

Prof. Ernest Rutherford, Ph.D., of McGill University, has been awarded the Rumford Medal by the Royal Society of Great Britain for his researches on radium and radio-activity. The Rumford Medal is one of the highest marks of distinction given in the world; it is awarded every two years to the author of the most important discovery, or improvement, in heat or light.

Mr. A. C. Garde, manager of the Payne mine, severed his connection with that company on the 1st of November. He was succeeded by Mr. G. F. Ransom, son of one of the Montreal shareholders. The closing of the mine and the leasing of both mill and mine to former employees are indications that nothing will be doing by the company for some time.

Mr. Horace Mayhew, of Chester, England, spent the month of November in Canada looking into the investments which he has made in this country.

Mr. Mayhew is one of the owners of the Alice mine, near Creaton, B. C., where a new wire-rope tramway has recently been installed and put in operation. He is also a shareholder in the B. C. Standard Company, which operates the Hunter V. mine near Nelson. The Hunter V. was started to supply limestone as a flux for the British Columbia smelters, but an increase in its gold values has dignified it so that it may be called a gold mine.

Mr. Mayhew is also president of The Cape Breton Coal, Iron and Railway Co., which acquired the Moseley and other areas at Port Morien in June last, and he went to Cape Breton from British Columbia, where he was joined by Mr. Herbert Gladstone, a director of the C. B. C. I. & Railway Co. Mr. Gladstone is a son of the late Right Hon. W. E. Gladstone. It is understood that business will keep both gentlemen in Cape Breton for a few days.

## INDUSTRIAL NOTES.

The A. S. Cameron Steam Pump Works have gotten out a miniature catalogue, which presents some of the distinctive features of this make of pump; the differential plunger sinking-pump and the vertical boiler feed pump present attractive features in their make-up and mechanical care which commend them to users of this class of machinery.

The Dominion Peat Products Company, Ltd., has come to financial grief. This company was organized with a capital of \$100,000 to work a peat bog in the vicinity of Newington, Ont., and obtained \$20,000 in cash, which has all been spent. More capital is needed for the plant, and to pay the liabilities, which amount to \$3,050. The balance of the capital stock is not saleable, and re-organization or liquidation are the alternatives. Dr. Spencer, president of the company, states that a syndicate is ready to take over the property and re-organize the company.

The Wellman-Seaver-Morgan Company, Cleveland, Ohio, was recently awarded a contract to construct two large coal-handling machines for the Boston Coal Dock & Wharf Co., Duluth, Minn.

The machines will consist of two conveyor bridges, each about 350 feet long, including front and rear cantilevers. The machines will be designed so that coal may be screened and loaded into box cars as well as unloaded from vessels, and will be built to be operated by steam. They will be equipped with 2-ton Hulett patent excavating buckets, and machinery designed to give maximum speeds of operation. The structural work will be of steel throughout, and the machines will be self-propelling along the dock.

A corporation composed of Montreal men has formed "The St. Lawrence Coal Company," to acquire and operate what has been known as the "Collins Coal Areas," in Cape Breton. The area obtained contains about 700 acres, which are to the westward of the General Mining Association's ground, and run to the east shore of the Little Bras d'Or. Three known seams of workable coal are comprised within the area: the Edwards seam, the No. 3 seam and the Collins seam, and each has been more or less developed.

The company has been capitalized at \$500,000, one-half of which is six per cent. preferred stock, and the balance common stock. The president of the company is Mr. James Robinson, Montreal, and the engineer is Mr. Charles Brandeis, who is also vice-president of the company.

The Ottumwa Box Car Loader Co., of Ottumwa, Iowa, whose advertisement appears in our pages, shipped one of their latest improved machines last month to the Dominion Coal Co., at Glace Bay. This loader is guaranteed to handle lump coal at the rate of 150 tons an hour, and load it in box cars without damage to either the coal or the cars. The Ottumwa Loader has proved itself valuable to many companies in Canada. The following coal companies are using it:—The International Coal & Coke Co., Coleman, Alberta; Canadian Pacific Railway, Fort William, Ont., Lake Erie Coal Co., Walkerville, Ont.; Acadia Coal Co., Stellarton, N.S., Intercolonial Coal Co., Westville N.S. The machine has been on the market now for about four years, and the large number of loaders in use prove it to be no experiment but an actual saver of time and money.

The annual general meeting of the St. Eugene Consolidated Mining Company, Ltd., was held at the company's office on the 8th day of November. The report presented of the directors was in marked contrast to those of the last two years. The cash surplus on the 30th day of December, 1903, was \$131,000, after paying off a liability of \$26,000. A quarterly dividend of two per cent was declared, payable on the 5th day of December.

Exclusive of the dividend, which is payable on December 15th, the Company has formerly paid dividends to the amount of \$210,000. The enormous output of 3,000 ton of concentrates per month was diminished during August, September and October by a shortage of water, which has crippled building operations. To remedy this, a large pumping plant is being installed to pump Moyle Lake to the concentrator, and the 200 horse-power engine is being added to the plant, giving additional power.

Messrs. Wm. Simons & Co., Ltd., Renfrew, Scotland, launched on the 10th of November, complete, with steam up ready for work, the twin-screw, light draft, bucket ladder hopper dredger "Manar," built to the order of the Secretary of State for India.

The vessel is fitted with two sets of triple-expansion surface condensing engines, supplied with steam from two steel boilers constructed for a working pressure of 160 lbs. per square inch, and powerful manoeuvring winches are placed at bow and stern for manipulating the dredger when at work. Independent hoist gear is provided for controlling the bucket ladder. Ample accommodation is also provided for officers and crew.

The "Manar" was constructed under the direction of Sir A. M. Rendel, K.C.I.E., consulting engineer for the Indian Government, and under the direct superintendence of Mr. Seymour B. Tritton, M. Inst. C. E., London, assisted by Mr. Gaze, resident inspector.

## MINING NOTES.

### NOVA SCOTIA.

The Nova Scotia Steel and Coal Co. has made a claim for a bounty on iron smelted at the Sydney Mines Furnace since August 31st. The amount smelted since that date, on which bounty is asked, is 3,575 tons

The Hub, or No 7 colliery of the Dominion Coal Company, has stopped coal cutting until navigation re-opens next spring. During the winter, work will be confined to driving the deeps and removing pillars. During the season 500 men were employed, but 200 will suffice for the winter's work.

Parrsboro, N.S., is endeavoring to assist in every way the Standard Coal and Railway Co. which has been chartered to build a railway from Parrsboro to Truro. The new line would open up quite a section of new country, and would permit a large amount of the coal mined at Maccan and River Hebert to be shipped by way of the Bay of Fundy.

Since August the Dominion Coal Co. has been working single instead of double shifts at its various mines, and announces that it is saving money thereby. The requirement of a double shift was the necessity of keeping pace with the contracts which the company had made, and now that many of their summer delivery contracts have been filled there is no probability that a double shift will be again worked until next season.

The Fundy Coal Company, Cumberland County, N.S., has applied for a charter to permit of incorporating a company which shall include the grindstone quarries and the coal mines which they have been operating thus far independently. The output of grindstones is very considerable, and the tonnage of the coal mines is gradually increasing. The shareholders are from Providence, R.I., as well as from Nova Scotia and New Brunswick.

The importance of locating schools of engineering in the vicinity of large engineering works is being daily recognized by universities and large institutions of learning. One of the latest examples is the movement of King's College, Nova Scotia, to hold its school of engineering at Sydney, C.B. The first year of the engineering course will be given at King's College, at Windsor, N.S., but the other three years will be given at Sydney, C.B., where the degree will be conferred.

Springhill, N. S., is the headquarters of the Maritime Mining Students' Association. The organization of this association and its meetings are both interesting and instructive as may be gathered from some of the topics discussed at its last meeting, when papers on the following subjects were read. "Entering a mine for exploration after an explosion," "The bord and pillar methods of working," "Miners' Diseases," "Blasting," "Fire Damp," "Explosions and Afterdamp" and "The use of Explosives in Mines."

