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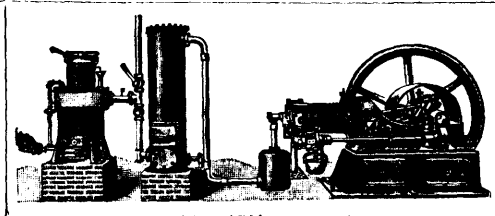
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CONTENTS.

Our article on *Lead in Ontario* in last month's issue has drawn a courteous letter from the mining superintendent of the Ontario Mining and Smelting Company, Mr. H. F. E. Gamm, which we print among our correspondence. Mr. Gamm's letter confirms our opinion in the article mentioned, i.e., that our B. C. friends have no occasion to be disturbed. It also shows that the Bannockburn vein is of a different character to the lead veins previously exploited in Ontario, and, as such, may have a very different history; the freedom from arsenic and antimony is certainly a distinguishing mark from other Hastings County deposits.

The Engineering and Mining Journal of Oct. 13th, published a letter from "Outsider," Spokane, which for candor and truth is commendable. "Outsider" wrote facts which have been well known to residents of Rossland for a year or more. It is well understood that any attempts at the amalgamation of Rossland's big producing mines will have to consider the acquisition of the Snowshoe property in the Boundary country, and no one knows better the comparative present worthlessness of the Snowshoe than the general manager of two of the big mines which are to enter the combine, Mr. E. B. Kirby. The Centre Star and War Eagle properties know well the disadvantage of the Northport smelter for Rossland ores; any consolidation sheme should eliminate the active operation of the Northport plant for the present.

In the REVIEW for August an editorial note promised investigation of the question whether the coals of the Nicola Valley were *true* bituminous or not. We are now in position to say that the matter has been very closely examined into, and, although the printed analyses have shown fixed carbon as high as 58. per cent., the vast majority of them show volatile matter above 37 per cent and fixed carbon below 52 per cent. Our informant is a disinterested geologist who personally designates the coal as "good lignite." In the report of Dr. R. W. Ells, a copy of which has been furnished us by courtesy of Mr. T. J. Smith, of the Diamond Vale Company, the only paragraph relating to the characterization of the coal reads thus :—"The greater part *appears* to be a bituminous coal of good quality," but Dr. Ells saves an authoritative pronouncement in his introductory letter wherein he says "As the specimens have not arrived, I am not able to furnish details of analysis of the coal."

According to the evidence which the REVIEW has submitted, we think our characterization of the coal in our August issue as "of a low bituminous character, just a little removed from lignite" to have been an eminently just and fair one.

Cheticamp (C.B.) Copper.

The Province of Nova Scotia has had several flotations of copper mining industries, none of which have yet been financially profitable, as witness Coxheath, Dorchester and Cape d'Or. There has come to our notice a new concern known as "Cheticamp Copper Company, Ltd.," which deserves mention. The Cheticamp Copper Company is the successor of the Eastern National Copper Company, which was formed in 1902, with a small capital, to prospect the Cheticamp field for commercial copper deposits. This original company expended all its funds in locating and developing, to a limited extent, some 155 mining areas, or about 135 acres, which it acquired from the Government of Nova Scotia under leases running for

eighty years, subject to a royalty of 2 per cent. of the gross value of the product.

Cheticamp lies nearly upon the 61st meridian, and in latitude about 46 deg. 30 min. north. The formation along the coast line belongs to the carboniferous series, but the mountainous character of the country shows rocks (syenite and granite) of pre-Cambrian age on the mountain tops, and the V shaped gorges, often of considerable depths, and due to erosion, reveal strata of schistose character which are probably of later Silurian or early Devonian age. It is in these schists that occur the outcroppings of the copper-bearing rocks. As many of these gorges reach to a depth of 1,000 feet below the mountain tops occasional good geological sections are afforded. The greatest elevation above the sea is about 1,500 feet, and we understand that the outcrops occur at 1,000 to 1,300 feet elevation, bringing them very near the pre-Cambrian granites.

The Schists have been much compressed and altered, and are penetrated by numerous dikes of felsite and igneous rocks. At the base of the Schists the mineralization appears to be chiefly galena, changing as altitude is attained to pyrrhotite, carrying arsenical sulphides, and in the upper layers to pyrite and chalcopyrite, with a little arsenopyrite.

The schistose layer or bed which is working, has little or no gossan, or oxidized outcrop, but is considerably leached of its metallic contents. It has a thickness of about 350 feet, and dips easterly at an angle of about 45 deg. Some 1,100 to 1,200 feet along the strike of these schists (which is approximately N. E. and S. W.) has been exploited by open cuts, and in one place a slope has been put down to a depth of about 100 feet. Assays of material from the open cuts gave an average of 3 per cent. copper; those from the bottom of the slope showed a highest content of 6 per cent. copper. In addition to copper values the sulphides appear to carry from $1 to $3 in gold and silver to the ton. Assays of sample lots of ore sent out from the property have ranged from 2 per cent. to 5 per cent. in copper, or from 40 to 100 lbs. of copper to the ton of ore. On the basis of western rates the copper values would then range from $3.00 to $8.00 per ton.