The Cumberland Coal & Railway Company are making important improvements at their West slope, the new large boiler house, new boilers and new machines for tipping the boxes on the tippie are among the changes which are now making. An endless picking belt has also been installed. Additions have also been made to the fire protection plant in the shape of a new steam pump and the location of hydrants about the works and lumber piles. The equipment of the West slope is rapidly becoming equal to that of any coal mine operated anywhere in Canada.

The Dominion Coal Company's output from the first of the year, with the corresponding figures for the same period last year, is as follows:—

	1903.	1904.
January .....	269,571	198,406
February .....	258,130	178,246
March .....	200,144	232,245
April .....	256,180	232,073
May .....	232,749	301,240
June .....	277,158	331,090
July .....	263,521	259,355
August .....	236,811	293,909
September .....	252,268	275,834
October .....	294,196	294,038

Halifax capitalists are reported to have purchased the Pictou Smelting Works which were built with considerable splurge a few years ago. The company which will operate the works is known as The Inverness

Copper Co., Ltd., who propose to increase the capacity from 100 tons to 300 tons per diem. It is reported that some \$220,000 have been expended on the plant, but this report lacks confirmation. The Inverness Copper Company is the name of a concern owning a large area of territory at Cheticamp, C.B. If the smelter can secure an adequate supply of ore and is managed by a competent man, it should at least pay expenses and would probably make a satisfactory profit; as to whether the ores from the Cheticamp district can stand transportation to Pictou, and the expense of two staffs instead of one, is a matter which will shortly be demonstrated.

### NEW BRUNSWICK.

Some Moncton people are opening a coal seam which crops at Dunsmine, near Anagance.

The New Brunswick Petroleum Company has ceased its boring operations for the winter, but the yielding wells will be pumped throughout the season.

The Maritime Copper Reduction Company, operating at Goose Creek, is in trouble on account of the refusal of shareholders holding some 50,000 shares to consent to a further development of the property; the tie-up is embarrassed by the refusal of these shareholders to sell their stock. It will be remembered that some of these shares are owned in the United States, chiefly in New York.

The Dominion Coal Company completed, during the month, the building of the best wharf in the harbor of St. John; the coal pockets have yet to be erected. The wharf is 300 feet long with a width of 80 feet; the coal pocket will be 240 feet long and 30 feet wide. There will be a power-house on one end of the wharf, but as to whether steam or electricity will be utilized has not yet been decided.

Application for incorporation has been made to the Legislature of New Brunswick by "The New Brunswick Iron Company, Limited." The provisional directors named in the application are: John S. McLennan, of Sydney, C.B.; Charles W. Young, of St. Stephen, N.B.; Leonard B. Knight, of St. John, N.B.; A. D. Wetmore, of Truro, N.S.; and Charles V. Wetmore, of Sydney, C.B. The capital is to be \$1,000,000 in 10,000 shares of \$100 each, and the chief place of business is to be Lepreaux, Charlotte County, N.B.

The death of Mr. E. B. Ketchum removes from New Brunswick one of its most active and enterprising citizens. The variety of activities in which this gentleman was engaged was considerable; he was a successful mariner, trader, manager of a cotton manufactory, and an industrial man. He was a native of St. John, N.B., and was seventy-three years of age when he died. Before he was twenty-one he was in command of a full rigged ship sailing from St. John, at the age of twenty-five he entered the employ of the Albert Mining Company, eventually becoming its manager. The limited mining history of New Brunswick loses quite an important figure in the death of Mr. Ketchum.

Dr. Matthew, of St. John, N.B., has sold his valuable collection of Cambrian fossils to Mr. William McKenzie, of Toronto, who has presented it as a gift to Toronto University. The price paid for the collection was \$2,500.

The collection represents the gatherings made since 187 for a period of twenty-seven years, and consists of the best representation of the life of the Cambrian period, as shown in New Brunswick, Nova Scotia, Cape Breton and Newfoundland rocks. The collection contains 130 genera, 13 sub-genera, 380 species, 41 mutations and 68 varieties, it consists chiefly of sea shells, worms and crustaceans. Toronto University is to be congratulated upon the possession of such an exceedingly valuable collection.

### QUEBEC.

A promising deposit of iron ore has been discovered on the farm of Mr. William Talmage, near Sweetsburg.

The Bell's Asbestos Co., Ltd., announce that they have been again favored with the contract from the Admiralty for the supply of their asbestos specialties.

The Hamilton Powder Company had an explosion at its works at Windsor Mills this month, by which two workmen lost their lives, and one small building was wrecked.

The McKenzie Trading Company has been absorbed by a new corporation as a result of the mineral discoveries which have been made in the northern part of the province, and to which reference is made in our correspondence. The new company will send an expedition into the Lake Chebogamoo district next spring.



## ONTARIO.

One of the Canadian Copper Co.'s plants at Copper Cliff is out of commission in consequence of a "freeze up."

The Burgess phosphate mines shipped 100 tons during the second week of November.

The old mill at Cragmont, formerly used to concentrate corundum, has been destroyed by fire.

The water power at Turbine is now controlled by the Huronian Company, whose first installation will be of 6,000 horse power.

It is reported that the Chambers-Ferland nickel mine, in the Temiscamingue section, has been sold to the International Nickel Co. for \$400,000.00.

The delay at Copper Cliff occasioned by the breaking of the electric crane has been overcome by the installation of a new crane, and the furnaces are all now running satisfactorily.

The local newspaper at Halleybury is authority for the information that Duncan T. McCann, of Eganville, has bought a share in H. Wright's silver claim on Kerr Lake, near Halleybury.

The Laurentian and Volcanic Reefs Mining Companies are constructing a new road from Dinoric station to the mines, in the Manitou district. The length of the road is eighteen miles.

The water power of the Wahnapiatae River will be harnessed this winter to an electric generator which will, next spring, supply the town of Sudbury with light and electric power for the water-works pumps.

The Government paid out about \$75,000 for bounties on crude oil in October, the greater part of which went to Ontario. It is expected the total disbursement on this account for the twelve months will amount to \$300,000.

Messrs. Duncan, Dunfield and Wilkinson struck a large gusher in Moore Township, near Petrolea, on October 31st. The column rose to a height of forty feet, and marks one of the largest flows of oil and gas ever known in Ontario.

Mr. W. E. H. Carter, one of the Bureau of Mines Inspectors, is authority for the statement that A. L. 282, known as the "Sunbeam" mine, has recently sent two gold bricks to the assay office; each was of the reported value of \$3,000.

W. E. H. Carter reports that new and important bodies of high grade hematite have been found on the line of the Algoma Central Railway, in the lower levels of the Williams Iron Mine. The clean ore measures twenty-three feet across, and there is an additional ten feet or more of second quality ore.

The City of Belleville, after making a bonus agreement with the Iron and Steel Company of Canada, recently attempted to collect taxes from the company. An injunction to restrain the city from attempting to collect was recently granted by the Court to the Iron and Steel Company, which will now go as before.

During the past season Professor W. L. Goodwin, director of the School of Mines at Kingston, and J. W. Bain, of the School of Practical Science, Toronto, have held ten schools of instruction at mining camps in Ontario. Instruction was given in geology and mineralogy and night lectures with lantern views, obtained by an acetylene plant.

Mr. E. D. Ingall, Statistician of the Dominion Geological Survey, reports great stagnation in the copper mining industry in the region near the Soo, and the Bruce Mines. The closing down of the Bruce property by the English corporation which owned it, and the litigation which has followed the Rock Lake property, is probably the cause of the present stagnation.

As a result of Dr. Haanel's trip of investigation made to Europe last winter in connection with the electric smelting of iron ores, two French gentlemen, Paul Koch and Jules Weill, have been looking over the Chat Rapids and the iron ores of the section to see what possibilities there are in Canada for the manufacture and sale of electrically-made steel and iron goods.

The Divisional Court at Toronto has dismissed the appeal of the defendants in the case of Cameron vs. the Mikado Gold Mining Co. The lower court had awarded the plaintiff \$1,411.03 on an agreement whereby he undertook control of the boarding house and stores of the company; subsequently it was sought to terminate the agreement. Judge Idington awarded the plaintiff the above amount, which award has now been confirmed.

From an English paper we learn that a corporation known as "The London and County Trust" is going to raise £1,000,000 sterling, for the purpose of developing mineral claims and concessions for a railway in the Rainy River District. The ignorance and folly of the promoters may be judged when it is stated that the scheme proposes to obtain water from Lake Simcoe for the purpose of generating electricity to be used in the Rainy River country.

The Stirling Co., of New Jersey, has obtained a judgment against the Nickel-Copper Co., of Hamilton, for \$68,231. The plaintiffs about two years ago advanced \$65,000 to the defendants on options, but the latter were unable to fulfil their obligations, hence a suit to recover the money with interest. The Stirling Co. will not be able to realize on their judgment for a time, as Mr. McConnel, of Ottawa, has a mortgage on the Nickel Co.'s property for about \$200,000 which takes priority. The Hoepfner Refining Co., composed of some of the officers of the Nickel Co., have also put in a claim of \$48,000 for rent, for which they made a seizure of the property.

It is reported that the Lake Superior Company has received enough orders from the Dominion and Ontario Governments to keep its rail mill running at its full capacity until June, 1905. The Dominion Government made a contract for 10,000 tons for the Intercolonial Railway, and it is stated that the Finance Minister has agreed to purchase all rails needed by the Government railways for relaying purposes during 1905, amounting to about 35,000 tons. The Ontario Government has contracted for all rails needed on the Temiscamingue line, which amount to between 15,000 and 20,000 tons. These large contracts, with the smaller ones that have been made, will take all the output until the middle of next year.

A suit has been instituted between a number of farmers and the Canada Corundum Co., by reason of an agreement in respect to certain mineral rights to corundum lands in the township of Carlow, under which plaintiffs claim to be entitled to shares in the Corundum Co., and to the payment of certain money. The defendants allege that plaintiff's abandoned their priority and suffered defendants to take out mining leases of said lands. At the trial in May last, Chief Justice Sir Wm. Meredith dismissed the action. On appeal this judgment has been varied by directing that the dismissal of the action is without prejudice to the right of any of plaintiffs to institute another action against defendant Craig for obtaining leases of the mining lands in question, and subsequently made to him by his co-defendants. In other respects the judgment of the trial judge is affirmed.

Professor W. G. Miller, provincial geologist for Ontario, has recently returned from his season's work in the field. His time was largely occupied in mapping out the valuable mineral discoveries which have been made along the line of the Temiscamingue and Northern Ontario Railway between North Bay and Halleybury. These deposits include native silver, cobalt, arsenic and nickel. Now that the railway is open for traffic five mines are shipping, and during the past two months many thousand dollars worth of the minerals specified have been sent to New York for treatment. New discoveries are constantly being made, and it is reported that one of the mines has been sold to New York capitalists. A new type of deposit of native silver has been found. The first deposits were in the slate or brecciated material, now the metal has been found in the diabase or gabbro. Prof. Miller has also made a preliminary investigation of the iron range discovered in the township of Boston, on the Blanche River. The ore is magnetic. The range is not so wide as at Tewagama.

The following mining leases, heretofore granted in Ontario, have been cancelled under section 36 of the Mines Act:—

Lease dated 16th May 1899, to Otto Taubert, for mining location K 475, being forty acres, and location K 476, being forty-two acres, near Seine River, in the district of Rainy River, for the term of ten years.

Lease dated 16th May, 1898, to the Bad Vermillon Gold Company, Ltd., for mining location G 213, being 183 acres, north of Seine River, in the district of Rainy River, for the term of ten years.

Lease dated 6th July, 1897, to George Heustis Campbell, for mining locations G 179 being 160 acres, G 180 being 213 acres, G 181 being 80 acres, G 182 being 18 acres, and G 183 being 40 acres, all near Bad Vermillon Lake, in the district of Rainy River, for a term of ten years.

Lease dated 10th May, 1899, to John M. Baer, for mining location K 602, being 60 acres between Shoal Lake and Mild Potato Lake, in the district of Rainy River, for the term of ten years.

Lease dated 27th April, 1898, to Donald Campbell Taylor, for mining location G 128, being 68 acres, and G 129, being 80 acres, being near the eighty-second mile on Niven's South Base Line, in the district of Rainy River, for the term of ten years.

Lease dated 17th June, 1897, to Solomon Lorle, for mining location K 477 being 40 acres, K 478 being 40 acres, and K 483 being 40 acres, near Seine River, in the district of Rainy River, for a term of ten years.

Lease dated 1st May, 1899, to Ernest William Calnek, David Morrah, and Howard Rosling for mining locations G 216 being 48 acres, G 217 being 40 acres, and G 218 being 34 acres, near Bad Vermillion Lake, in the district of Rainy River.

Lease dated 3rd March, 1897, to Ernest William Calnek and Henry Cockman for mining locations K 367, being 40 acres, near Seine River, in the district of Rainy River, for a term of ten years.

Lease dated 14th August, 1899, to George Stewart for the mining location known as the north half of lot number seven, containing 149½ acres, in the second concession of the township of Aberdeen, in the district of Algoma, for a term of ten years.

#### BRITISH COLUMBIA.

Examinations of assayers for licenses to practice in British Columbia are to be held at Victoria on December 5th.

It is reported that the Boundary Falls smelter will blow in its second furnace on the first of December.

The St. Eugene Mining Company has declared a quarterly dividend of two per cent., payable in December.

The Estella group on Tracey Creek, East Kootenay, is to be again worked after having been closed for some time.

F. Malcolm has taken a contract to drive 600 feet on the tunnel of the Ruth Mining Company. It will be driven by air drills.

After two years of idleness the Moille Gibson mine in the Slocan has recommenced work under the superintendence of Capt. Trethewey.

The Chapleau mine, near Slocan City, will be worked all winter, and the high grade ore will be raw-hided down to Slocan City.

The sixth annual meeting of the Centre Star Co. was held in Toronto on the 29th of November, too late for a notice to appear in this issue.

Henry Nicholson was appointed attorney in the province for the Waterloo Consolidated Mining and Milling Company on November 8th.

The Senator group in the Boundary country is shipping a carload of ore a day with a force of twelve men; the ore is sent to the railway in waggons.

The Ivanhoe and the Idaho are the only concentrators in the Sandon section which are at work at present; the scanty water supply is given as the reason.

The Wild Horse Creek section of East Kootenay cleaned up \$30,000 from hydraulicing for the season of 1904, which is an increase of 50 per cent. over 1903.

The lessees of No. 1 and No. 2 tunnels at the Payne mine have concluded their lease, during which they have shipped about 150 tons of good grade ore.

Operations at the Bad Shot mine in the Lardeau are reported to be closed for the season, after taking out thirty tons of high grade ore in forty-five days.

The Mother Lode converters are treating copper matte from the Montreal and Boston, and the Trail, smelters, in addition to converting their own mattes.

The old Stemwinder mine, in the Boundary District, made the first shipments of ore in its history this month. The ore went to the Boundary Falls Smelter.

Ernest Levy was appointed attorney for the Le Roi No. 2 Limited in the province on November 8th, in lieu of Paul S. Couldrey, whose appointment was revoked.

The Slocan Star is now the heaviest shipper of the Slocan Division; it is sending out from one to two carloads of ore daily. The ore is shipped directly from the mine.

The British-American Dredging Company, of Atlin District, are having a second and larger dredge built, which is to be completed and set up on the property next spring.