This company has had the property reported upon by Messrs. J. E. Woodman and F. H. Sexton, professors of geology and mining respectively, at Dalhousie University, N.S., and also by Mr. W. H. Kinnon, late of Denver. While the professional reports are, in a sense, favorable they are not authoritative, neither gentleman being proficient in practical commercial work; they have perhaps measured more ore "in sight" than would be accepted by a conservative engineer. Nevertheless the fact remains that an enormous quantity, in tonnage, of copper bearing rock is probable, though not *technically* in sight.

It seems, to the REVIEW, that the question before the Cheticamp Company is whether a 3 per cent. copper ore in that locality can be made to pay. We trust it can, and that Nova Scotia may be known for its copper production as well as for its coal, iron and gold.

The Dominion Iron and Steel Company.

The fifth annual meeting of the Dominion Iron & Steel Company was held in Montreal on Wednesday the 19th of October.

The President, Mr. J. H. Plummer, presented his report, which the shareholders regarded as very satisfactory.

The financial statement for the year was as follows :—

Dr.

Interest on first mortgage bonds	$395,550.00	
General interest account	131,303.07	
Sinking fund first mortgage bonds	55,799.96	
Dividend on preferred stock, April 1, 1903	87,500.00	
		$670,153.03
Balance of account for coal department, written off		245,467.23
Appropriation for shrinkage in value of materials not chargeable to operating account, 1903, provision for unsettled claims, etc.		123,633.73
		$1,039,253.99

Cr.

Balance brought forward, December 31st, 1902		$309,612.88
Net profits operating account, iron and steel department, 1903	$115,576.87	
Rents received	8,036.86	
Reserve and suspense account, transferred	21,790.27	
		145,404.00
		$455,016.88
Balance at debit carried forward, December 31, 1903		584,237.11
		$1,039,253.99

In speaking to the accounts, the President drew attention to the decline in market value of the products of the company during 1903, and the consequent reduction in assets which the accounts presented. The operating account of the Iron and Steel Department was as follows :—

Net profit on sales	$341,890.07
Shrinkage in value of pig iron, steel, etc.; provision for bad debts, etc.	226,313.20
Net profit in operating account for year	$115,576.87
Earnings, accounted on December 31, 1902	$1,977,328.10
Rental, January 1st to August 31, 1903	1,066,666.67
Interest on special loans for payment of rental	118,100.00
	$3,162,094.77

Speaking of the Coal Department, President Plummer said that the sum of $2,635,000 had been paid over by the Dominion Coal Company on the 17th December, 1903, and that sum had been disposed as follows :—

Received from Coal Department	$ 265,000.00	
Received from Dominion Coal Co	2,635,000.00	
Receiver for interest	16,627.54	
		2,916,627.54
Balance written off		$ 245,467.23

Mr. Plummer, in the course of his address, and in moving adoption of the report, declared his confidence in the position and future of the company, and his appreciation of the Director of the Works, Mr. Graham Fraser. He declared that Lake Superior ores could be laid down as cheaply at Sydney as at Pittsburgh, and denied all stories of the deterioration of the Wabana ore, of which he declared the company were using ninety-four per cent. in their furnaces.

Mr. Graham Fraser presented his report as Director of the Works. We regret that his report is too lengthy for reproduction in this issue, but its main points were as follows :—

The main source of ore supply is Wabana; this year fully 315,000 tons will be mined, of which 115,000 is contracted to

be delivered in Europe, where it has a ready sale at fair prices; 200,000 tons will be consumed by the furnaces at Sydney. The ore is actually costing less than the original estimate, and the present cost price need not suffer an increase for some years to come.

Mr. Fraser stated the coal requirements to be at the rate of 22,500 tons per stack per month, and that the Dominion coal contained too much sulphur to be coked without washing. The requirements of the furnaces will need an enlargement of the number of coke ovens, which at present are 450 in number.

The four blast furnaces are reported to be in good condition and well equipped, two are now steadily in blast, one making foundry pig and the other basic iron.

Of the ten open-hearth furnaces five are in operation; the other five are being overhauled, and equipped with the additional gas producers which are necessary.

The blooming mill is reported to be ample for the product of all the ten open hearth furnaces, but an enlargement of the present heating furnaces is needed, which is now going forward and will be finished in January, 1905.

The rod mill, completed last April, has shown a capacity greater (by twenty-five per cent.) than it was planned for, and the quality of the rods turned out is very satisfactory.

In reference to the rail mill, Mr. Fraser confined himself to stating its capacity at five hundred tons per diem, and to the fact that the buildings and machinery of the first rail mill would be utilized so far as they would go.

The significant part of Mr. Fraser's report, lies in the statement that "The output of the plant should be manufactured into such products as the Canadian market demands, keeping to the fewest lines which will keep the works running at full capacity." Mr. Fraser believes that the whole of the tonnage of the works can be sold in Canada, since the consumption of the Dominion is now annually over 1,000,000 tons of pig iron, bar iron and steel products.

This is in marked contrast with the declared policy of two years ago when the export portion of the business was looked upon as of much more value than the home market.