Some of the recent changes which have occurred at the Le Roi smelting plant indicate a desire for economy; two furnaces are now being operated in place of six as formerly.

Reports from Sandon, and the Slocan generally, say there has never been a time within the recollection of the oldest miners when the snow has held off so long as it does this fall.

The location surveyors for the final line of the railway from Golden to Fort Steele have finished work on the vicinity of Golden and have moved camp twelve miles up the river.

Mr. James Cronin, manager of the St. Eugene mine, has been elected to the directorate of the Centre Star and War Eagle companies, vice Mr. C. H. Gooderham, recently deceased.

Reports from the Ymir mine are to the effect that the outlook is much improved, and that the new manager, Mr. S. J. Speak, expects the property to soon return to a paying basis.

The Sullivan smelter outfit at Marysville, East Kootenay, is hard up for funds, and proposes to mortgage all its property for \$400,000 with which to complete the smelter and start work.

The Kootenay Ore Company at Kaslo, and the Monitor mine at Roseberry, are each erecting magnetic zinc separation plants; the former will be on Kootenay Lake and the latter on Slocan Lake.

Reports from Grand Forks, B. C., make the statement that a smelter man from Colorado has secured contracts for a daily tonnage of 700 tons, and will at once proceed to erect a custom smelter.

The Rossland papers say: "The examination of the Snowshoe mine, near Phoenix, is being continued with humorous solemnity, but the prospect of its being merged with the Le Roi is the same as before."

The high grade mines in the Boundary are coming to the front; at present sixteen claims around Greenwood are working with a total force of 150 men. This number of men is being steadily added to week by week.

On the 14th instant, Thomas and James Kennedy, of Nova Scotia, working in a coal mine at Canmore, in British Columbia, were blown to death by the explosion of a lamp in the dressing shed in which they were.

The Britannia mine at Howe Sound is asking its shareholders to agree to increase the capital from \$250,000 to \$625,000; the chief reason stated is that funds may be on hand to carry forward the work of development.

Shareholders in the Morrison mine, which was included in the combination out of which arose the Montreal and Boston Consolidated, are asking for information from that company; they say they have not received shares in the new company.

The Granby Company on the first of the month started sinking a winze from the 300 feet level of the Old Ironsides property; this winze will be sunk 100 feet. No. 2 shaft is already sunk to the 400 feet level, but no levels have been turned off.

The shortage of water in October handicapped the operations of the Rossland Power Company in its concentrating work at Trail, but the recent rains have given plenty of water and the Power Company's mill is now free from the water difficulty.

A. B. W. Hodges, general superintendent of the Granby properties, has devised a new electric arrangement for his six stacks by means of which they are rendered self-charging; five of the six furnaces have already been equipped with this device.

The Strathmore mine, near Greenwood, has struck a high grade galena carrying native gold and silver. Ore values are said to average \$100 a ton. Several tons of this high grade ore are now on the dump, and will shortly be shipped to the smelter.

Mr. H. Craven, of Rossland, has commenced hydraulic operations on the west bank of the Columbia River, two miles below Waterloo. The necessary head is obtained by pumping, at a cost which is said to be fifteen cents per cubic yard; the yield is stated to be forty cents per yard.

The Southeast Kootenay Coal and Petroleum Company is the name of an organization which has been formed to work coal and oil lands in East Kootenay district. This company has taken an American charter, and is capitalized at \$250,000, in 1,000,000 shares of twenty-five cents each.

The Payne mine has leased that portion of the mine lying between the second and the fifth levels to Messrs. Brown and Smith, and the mill has been leased to Mr. Little, the superintendent of the mill. Messrs. Brown and Smith were foreman and timekeeper, respectively, before the shut-down.

Mr. R. D. Fetherstonhaugh, of Atlin, is authority for the statement that the gravel mines of Spruce Creek, Atlin, can be worked more cheaply and in a more satisfactory manner by a steam shovel than in any other way. He is going to put on a 1,000 yard Marion steam shovel and try it next spring.

The Montreal and Boston Consolidated is reported to have "in sight" and blocked out some 2,000,000 tons of ore throughout the aggregation of claims which it controls. The average value of this ore is stated to be from 1½ per cent. to 1¾ per cent. of copper, and \$2.00 per ton in gold, or about \$6.00 smelters' gross assay value.

The Jumbo mine, near Rossland, is increasing its output steadily. October amounted to about seventeen tons, and it is expected that this will be doubled by the beginning of 1905. The Great Northern Railway is to construct a spur line to the Jumbo property to permit the rapid loading of Jumbo ores into the railroad cars.

The Mohican, in the Lardeau, has completed the laying in of its winter supplies. This mine has two distinct streaks of ore in the same vein. One is a chalcopryite carrying low values in silver (50 ozs.), the other is a galena which is often of high grade, picked samples showing eighty-two per cent. of lead, with 340 ozs. of silver.

Atlin district reports an increase of \$100,000 for 1904 over 1903, when the amount totalled nearly \$500,000. The largest clean up was made by the McKee Creek Company, which shows \$58,000 for the season; next in order are the Pine Creek Power Company, the North Columbia Gold Mining Co., and the British-American Dredging Company.

The report which has been current in Western newspapers that the Canadian Pacific Railway Co., had purchased the plant of the Cascade Power Co., at Cascade, with the intention of erecting a smelter at that point, is entirely without foundation. That offers of the plant to the Canadian Pacific Railway have been made is not denied, but the purchase is not contemplated.

Our advices inform us that the Le Roi Company will continue to use the Northport smelter, on which extensive repairs are making. A large force of men is engaged in making repairs to the furnaces and engines, and the buildings have had new roofs put on. It is also rumored that additional stacks will be built, and that the Snowshoe mine has contracted to deliver 100 tons of ore daily.

Early in the month the Providence mine, near Greenwood, reported a strike of high grade ore on a vein hitherto unexploited. The vein was stripped for 300 feet in length, and averages between ten and twelve inches wide; assays made showed \$10.00 per ton in gold and \$95.00 per ton in silver. The character of the ore differs from that in the workings of the old vein, carrying much native silver.

The charge made against Mr. Archibald Dick, Inspector of Mines for British Columbia, of receiving pay from the Crow's Nest Pass Coal Company, during the trial of the damage suits at Nelson, arising out of the Fernie explosion, is to be investigated by the Provincial Government. Mr. Dick has been suspended pending the investigation, and Mr. Frank Shepard has been appointed temporary inspector.

As lending credence to the stories which have been afloat for some time regarding the amalgamation of Le Roi, Centre Star, War Eagle and Snowshoe properties, comes the report that Mr. E. B. Kirby and Mr. Carl R. Davis have also been at Phoenix to examine the Snowshoe. Prof. W. R. Brock, of Kingston, Ont., and Mr. J. W. Astley, of the Le Roi, have been some time at the Snowshoe, as per the Review's announcement last month.

The Switzer-Robinson Corporation, of Atlin, B.C., have given a bond on 15,000 out of their 20,000 acres to the Guggenheims of New York; price is not made public. The Switzer-Robinson Corporation claim to have expended between \$500,000 and \$750,000 in lands and machinery; they have now two dredges operated by electricity on their claims on Pine and Spruce Creeks. The claim is made that the gravel runs as high as \$2.00 per cubic yard.

The Juno property on Morning Mountain, near Nelson, B. C., is to have a new stamp mill and a cyanide plant for the tailings. The main vein has an average width of eighteen inches, has been proved horizontally for 250 feet, and in depth to 600 feet. Values are not made public, but the statement is made that the ore has paid all the expenses attending 2,000 feet of development, and has \$20,000 on hand to meet the cost of the mill and cyanide plant.

The Windermere section of East Kootenay is having something of a boom, due to the impression of that region of British Columbia that a railway from the Crow's Nest Pass branch line to the main line near Golden will very soon be built. The charter for the road is held in the name of the Kootenay Valley Central Co., and it is understood that the delay in the construction is chiefly due to the company not receiving the bonus which was promised by the Provincial Government.