The figures and statements produced at this meeting certainly justify a certain amount of optimism among the holders of preferred shares. Time and good markets are both required before the heavy fixed charges (amounting to $750,000.00) can be considered as safely earned, but that the preferred shares have a real value is unquestionable.

Further time must elapse before the common shares can be considered as anything but mere paper.

The Le Roi Merger.

The correctness of our information with reference to the proposed amalgamation of *Le Roi, Centre Star* and *War Eagle* mines and the inclusion in the merger of the *Snowshoe*, is verified by the steps that have been taken since our last issue appeared, to further this project. Prof. W. R. Brock, of the Geological Survey, has been granted special leave of absence to act as valuer in the matter and is now at Rossland. He has already visited the Snowshoe mine in company with Mr. Astley, now manager of the Le Roi and formerly of the Snowshoe, which has been re-opened and cleared up for Prof. Brock's inspection at considerable expense. It is admitted that the intention is to include this mine in the amalgamation. So long as the shareholders of the other properties go into the deal with their eyes open, and are fully acquainted with the facts it will be their own fault it they make a bad bargain. We have every confidence in the ability and integrity of Prof. Brock relied upon to make a fair and competent valuation, but that is not the point; he goes into the transaction with his hands tied. The fact is that Mr. McMillan left London with authority to include the *Snowshoe* in the merger, the only question being one of valuation. Prof. Brock's opinion is not asked as to the *desirability* of this, he is simply told to estimate the ore and its value. Now, much could be said on the position of Mr. Waterlow and Mr. McMillan in this connection; they are the largest shareholders in the Snowshoe, having some $400,000 invested. By mining men in the Kootenays this money is looked upon as lost. Several years' experience of working the mine had been had by these gentlemen, and they know, better than anyone else (except the smelter people), that the ore is highly silicious and very low grade. They know that its smelter value did not average $4.00, and yet they undertake to negotiate for its sale to a company of which they are the chief officers, and on the basis that it will help to solve the "fluxing" problem of ores already so silicious that they require basic flux and not silicious. We prefer to leave this statement of the case, which is absolutely true, to tell its own tale. We hope it will reach the eyes of the Snowshoe shareholders and that they may not be made the unconscious instruments of inflicting another "black eye" on B. C. mining prospects. The local press, fully posted on the case, is scathing in its comments, and our esteemed contemporary the Engineering and Mining Journal handles the whole subject, and especially Mr. McMillan, without gloves. We have still one hope that this esclandre may not eventuate, it lies in the fact that Mr. Waterlow is in Canada. Hitherto his name, high in the financial world, has never been associated with a scandal and we believe that if the matter can be made to appear to him in its true colours, he will prefer the sacrifice of his Snowshoe investment to that of his reputation.

CORRESPONDENCE.

Lead in Ontario.

To the Editor:

Sir:—I notice in your September issue an article on "Lead in Ontario." Some of the statements, however, are misleading, as the description of the lead-bearing vein is inaccurate.

The "Bannockburn" vein as it is called, is in Madoc Township, and runs N. W. and S. E. The gangue, so far as known, is always carbonate of line, and, while most of the veins in

Ontario are very narrow, especially in Tudor Township (seldom over two to four inches), the Bannockburn vein runs from three feet to five feet in width.

The pure galena varies greatly, being from one inch to forty-six inches in width; one of the larger "bunches" being thirty feet long and twenty-five feet deep. The veins are all perpendicular, and in general are well defined; when the galena occurs in the country rock the impression is given that movements have taken place at a period subsequent to the deposition of the matrix.

This Company has uncovered its vein for some 2,200 feet in length, and have found its outcrop from 18 inches to 24 inches below the surface.

The lead-bearing veins in quartz gangue do not seem to be of any extent, as those which I have examined usually carry only small bunches of lead ore associated with a little copper pyrites and gold. The lead ores seem to be remarkably pure, as a number of assays have shown no arsenic, antimony, copper or zinc. The silver is very low in amount, about one ounce to the ton. The pig lead produced is accepted by manufacturers, and reported suitable for any use.

While the mine has not been thoroughly developed, having only seventy-five feet of depth, the vein holds out and shows no signs of being only a surface deposit. Active work in sinking this winter will show us more of the underground system of the Ontario lead veins.

Yours very truly,

H. F. E. GAMM, Supt.

Bannockburn, Ont., Oct. 14, 1904.

A Smelter at Republic, Wash.

To the Editor:

Sir:—Canadian shareholders of the Mountain Lion Mine and other mines in the Republic camp will hear with interest that negotiations are now completed for the establishment of a smelter at Westfork of the San-Poil River, fourteen miles below Republic.

In order to fully appreciate the value of such an undertaking, it is necessary to understand the difficulties, through which the Republic mining camp has passed since 1897. The treatment of the Republic ore was one of the principal difficulties since the mines commenced to produce ore; the once famous Republic mine has spent three-quarters of a million dollars for its two mills; much bullion was extracted from the ores of the Republic mine in the first mill, but this process, on account of its costs, could only be applied to the high grade ores (realizing over fifteen dollars a ton), while the low grade ores could not be treated at all. The result was that this mill was dismantled; a second mill was built according to the plans of Mr. Jackling and, while there is much diversity of opinion regarding the successful treatment of the ore by this process, there is one sure thing that the process, if it was a success at all, was also too expensive to be applied to low grade ores, say according to Western practice, below eight dollars a ton. This is evidenced by the fact that although there were many operators waiting for a realization on their accumulated ore, not one of them seemed to care to have his ore treated by this process, and to pay the high treatment charges demanded. This large second mill was never worked to its full capacity on account of the shortage of ore from the Republic mine; when the mill was ready to treat its full quota every day, operations at the mine were suspended on account of the failure to tap the ore body in the 600 foot level. This whole milling plant, fitted out with the most modern cyaniding and milling apparatus, was recently offered for sale at public auction in Spokane, Wash. There was no bidder, and the sale was withdrawn. The inability of the Republic mill to treat custom ore cheaply, prompted most of the other mines which had arrived at the point of realizing on their large ore reserves, to suspend operations, until the question of treatment was properly solved. The Gold and Silver Extraction Company of America then undertook the responsibility for the treatment of the Mountain Lion ore at a royalty of ten cents a ton, at the same time guaranteeing an extraction of at least 85 per cent. of the gold and 60 per cent. of the silver values. A mill for the employment of this process was constructed in 1899 at a cost of about $60,000, and was started for actual treatment of the ore on the 16th of March, 1900, but the results obtained were far from satisfactory. Altogether 11,960 tons of ore were treated, the average saving being only 54.9 per cent. of all the values. The treatment costs per ton were $3.75. Following these disappointments the mill was shut down on Nov. 1, 1900. Then there was a series of metallurgical tests undertaken with the ore, and, although the results gave some encouragement as to the percentage of extraction should further modifications of the plant and process be made, still, after the experience already gone through and the failure of previous metallurgists to verify their predictions, it was not deemed advisable to incur any expenditure for further mill modifications at that time, especially in view of the fact that it was certain that a railroad would soon be constructed to the town of Republic. This would give an opportunity of selling the ore to the smelters located on the line, which were desirous of obtaining a certain quantity of silicious ore hitherto procurable only in a limited measure. After the completion of this railroad, arrangements were at once made to make contracts for the delivery of ore with the smelters at Nelson and Grand Forks and to resume operations at the mine. Since the beginning of August, 1903, up to the present time, ore has been shipped from the Mountain Lion mine with slight interruptions, at the rate of 100 to 125 tons a day, but it was questionable whether with freight and treatment charges as low as $6.50 per ton, a reasonable profit could be made. Again it was found that the market for the Republic ore was not so large as anticipated, as the self-fluxing character of the Boundary ores does not allow of any large additions of pure silica. In October last year tests with the ore were resumed, this time with an entirely new process, invented by Dr. Hendryse, of Los Angeles, who has had a large experience in leaching gold ores in Colorado. Since the beginning of December, 1903, the old mill of the Mountain Lion mine has been altered for the application of above process, and a fifty ton agitator added. Thorough tests were made, in the course of which it was found that again radical changes had to be made in order to obtain a promised saving of 90 per cent. of the gold values, but up to this time it appears that no such saving can be effected, at least not in the treatment of a large tonnage of the average Mountain Lion ore, and unless the average run of mine can be treated successfully by such a process, there is no chance for its general adoption. The question of adequate and cheap treatment after eight years of permanent testing and an expenditure of large sums of money, which comes up to nearly three-quarters of a million dollars, is again the all-absorbing one in the camp. The inability of the mine owners to contract with the smelting companies to treat any certain amount daily has caused the closing down of a number of mines, and the curtailing of the output of a number of others; mine operators are confronted with a very serious state of

affairs—either to close down their mines entirely until a cheap treatment can be invented, entirely different from those already tested, or to make strenuous efforts to have a smelter built. Up to the beginning of this year the operators have made little effort to induce capitalists to enter this field and erect a suitable plant, for the reason that the smelter operators promised an enlargement of their plants which then would absorb all the ore of the camp. These promises, perhaps made in good faith, have not materialized, and now the mine owners, realizing the immense benefit which the community at large would derive from the establishment of a smelting plant on the spot, have taken up seriously this matter, and from information received, it appears that the erection is an assured fact. Mr. Harper, the manager of the Belcher and Midnight Mining companies at Republic, is at the head of the enterprise. The smelter will be built at West Fork, fourteen miles below Republic, on the San Poil River, in the midst of a number of mines producing copper, gold and silver ores of low grade, and lead ores. The initial equipment will consist of one copper-matte blast furnace and one silver lead stack of smaller capacity. Water power of several hundred horse power is available, and power for a part of the plant will be generated in this way. Rail transportation to the smelter is assured, and when this is completed additional furnaces will be added to handle the tonnage from the camps of the north half of the district as well as the big tonnage from the Keller district.

It is not intended that the smelter will handle at once all the ore which can be readily stoped at the Republic mines, but it is certainly an important step in the right direction. We trust that this new enterprise will be crowned with the success it deserves; and that the initial step to smelt the ores of the Republic camp will develop into an industry of large dimensions commensurate with the vast resources of the camp, for the public at large and for the benefit of the mine owners in particular.