The October shipments of lead ore to the B. C. smelters were as follows:—

	Lbs. ore.	Lbs. lead contained.
To Nelson .....	2,578,375	1,221,501
To Trall .....	4,317,599	1,391,382
	<u>6,895,974</u>	<u>2,612,883</u>

a record of nearly 3,500 tons.

Shares of the Granby Consolidated Mining and Smelting Company have been very active on the Boston Exchange since the control passed to New York parties. The present distribution of shares is said to be as follows:—

The Nichols Chemical Company and associates .....	400,000
American Metal Company (Phelps, Dodge & Co.).....	100,000
J. J. Hill and Great Northern Railway.....	200,000
Canadian shareholders .....	350,000
Miscellaneous in the United States.....	285,000
Total .....	<u>1,335,000</u>

No successor to Mr. H. S. C. Miner has been elected.

The B. C. Standard Mining Co., Ltd., owning and operating the Double Standard and Hunter V. mines, are now shipping 160 tons a day to the Granby, Northport, Trall and Nelson smelters. The bulk of this output maintains the previous high standard of 45 per cent. Ca. O. with 12 per cent. of Si O<sub>2</sub>. A portion of the ore body recently opened is more silicious, carrying from 25 to 35 per cent. of silica, but also running much higher in metal values, viz., from \$8 to \$10 per ton. The crushing plant which is under consideration will save much hand labor in bulldozing and hammer-breaking. The larger quarry is 140 feet wide with ore on all sides; the smaller one, 1,400 feet distant, is opened by a pit about 70 x 100 feet.

The right of a placer miner to stake a claim above a quartz mine has been confirmed by the recent decision of the full court, consisting of their Lordships Chief Justice Hunter and Justices Duff and Morrison, who dismissed the appeal of the Northern Mining Company, for a reversal of the judgment of Mr. Justice Martin on the same subject several months ago. In summary, the case showed that a placer miner named Tanghe had staked a claim above the Lucky Jack mine, operated by the defendant company, but had abandoned it to move aside, that he might not interfere with the quartz miners, but as the ground proved very rich, he moved afterwards to re-possess himself of the claim, and the court confirmed his right to do so.

The Centre Star Mining Company has entered an action for damages against the Rossland-Kootenay Mining Company, owning the Nickel-Plate mine at Rossland. There are several counts to the suit; one is for trespass and mining of ore belonging to plaintiffs, which fact is not disputed by defendants, but the answer is made that such trespass was the act of a predecessor in the title of the present defendants, and that present owners are not liable. At a former trial decision was for defendants, and in the appeal the plaintiffs ask not only for damages for trespass and refund of value of ore taken, but also for an injunction to restrain the owners of the Nickel-Plate from filling the Centre Star workings with water. The Nickel-Plate has been shut down for some time, and the water from that mine flows through the trespass workings into the Centre Star mine.

On the 18th of November an explosion occurred at the Carbonado mines near Morrissey in the Crow's Nest Pass region which killed fourteen miners. The explosion was of coal gas, and the place was in No. 1 mine, which is ten miles west of Fernie. The only man in the mine who escaped was D. D'Arcy, a mule driver, who was on the way out when the explosion occurred. Last year a similar explosion occurred at this colliery which killed four men, and about a year ago there was a break out of gas on the upper tunnel which shattered the roof and filled the tunnel with debris for 350 feet, but no lives were lost. This last explosion is the third in this particular mine in one year.

The Crow's Nest Pass Coal Company has been unfortunate in its experiences in No. 1 mine; they have endeavored to counteract the dangers encountered from the large amount of gas occurring in this section, and have driven a second tunnel for safety; it is now expected that the No. 1 Morrissey mine will be abandoned. At Coal Creek the company are operating successfully six mines, at Michel eight mines, and at Morrissey six; the capacity of these twenty openings is in excess of 3,500 tons a day, and some 1,200 tons of coke are made daily for the smelting industries of western British Columbia.

## NORTH-WEST TERRITORIES.

The West Canadian Collieries Company are making preparations to increase the output from the Bellevue mines. Yards and sidetracks have been made which will enable the company to handle at least 600 tons of coal a day.

The Imperial Coke and Coal Company have been opening up their coal areas on the Fording River; should the C. P. R. build a branch to its own collieries in this vicinity, the company may be expected to put in its own spur and thus have connection with the outside world.

The Canadian-American Coal Co., operating at Frank, Alberta, have installed a 400 horse power hoisting engine, and are erecting a new gallow's-frame and tibble. As soon as these are finished all shipments will be made from the shaft instead of the tunnel, as the shaft will serve all three of the seams now being worked. The present daily output averages 700 tons, all of which goes to the C.P.R.

## THE YUKON.

From the 1st of December, 1903, until the 21st of October, 1904, the Town of Dawson lost 2,400 in population, according to the Yukon World. The bulk of these people went to the new diggings at Tanana.

Ordinary sluicing ceased on the Klondyke about the 10th of October this year, having opened early in May; this year's season therefore has been the longest known on the Klondyke since its discovery.

Sulphur Creek reports greater activity in October than in September, and a very encouraging outlook for the winter. The large companies have let out a large number of lays, and a big spring clean-up is anticipated.

The Post Office Department have made arrangements with the North-West Mounted Police by which the latter will carry mail this winter to outlying points; for this service policemen will receive additional remuneration.

The season on Clear Creek has been wet, but has not diminished the amount of work done. Provisions will be very scarce throughout this district this winter on account of failure of supplies to reach the upper portion of the left fork.

The recent discovery on Bounty Creek, a tributary of Rosebud Creek which flows into the Stewart River, is believed to be a continuation of the famous White Channel; the wash, the character of the gold, bed-rock, etc., all resemble the same features of the White Channel on Bonanza.

Mr. J. B. Tyrrell, formerly of the Dominion Geological Survey, but for the last two or three years practicing as engineer in the Yukon, has brought suit against the Bronson and Ray mining concession for the sum of \$30,000, alleging that this sum is due for services rendered and moneys invested in the concession; Mr. Tyrrell is himself a shareholder in the Bronson-Ray Concession.

The dredge at work on Bonanza, and the steam shovel operating at the mouth of Bear Creek, both report very satisfactory results for the season. The dredge has worked without interruption from May 5th to October 22nd, making a season of 170 days. Reports from the steam shovel plant are equally satisfactory, the only trouble experienced being the large amount of water seeping into the cut from the river.

Owners of big pumping plants, pumping water from the creek bottoms to high benches, declare the bulk of the profits are eaten up in creating steam for the pumps, and the general tone of the operators is distinctly more favorable towards legislation along the lines of the much-abused Treadgold Concession. A Government-installed and controlled water supply is now desired by property owners. Results from the Asklin ditch (running up to Twelve-Mile River) will be eagerly looked for next season.

The Gold Commissioner has rendered judgment, in the case against A. B. Palmer et al., by T. Lamar and others to deny the application of Palmer et al. for one hundred inches of water from Ora Grande Gulch. The Commissioner ordered that the flume carrying water from Eldorado Creek for Palmer et al. should be carried across Ora Grande Gulch so as not to obstruct the natural flow of the creek, and enjoined Palmer et al. from taking and using the water of Ora Grande Gulch when Lamar et al. were using it.

The Coal Creek Coal Company has employed a force of sixty men all summer at its mines, and the output will aggregate more than 6,000 tons. Of this tonnage the Dawson Electric Light and Power Co. have taken over 3,000 tons, and the balance has found a ready sale in the town. Some \$50,000 have been expended at the mines on permanent improvements, among which are new loading docks and new storage bins; the mines are twelve miles distant up the creek, but the coal is brought to the docks by a dummy locomotive. The roadway of the railway has been re-ballasted, and new bridges and culverts put in.