FRITZ CIRKEL.

Montreal, October 12th, 1904.

Obituary.

As the REVIEW goes to press it learns, with the deepest regret, of the death of Mr. Cornelius Shields, at Sault Ste. Marie, Ont., on the 28th October, of oedêma, or dropsy, of the lungs, which was attended with the usual heart trouble accompanying the disease.

Mr. Shields was born in New York State in 1855, and was, therefore, forty-nine years old. He began his business career in railroading, commencing on the Northern Pacific Railway, and rapidly came under the favorable notice of Mr. J. J. Hill. He left the service of the Northern Pacific to engage with the Canadian Pacific Railway, where he filled different important positions, and resigned a post as Divisional Superintendent in the West to become the Receiver of the Virginia Coal & Coke Company.

In 1901 Mr. Shields was appointed General Manager of the Dominion Coal Company, succeeding Mr. Donkin, and in 1902 upon the temporary amalgamation of the Steel and Coal Companies, he became second vice-president and general manager of the combination.

In March, 1903, Mr. Shields resigned from the Steel and Coal Companies and accepted the presidency of the Consolidated Lake Superior Company at the Sault. Upon the reorganization of this company Mr. Shields retired from the presidency, but retained the general management.

He leaves a widow, three daughters and four sons.

For energy, prompt administration and general executive ability Mr. Shields was invaluable; his judgment was sound and his place will not be easily filled by the Lake Superior Company.

The Corundum Industry of Ontario.

(From our Special Contributor.)

The Canada Corundum Company may be said to have established the corundum industry of Ontario upon a fairly firm basis. It is now five years since this company placed its first output upon the market, and within that time it has increased its daily output from one ton to twelve tons.

It was in the fall of 1896 that Mr. W. F. Ferrier, of the Dominion Geological Survey, first drew attention to the occurrence of corundum in Ontario. Next year Dr. A. E. Barlow, on behalf of the Dominion Government, made a general examination of the rock formations, while Prof. W. G. Miller performed the same work for the Ontario Government.

There are three distinct corundum areas which have not yet been geologically connected. Of these the most northerly is by far the most extensive, and contains all the known deposits of economic importance. This northern belt extends from Haliburton County eastward across the north end of Hastings County, and the south end of Renfrew for a distance of about seventy miles. Its average width is something over two miles. In Frontenac and Lanark counties is a much smaller belt with a length of about fifteen miles. In Peterboro County is another belt, known as the Burleigh-Methuen.

Throughout the corundum-bearing areas run several systems of syenite dykes. These dykes are, broadly speaking, of two kinds, (a) Orthoclase syenite, (b) Nepheline syenite. The distinction between the two cannot be very sharply drawn, as often dykes of nepheline syenite are found, which when traced, gradually shade off into orthoclase syenite. At several points these dykes are found to be impregnated with crystals of corundum in greater or less quantities. As a rule the corundum occurs most abundantly in the orthoclase syenite, but on the York River is found a nepheline syenite dyke which is between one and two hundred feet in width, and which for over a mile carries corundum very evenly disseminated throughout its mass. Throughout this deposit the rock matter is seen to be schistose, whereas the other parts of the dyke are more or less massive.

So impressed was the Ontario Government by the importance of the discovery that the mineral rights of the corundum-bearing area were withdrawn from sale. Upon making a study of the matter the Government came to the conclusion that, as the market for corundum was not unlimited, the industry would be developed more quickly were it confined to a few strong companies. They accordingly drew up special corundum regulations and then called for tenders. The result was an agreement entered into with the organizers of the Canada Corundum Company. Under this agreement the successful tenderers were granted the right of first selection of deposits, and were given the further right to take up additional areas each year for ten years. In return, the organizers of the company agreed to expend $100,000 within three years and such further sum as should then be seen to be necessary.

In tendering on these terms the organizers of the company were in a somewhat advantageous position, as they had already acquired by purchase what is known as Craig Mine Mountain. This property, which is recognized as the largest in the district, had been taken up some years before by some local parties, who were under the impression that they had found a mountain of phosphate. The deposit itself forms the central part of the dyke which contains virtually all of the large deposits, (save the nepheline deposit above referred to, which is situate some fifteen miles from the mouth of the York River). The dyke itself has been traced for a distance of nearly fifteen miles and its strike is almost due east and west. At different points corundum is found to occur throughout it for a distance of a quarter of a mile or more. At the Craig Mine, however, the corundum is found to occur throughout the dyke for a distance of over a mile. At this point the land rises in the form of a hill about a mile in length and 590 feet in height. The dyke forms the southern face of the hill, which has a slope of 30 degrees. Towards the top of the hill a good deal of the dyke matter has been worn away by glacial action. At its west end the hill breaks off sharply, and here a good idea can be had of the thickness of the deposit. At the top where glacial action has been most pronounced, it varies from 30 to 40 feet in thickness, while towards the bottom it is found to increase to about 100 feet. Starting at the west end, the corundum can readily be traced almost without a break to the eastern end of the hill.

It is at the eastern end that most of the development has been done. This consists of open quarries into the side of the hill. One of these quarries has been carried in a distance of about 70 feet horizontally, and this summer had a vertical face of about 60 feet. In addition to this main quarry a number of others have been opened up and in all of them the rock is found to carry corundum. In many places there are considerable areas on the side of the hill that contain no soil, and on all of these surfaces the rock is found to be thickly studded with corundum crystals. This summer considerable stripping has been done and an additional quantity of corundum brought to view. At one place the face of the hill is cut by a gulley, which has a depth across the strike of the dyke of about 72 feet. The sides and bottom of this all show corundum.

Many estimates have been made of the quantity of ore in sight. A correct estimate is rather difficult. One is safe, however, in saying that the quantity is very large. The corundum is an original constituent of the dike, and as the dyke is eruptive its permanent depth is virtually certain. Should the present deposit ever be exhausted, however, the company has a number of other deposits situated in the same dyke a few miles to the west, which could be easily connected up with a short tramway. One of these deposits is quite large. Besides this, the company has ten half lots of fifty acres near Palmer Rapids, each covering deposits to the east of Craig Mine and situate on the same dyke. The railroad which is already surveyed will connect all these with the company's new mill.

The winning of the ore is so simple that it is not entitled to a long description. The work is all open quarrying and is carried back in benches. While the old mill was being worked all the drilling was done by hand. Since the erection of the new mill, machine drills have been used. As a rule, two drills have been found sufficient to supply the mill. The quantity of ore turned out at a blast depends largely upon the length of the face of the quarry in which the men happen to be working. It is not an uncommon thing for a battery shot to blow out 2,000 tons or more. The rock breaks in large masses, and these are further broken down either by plug drilling or by sand blasting. At times more or less cobbing has to be done, but the amount is not excessive. The ore, on being broken down to pieces that a man can lift, is loaded on to cars and run into an ore bin at the top of the mill.

In 1899 the company erected a small experimental mill upon a water power about half a mile distant from the hill. As the process of treating the ore was perfected, this was enlarged until about thirty tons per day were being treated.

In the spring of last year the company began the erection of a new mill with a daily capacity of 200 tons of ore. This mill was designed by Mr. G. F. Bartlett, the then superintendent of the company. He was assisted in his work by Mr. G. A. Overstrom, the inventor of the Overstrom concentrating table. It was expected that the mill would be completed last fall, but a number of delays were met with and it was not until this spring that the mill was in operation. This new mill is built on the eastern end of the hill and overlooks the York River. From the quarries the rock is carried by a tram to the ore bin already spoken of, the top of which is about the same height as the floor of the rock cut. This ore bin has a capacity of about 450 tons. Underneath is placed a 15 x 24 Blake crusher, into which the ore is fed. From this a conveyor carries the crushed rock to three additional crushers which sit over another ore bin which has a capacity of about 300 tons. Two of these crushers are 6 x 20 Blake crushers. The third is a 7 x 21 Gates crusher taken from the old mill. These crushers break the ore down to about three-quarters of an inch, whereupon it drops into the bin over which they sit. From this second bin the ore, after passing through trommels, is fed to a set of 14 x 40 crushers rolls, and from these, two to more sets of rolls of the same size, the rejections going to a fourth set of similar size. These four sets of rolls are of extra heavy construction throughout and are, perphaps, the most distinctive feature of the mill. The roll shafts are 10 inches in diameter and special wearing parts have been provided for. They run at a speed of eighty-five revolutions.

After passing through these rolls, the ore is elevated to two sets of trommels. Below these is the table floor. This contains sixteen Overstrom tables and three double, three-compartment jigs. The coarsest sizes go to the jigs, while the finer sizes are fed to the tables. The heads and middlings from the jigs are recrushed by a set of 30 inch rolls and fed to tables, while the middlings from the tables are drawn on to five more tables, situate on the floor below. The concentrates are then let run into seven bins of a capacity of 40 tons each, at the bottom of the mill, where they are let drain.

The mill building proper is 120 ft. x 65 ft. and has a height of 120 ft. Thirty feet away and parallel with it is the grader building. This is a three storey building, 120 ft by 56 ft. A belt conveyor carries the concentrates from the concentrate bins to the top of the dryer in the grader building. The dryer is very simple and consists of horizontal nests of steam pipes on which rest screens of about 4 mesh. The concentrates rest upon the screens until they have dried, whereupon they at once drop through the screen to the bottom of an elevator, which carries them to the magnetic separators, placed at the top of the building. More or less magnetic iron ore is found in the rock and the magnetic separators extract this. From the magnetic separators the ore passes to the screens and is sized into twenty different sizes running from 8 to 200 mesh. On passing through the grading screens it is let run into a number of bins.