There are some 200,000 tons of coal blocked out from the inclined shaft, but the management proposes to sink a vertical shaft during the winter, in order to cut a seam lying 200 feet below the one now opened. Some 700 to 800 tons of coal from the lower seam have been mined and tested, and have proved to be of a harder and better character than coal from the upper seam. The lower seam has a thickness of eighteen feet.

## FOREIGN MINING NOTES.

Cape Colony has a mining shaft sunk to a depth of 5,500 feet, thus rivalling the deep shafts of the Michigan copper mines. The deepest borehole has been made in Silesia, and has reached to a depth of over one mile.

The Billet, Bar, Rail, Structural, Plate and Wire Associations of the United States met in New York on Tuesday, the 15th of November, to revise the whole list of prices in view of the changed conditions which have arisen in the trade.

The first two weeks of November witnessed the heaviest buying of iron and steel goods ever recorded in Chicago. Orders for over 200,000 tons were placed in that city in that time, and delivery is to be made during the first six months of 1905. In consequence of the increased activity in the United States, pig iron has advanced \$3.50 per ton since October 1st.

A western contemporary is the authority for a statement to the effect that properties of the Montana Ore Purchasing Co. and F. August Heinze are under option at the price of \$15,000,000 to John W. Gates and August Belmont, who, it is surmised, will turn them over to the Amalgamated Copper Company. The option is said to run until January, 1905.

The 7th ordinary general meeting of the White Pass and Yukon Railway Co., Ltd., was held in London on the 31st of October. The chairman again called the attention of the shareholders to the fact that they were really listening to a report of the proceedings of a year really prior to the year in which the meeting was held; the reason for this was that, the corporation, in effect, was really a security company, holding the securities of the local companies, and as such situated in a different country, it was somewhat difficult at the expiration of the year to get together the accounts of each company.

The issue of 1,000,000 new £1 shares by the British South Africa Chartered Co., was concluded the first of the month. Applications for three and one-half times the issue were received, and allotments had to be cut down accordingly.

The directors of the company, it will be remembered, at first proposed to float one-half of the issue to stockholders of record, having rights, and to dispose of the other half to a syndicate composed of their own friends, but this arrangement was emphatically voted down at a shareholders' meeting, and the directors compelled to offer the whole issue to the shareholders of record.

The year 1903, although exceptional by reason of the lowest water ever experienced on the Yukon River, yet the results that had been achieved were profitable, the net profit for the year 1901 had been £137,000 sterling; for 1902, £60,000 sterling; for 1903, £58,000 sterling. The payment of a four per cent dividend was recommended and adopted, being one per cent, less than last year. The freight business has increased from the previous year by some twenty per cent., and in the river division the passenger business had increased twenty-five per cent.; the freight business had increased about ten per cent., but the operating expense had been decreased, and results were gratifying. Mr. H. S. Graves, the president of the local companies, addressed the meeting on the prospects of the company for the current year. Mr. Graves gave it as his opinion that more progress had been made in 1904 than in any previous year in extending actual mining operations in the Yukon country. The Klondyke continued to be the chief camp, but it was no longer the only large one. The volume of tonnage continues to increase, and there is no foundation whatever for the pessimistic rumors heard from time to time in the public press.

## COAL NOTES.

The Dominion Coal Company's contracts for St. Lawrence River ports aggregated 1,227,000 tons for the season of 1904.

Shipments from the Springhill Collieries for the month of October by the Cumberland Coal & Railway Company amounted to 36,896 tons.

The consignment of coal from Nova Scotia, which is to be tested as to its suitability for naval purposes, arrived at Portsmouth Dockyard on November 22nd.

Shipments of coal from the United States to the port of Montreal have not been large this season, the total aggregating about 265,000 tons, of which only 40,000 tons came via the inland waterways.

The heaviest shipments of this season from Nova Scotia to the port of Montreal were in the month of June, when 277,239 net tons were delivered; the next heaviest were in the month of July, which totalled 252,677 tons.

The approximate tonnage of coal which has been sent to Montreal this season from Nova Scotia is 1,500,000 tons. Up to the 11th of November there had been delivered 1,352,863 tons of bituminous coal, and there were then three further weeks of deliveries due.

The Cape Breton Coal, Iron and Railway Co. held a meeting on the 17th inst., at which the bonds of the company were transferred from the Guardian Trust Company of New York to the Royal Trust Company of Montreal; the business of the company will hereafter be done in Canada instead of the United States.

The Maritime Coal and Railway Company, operating at Chignecto, N. S., is now putting out about 200 tons of coal a day, furnishing employment for 150 to 160 men; and it expects to double this amount shortly. The company's charter permits the construction of a railway from the mines to a point in the Straits of Northumberland.

Reports from Michel, B. C., are to the effect that building has been brisk during the summer, but that otherwise business has been dull, owing to the fact that for over three months now the mines have only been worked for four shifts during the week. Lately, the local depression has been increased by the posting of notices to the effect that No 3 mine would close down, and only married men be employed. Recently notices have been given that Nos. 4 and 5 mines would also shortly be closed. The superintendent, Mr. A. R. Wilson, says that the output will be about as usual this winter, but that fewer men will be needed, and they will have steady employment and full time.

The shipments from the Dominion Coal Co.'s collieries for the month of October aggregated 294,615 tons.

The output during this same month amounted to 294,038 tons, made up as follows:—

Dominion No.	No.	Tons
1	50,671	tons.
"	2	66,209
"	3	29,418
"	4	41,260
"	5	67,628
"	7	15,903
"	8	22,949

The International Coal and Coke Company, at Coleman, Alberta, have made a record performance in the rapidity with which they have pushed development and equipment. Within fifteen months, one and three-quarters miles of galleries have been driven on the coal seams of the company's property; and its capacity is now estimated at 1,000 tons in every twenty-four hours. The slope has now reached a depth of 150 feet, and fifty rooms are now ready to break coal. A reversible double Capell fan, capable of delivering 150,000 cubic feet of air, has been installed, with a 150 horse-power motor to drive it. The haulage system of the mine is of the compressed air type, the air being furnished by a four stage compressor, which delivers air at the pressure of 1,000 pounds to the square inch. The power-house contains four boilers, with a total capacity of 600 horse-power, two electric generators of 325 horse-power each, and the four stage air compressor. In addition to the mining plant, a very complete machine shop has been fitted up, which is also driven by electricity.

## NEW COMPANIES.

### BRITISH COLUMBIA.

The Eagle Mining & Development Co., Ltd. Incorporated Oct. 21st, 1904. Capital \$100,000.

"The Gold King, Ltd." Non-personal liability. Incorporated Oct. 21st, 1904. Capital \$120,000.

The Canadian Metal Company, Ltd. Non-personal liability. Incorporated Oct. 20th, 1904. Capital \$1,100,000.

The Bayonne Gold Mines, Ltd., registered on Oct. 13th, 1904, as an Extra Provincial Company. Capital \$450,000.

Pilkington Brothers, Limited, head office, St. Helens, England, Capital £800,000, has been registered on Nov. 8th as an Extra Provincial Company, with Arthur G. Thynne, of Vancouver, B. C., as attorney, with head office in Vancouver, for the Province.

The Velvet Portland Mine, Limited, head office, England, Capital £125,000, has been registered as an Extra Provincial Company on Nov. 7th, 1904, with Charles R. Hamilton, of Victoria, as attorney for the company, and head office for the Province at Rossland.

### ONTARIO.

The Dominion Natural Gas Company. Head office, Hamilton, Ont. Capital \$500,000. Provisional Directors:—William Aikens, Henry Cockshutt, Edmund Cockshutt, Joshua Hamilton, and Edmund Sweet, all of Hamilton. Incorporated Oct. 12th.

The Algoma Power Co. Head office, Berlin, Ont. Capital \$100,000. Provisional Directors:—Daniel Detweiler, Oliver Kinzie, Noah Detweiler, and Charles Hagedorn, all of Berlin.