Considerable care is taken in the concentration in the mill,

and by the ordinary mining man the concentration would be thought to be sufficiently pure. The chief use of corundum, however, is in the making of vitrified corundum wheels and if more than two or three per cent. of felspar be left in the corundum this will flux and will interfere with the bonds which are used in making the wheels. It is necessary, therefore, to re-concentrate the already concentrated material. It is found that Hooper pneumatic jigs will successfully handle the sizes between 24 and 90 and these sizes are, therefore, fed from the bins to the Hooper machines. The coarser and finer sizes, however, are fed to four concentrating tables which are situate in the grader building. This concentrating is very carefully done, and as the material fed on to the tables has already been accurately sized, a very perfect product is obtained. After being reconcentrated, all the corundum that has gone over the concentrating tables instead of the Hooper machines, is again dried, and all the corundum is then re-sized and let run into a number of other bins which are reserved for the re-concentrated material. From the bottom of these bins it is drawn into 100-lb. duck bags and is then ready for the market.

The motive power consists of four boilers of 150 H.P. each, together with three engines, one of 225 H.P., one of 125 H.P. and one of 35 H.P. for the running of the dynamo and of the lathes and other special machinery. In addition to the engines there is a new seventeen drill Rand compressor which was installed with the idea of equipping not only for present quarrying, but also for underground work should this ever become necessary.

The shipping point of the company is Barry's Bay on the Canada Atlantic Railway. The mill is twenty miles from the railway, but as this twenty miles consists of water navigation the company's transportation facilities are good. A tramway has been built from the mill to the company's wharf on the York River. Here the corundun is loaded on to scows which the company's steam tug tows to the wharf at Barry's Bay. The tug can easily handle two scows carrying from twenty to thirty tons each. There is a siding from the railway to the water at Barry's Bay and the Government is now building a new wharf there.

On account of the hardness of corundum, any weakness that may exist in the mill is sure to be found out. The company has had a number of rather serious breakages which have delayed them considerably. The extra high percentage of purity to which it is necessary to bring the concentrates has also made it necessary to go slow in balancing up the mill. The company expects, however, that before long it will be turning out twenty tons per day instead of twelve. The crushing capacity of the mill is nearer four hundred than two hundred, and the floor space is ample for the addition of new concentrating machines: hence, as the market expands it will be a very simple thing for the company to increase its capacity. At present the company is fully supplying the demand. By lowering the price, the demand can be rapidly increased. As production on a large scale is much cheaper than production on a small scale, the company's policy is to increase its output as rapidly as possible, and at the same time to lower the price to a point where the demand will take care of the output. In addition to the advantages of cheaper production, this policy also renders competition on a small scale almost impossible, and it is questionable whether other companies are in a position to produce on a large scale.

The head offices of the company are in Toronto and it is from there that its selling is at present conducted. It has established branch offices in both Paris and Berlin.

The Mines of Ontario.

By W. E. H. Carter, B.A.Sc.*

A very wide field for discussion is laid open by the title chosen for this paper, too wide, in fact, to be here gone into fully, so that only certain phases of the mining operations will be dealt with, and since the mines of eastern Ontario formed the subject of a paper (1) read before this Society at the 1902 session more attention will here be paid to mining in western Ontario. Probably the best ends will be served by making the present status of the mining industries the main topic and attempting to set forth the reasons for the abnormal inactivity in many of the mining districts.

The gold areas in particular are placed in a rather critical position, as the culmination of an unfortunate policy or method of mining which has prevailed from the start, and which may be summed up in the words, "inefficient management." This has arisen from the persistent disregard, at all but a few mines, of the need of employing a capable engineer as head, and out of the fact that few companies start mining with a really *bona fide* intent to see the undertaking through on a proper business basis. Until the trouble is squarely faced, realized and remedied, the same disappointing results from the mining ventures will without doubt continue.

The important historical points of the different mineral industries, so varied in this province, will also be dealt with, in connection with the above and in order to collectively summarize the mining development from the beginning.

While the mining industries in the eastern portion of Ontario are much more varied than elsewhere and the number of mines large, the value of the output is small compared with that of the fewer metals or minerals raised from western Ontario, which extends from Nipissing district west to Rainy River district, and this is due mainly to the product of the nickel-copper and iron mines of the latter area, and to the fact that practically the whole product is metalliferous and more valuable. There are, however, non-metallic minerals being raised, such as building stones of the greatest variety and value, from end to end of the western half of Ontario, of which but little is heard in the east on account of their distant situation and of the presence in the east of sufficient of the same class of materials for all ordinary requirements. They play an important part in the development of that end of the province simply by supplying local needs; but their value lies rather in a greatly increased future demand, a matter merely of time, than in the present small consumption. Of them no further mention will be made, since their operation comes more under the head of commercial than mining undertakings.

The facilities necessary for economic and profitable mining in Ontario are yearly increasing by the location and construction of new railways, in particular throughout this western end of the province, where they are most needed, by the settling of the country, and by the development of water powers for the transmission of electric energy to the mining and manufacturing centres. The prospector and farmer no longer confine their efforts to the older known areas, but have advanced for a hundred or two hundred miles north of the main line of the C.P.Ry. A good example of this is in the Temiscamingue country, where as a natural result a railway, the Temiscaming & Northern Ontario, has followed them. Not

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

(1) Can. Min. Inst., Vol. V., "Eastern Ontario: A Region of Varied Mining Industries," by Willet G. Miller.

only have good new lands been already cleared, but valuable mineral discovered and many of those formerly known to exist are now being mined, or this year will be mined, along the road. Seldom does a railway or at least a branch line enter a new country before the prospector and farmer, and we may, therefore, expect to find that very soon other roads also will tap the new northern mineral fields, such as the northern nickel range and the iron ranges north of Sudbury, the iron ranges north of Lake Superior at Lake Nipigon, and the gold areas in parts of the west now distant from either of the two existing roads.