The Windsor Gas Company. Head office, Windsor, Ont. Capital \$200,000. Provisional Directors:—S. A. King, with Wm. C. Kennedy, of Windsor, Ont.; and J. C. Baxter, of Detroit, Mich. Incorporated Oct. 24th.

The Camp Bay Gold Mining Company of Ontario, Ltd., of Arizona, has been granted a licence, dated Oct. 26th, to operate in Ontario under the name of the Arizona Camp Bay Gold Mining Company of Ontario. Charles Brent of Rat Portage, Ont., is to be the company's attorney.

## Digest of Recent Patents; Mining and Metallurgical.

### CANADIAN.

Oct. 25, 1904.

773,450.—Process of Making Alloys. Robert S. Anderson, Seattle, Wash., assignor of three-fourths to Walter F. Horner, Willis C. Meeker, and Hiram U. Woodin. A process which consists in mixing copper and tin, and heating the same until they are brought into a molten mass, and then adding sulphate and finally adding aluminium.

773,194.—Apparatus for transferring coal or other material. Jeremiah Campbell, Newton, Mass. An apparatus for transferring coal or other material, devices as a truck and a carrier-tower or support mounted upon the truck, upon which they are horizontally movable, and a bridge or extension carried by said means and affording a device by which the truck and carrier-tower or support may be moved horizontally from said means, in combination with means located beyond the farther side of the bridge from said level-varying truck-support whereby said tower may be supported while in action.

773,246.—Magnetic Separator. John W. Carnoghan, Silvercreek, N. Y., assignor of one-half to Albert B. Chapman, Silvercreek, N. Y. The combination with a downwardly-tapering mill-hopper, of a magnetic separator comprising a downwardly-tapering funnel, which is seated loosely in the mill-hopper, and separating-magnets supported on the funnel at the outlet thereof.

773,266.—Amalgamating Machine. Gerard C. Scott, Columbus, Ohio. The combination of a substantially horizontal tapered mercury-containing casing closed at its larger end and open at its smaller end with an inlet for its larger end, a steam-jacket for the lower portion of the casing, a longitudinal substantially horizontal shaft journaled within the casing and a closed amalgamating-body carried axially upon the shaft, tapered with the casing and provided with longitudinal substantially radial blades, means for rotating said amalgamating-body and an inclined tailings-discharge chute located adjacent to the smaller end of said tapered amalgamating-body forming a continuation of the tapered casing.

- 773,210.—Conveyor. William C. Mackellar and Thomson Mackenzie, Greenock, Scotland. In combination with a body for supporting the material, inclines upon which the body is supported and means for reciprocating the body longitudinally over the said inclines, said inclines being rigid and sloping toward opposite ends of the body.
- 772,925.—Roasting and Smelting Furnace. Harvey Cockell and William H. Fish, Columbus, Ohio. An ore roasting and smelting apparatus, a furnace, an outlet for the products of combustion therefrom, an ore feeding and roasting chamber located in said outlet having a separate discharge into said furnace, and a fuel-supply communicating with said discharge.
- Nov. 1, 1904.
- 773,732.—Stamp-Mill. Alvan P. Granger, Denver, Colo. The combination with a stamp, of a swinging arm provided with bearings through which the stem of the stamp passes, one of the bearings engaging a stop on the stamp, whereby, as the arm is lifted, the stamp is raised, and means acting on the arm between the stamp and the axis of the arm to lift the stamp.
- 773,809.—Coke-Oven. George S. Ramsay, St. Mary's, Pa. A coke-oven having a stack, and provided with a main bottom flue communicating at one end with the stack, front and rear upstanding flues communicating at their upper ends with the interior of the oven, and the independent front and rear bottom flues connecting the upstanding flues with the main flue, and the flues on each side of the main bottom flue being independent of the flues on the opposite side and also independent of each other.
- 773,636.—Process of Recovering Nickel Oxide and Ammonia. Hans A. Frasch, New York, N.Y. The method of recovering nickel oxide and ammonia from nickel ammonium chloride, consisting in subjecting the nickel ammonium chloride to distillation in presence of a dehydrating agent, thereby expelling ammonia and precipitating nickel oxide, removing the distilling fluid from the nickel oxide, treating it with calcium oxide, and subjecting it again to distillation.
- 774,092.—Manufacture of Carbonic Acid. James Leslie, Belfast, Ireland. The process of manufacturing carbonic acid, which consists in burning carbon free of hydrogen in a confined space, cooling the resulting gases first by utilizing their heat to drive off the carbonic acid from a bicarbonate solution, then washing them in cold water, then driving them under strong pressure into intimate contact with an alkali monocarbonate solution, from above which and while still under pressure, the extraneous gases are allowed to escape, and which solution is afterward heated under reduced pressure and the carbonic acid driven off, condensed and stored or utilized.
- 774,083.—Apparatus for making Sulphuric Anhydrid. Rudolph Knietsch, Ludwigshafen-on-the-Rhine, Germany, assignor to Badische Anilin & Soda Fabrik, Ludwigshafen-on-the-Rhine, Germany, a Corporation of Baden. In combination, a contact-compartment enclosure, a plurality of substantially horizontal layers of contact material adapted for the formation of sulphuric anhydrid by catalytic action arranged in a substantially vertical series and each extending substantially across said contact-compartment, gas-passages connected with said compartment respectively above and below said plurality of layers, a series of pervious supports detached from the walls of said compartment and a connecting member extending through said series of supports.
- Nov. 8, 1904.
- 774,476.—Conveyor. David E. Hughes, San Diego, Cal. Means to elevate objects, without canting them, from a lower to an upper table comprising a frame having journaled therein an upper and a lower shaft; chain-carrying wheels keyed thereon two endless chains carried by said wheels, cross supporting-beams journaled in said chains and having downwardly-projecting offsets; load-carrying cross-arms mounted above and on the supporting cross-beams; the cross-arm spaced apart and above the beams sufficiently far to pass above and on either side of the projecting ends of the upper table, and the supporting-beams below the projecting ends.
- 774,304.—Metallurgical Process. Martin P. Boss, San Francisco, Cal. A method of producing steel direct from iron ore, which consists in subjecting the ore to the reducing action of a hydrocarbon-flame, and at the same time to the combining action of a hydrocarbon vapor.
- 774,591.—Furnace for Reducing and Smelting Nickel Oxides. Robert R. Maffett, Bayonne, N. J., assignor to International Nickel Company, a Corporation of New Jersey. A furnace having an open-hearth smelting-chamber, an elongated reducing-chamber leading therefrom, charging-openings for said reducing-chamber arranged lengthwise thereof, a flue extending beneath the reducing chamber, and a stack-flue with which the reducing-chamber and flue communicate at their rear ends.
- 774,614.—Dumping-Car. Swan F. Swanson, Pueblo, Colo. The combination of a body-frame having a central bottom ridge, swinging bottom gates hinged upon each side of said ridge, a series of toggle-levers connecting said body-frame and said gates upon each side of said ridge, a shaft journaled beneath said bottom ridge, crank-disks upon said shaft, oppositely-disposed adjustable links connecting said crank-disks and said toggle-levers, and threaded blocks, for adjusting said links to vary the movement of said toggle-levers.
- 774,704.—Ore-Washing Machine. Gustave Seberg, Racine, Wis. An ore-washing machine, a main receptacle, a sluiceway surrounding said receptacle, the floor and outer wall thereof being formed integral with said receptacle, said floor-section being slightly inclined toward said main receptacle, an inner wall and means to adjustably secure said inner wall above said floor-section.
- 774,387.—Hoisting Apparatus for Blast Furnaces. Harry Heffrin, Pittsburg, Pa., assignor to Thomas H. Martin, trustee, Pittsburg, Pa. A hoisting mechanism for blast furnaces having in combination a skipway, a constant-speed motor, a car movable along the skipway, and means for moving said car operated by said motor, and having a slower speed as the car approaches the ends of its travel than between intermediate points.
- Nov. 15, 1904.
- 775,241.—Artificial Fuel. George K. Hollister, Jr., New York, N. Y. An artificial fuel briquet composed of carbon particles, water, clay, resin, muriatic acid, molasses, sulphate of iron and alum, and bakes until hard and dry.
- 775,043.—Process of Recovering Gold and Oxide of Iron from Sand. Thomas J. Lovett, Chicago, Ill. The process of obtaining the values from concentrated gold-bearing iron oxide in a finely-divided condition, which consists in subjecting the iron oxide to the lixiviating action of a suitable chemical solution capable of dissolving the gold without materially injuring the iron, separating the iron and solution, then recovering the gold from the solution.
- 774,731.—Portable Conveyor. Jesse Ainsworth, Lyons, Kans. The combination of a truck-frame mounted on wheels, a conveyor-frame mounted on said truck-frame, and projecting outward therefrom, a conveyor-belt and supporting-rollers on said conveyor-frame, the outer end of said conveyor-frame being divided and hinged transversely to adapt said outer section to fold over upon the main section, a suspending device connected to the conveyor-frame inside of said hinged section, and means on the truck-frame for driving the conveyor.
- 774,786.—Gold-Saving Apparatus. Louis Sachse, Oroville, Cal. The combination with a tank having upper and lower compartments arranged one above the other and having a floor between them, said compartments intercommunicating through an opening in said floor, means restricting the outflow from the upper compartments; means vertically over the opening adapted and arranged to intercept the precipitates from such liquid through the opening into the lower compartment, and means for supplying a current of water above said opening in said floor.
- 774,930.—Process of Reducing Ores. Horace F. Brown, Oakland, Cal. The process, which consists in first passing the ore in a finely crushed or pulverized condition through a non-whirling atmosphere, and then subjecting the highly-heated ore to the action of a whirling heated atmosphere moving in the same direction as the travel of the falling body of ore.
- 775,060.—Process of Reducing Aluminum or other Metals. Henry S. Blackmore, Mount Vernon, N. Y. A process which consists in fusing a metal oxy-compound, adding an oxy-compound of a metal having less affinity for oxygen, subjecting the mass to the action of an electric current capable of liberating the metal having less affinity for oxygen, and replenishing the mass with an oxy-compound of the metal liberated and separated as the fused bath is depleted thereof by reduction.



## 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.

Licences 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 leases 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.

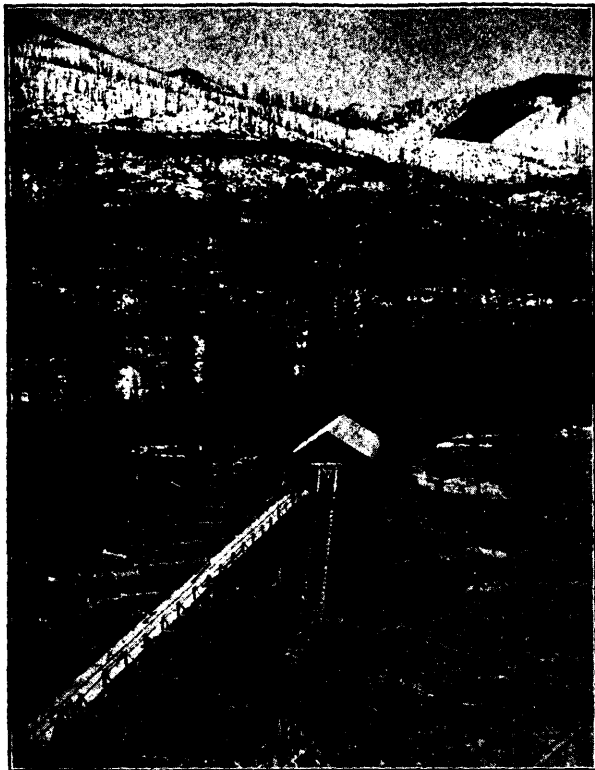
No free miner shall receive a grant of more than one mining claim on each separate river, creek or gulch, but the same miner may hold any number of claims by purchase, and free miners may work their claims in partnership by filing notice and paying fee of \$2. A claim may be abandoned, and another obtained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



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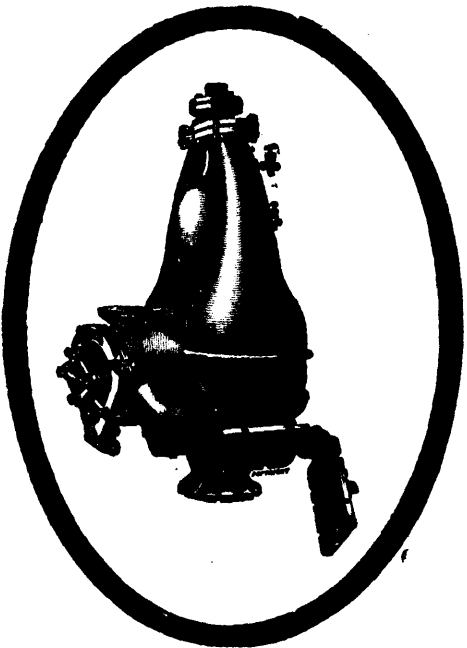
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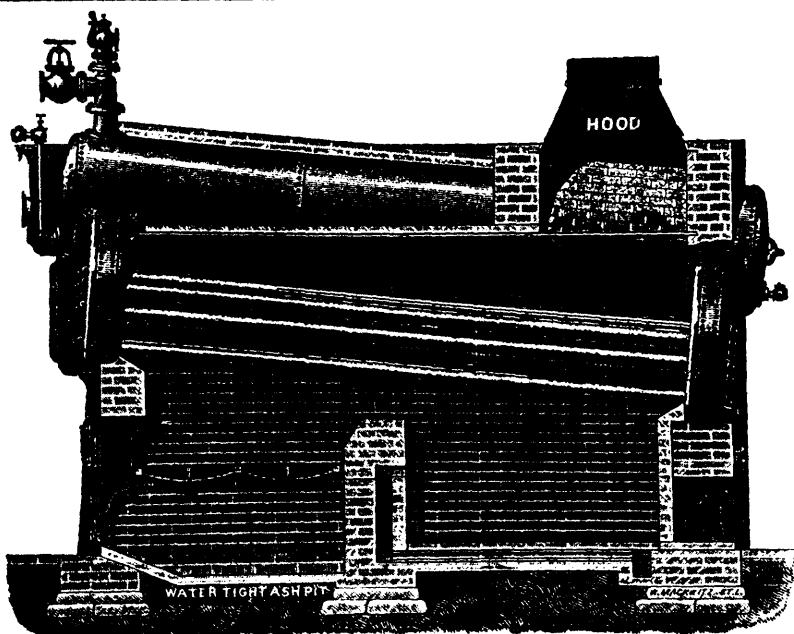
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CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** CANADA LIFE BUILDING Montreal



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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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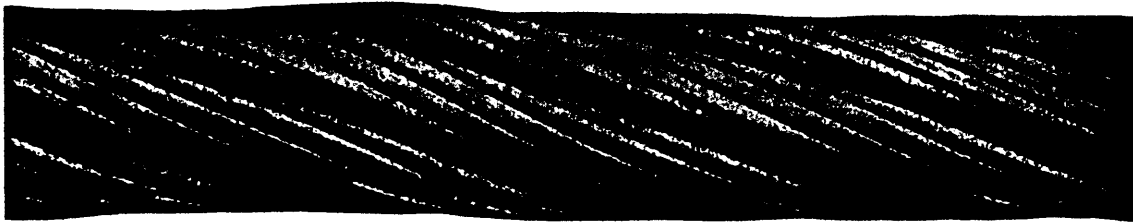
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Illustration of Winding  
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