Gold Mines.

The first noteworthy discovery of gold was made at the Richardson mine, in Madoc township, Hastings county, in the year 1866. Since then valuable gold areas have been found from here to the western end of the province, over a distance of some 900 miles, and with nowhere a gap of more than 100 miles. And there appears no reason why gold should not be found in these stretches also when the prospector devotes his attention to them. An enumeration of the different points at which gold mining has within recent years progressed will serve to exemplify this very general distribution. From east to west the areas consist of the Eastern Ontario belt, extending through the four counties of Peterborough, Hastings, Addington and Frontenac; the Parry Sound area in the district of that name; the vicinity of Wahnapitae lake; from Sudbury west along the north shore of Lake Huron; the Michipicoton area following the belt of Huronian rocks from Lake Superior northeasterly to Dog and Missanabi lakes; along the north shore of Lake Superior at Jackfish, Rossport and other isolated localities in the area; and from Shebandowan Lake west to the Lake of the Woods and north to Sturgeon Lake, which last area comprises practically all of the Province west of Lake Superior.

Placers.

Unlike most gold regions, Ontario has no placer deposits which have so far been proved of commercial value. From time to time auriferous sands have been discovered and immediately subjected to official examination. There are two main occurrences and one consists of the gravel and sand areas along the Vermilion and Wahnapitae rivers, the more important beds of which follow the Vermilion River for a stretch of forty miles with a breadth of from one to three miles. It was generally conceded that the only feasible method of profitably working the sands would be by dredging, since the gold is mostly in fine colors and the average value of the sand not more than a few cents per cubic yard. During 1901 some tests were made with the sand with a plant erected on the ground, the idea being to combine amalgamation and cyanidation in the process. A forest fire wiped out the works, however, before much of value had been accomplished, and the attempt has not yet been renewed. The other area comprises the sand and gravel hills and beds in various parts of Savant Lake and district, which is reached by canoe northerly from Ignace, western Ontario. These sands also cover an extensive area. They differ from the Vermilion sands, however, in that but little gold could be collected by panning, while by fire assay values in the precious metals were frequent. To quote from the report thereon by Willet G. Miller: "These values (by fire assay) come from material, which is probably more or less refractory, in the rusty fragments of rock in the gravel. Only a very small percentage of the gold can be extracted by placer methods." Gold values, per ton by assay, ran all the way from traces to $2.00. Silver appeared in traces in most of the samples.

As an example of the small local occurrences of auriferous sands or other detritus, the result of either glacial action or weathering, which may be found at many places in our gold areas, those in the arsenical gold belt in Hastings county are interesting. Besides quite small beds of auriferous sand filling depressions in the rocks in the vicinity of the Deloro and other mines, one was found on the Cook property, in Marmora township, forming the bed of a swamp of less than an acre in extent, composed of large and small angular boulders of quartz and country rock carrying weathered sulphides and compactly filled with fines of the same materials. The whole was rich in gold values. It probably represents the glacially denuded portion of one of the nearby veins, deposited as a moraine against the more solid trap country.

Eastern Ontario.

To return to the discussion of the auriferous ore bodies in place as found in the above enumerated areas: In the eastern Ontario gold belt, of which a general description has already been given before this Society and elsewhere (2), a number of mines have been producing bullion recently, although at present most of the mills are closed, presumably temporarily. These include the Belmont, one of our most promising gold mines, the Deloro, the Atlas Arsenic and the Cook. Several new companies have been formed to develop other gold properties in the district, some merely prospects adjoining these known mines, and others, older mines already considerably developed.

In 1897 the Belmont mine, then merely a prospect, was acquired by the present owners, who have systematically explored most of the important showings of ore, developed a number of them, erected the present extensive mining and milling plants, and produced from that year to date 16,789.79 ounces gold bullion, valued at $289,301.76. Numerous and sufficient descriptions of the ore bodies have already been published (3), from which they are seen to be unusually large, but of low grade, requiring large milling plant and economic operation throughout. For this last, the mine is well equipped with a developed water power, and lies in a district handy to the main centres of the Province.

It would appear that amongst the arsenical-gold properties in this district an amalgamation of the different interests is necessary to bring about the continued profitable operation of the different mines, principal of which are the Deloro, Atlas Arsenic and Cook. This course has been advocated and attempted a number of times, but so far without definite result. The Deloro, a pioneer amongst these mines, has been operated off and on for the past thirty years or more, and during that period various methods for the extraction of gold values from the arsenical pyrites tried. In all of them amalgamation in one way or another formed a part. Chlorination and ordinary potassium-cyanidation proving commercially unsuccessful, the bromo-cyanide process was evolved, and has since been successfully adapted to the ore (4). The residue from the mill, after cyanidation, consists of these arsenical pyrites (mispickel) concentrates which then pass to the adjoining refinery for extraction of the arsenic. The total saving in the original

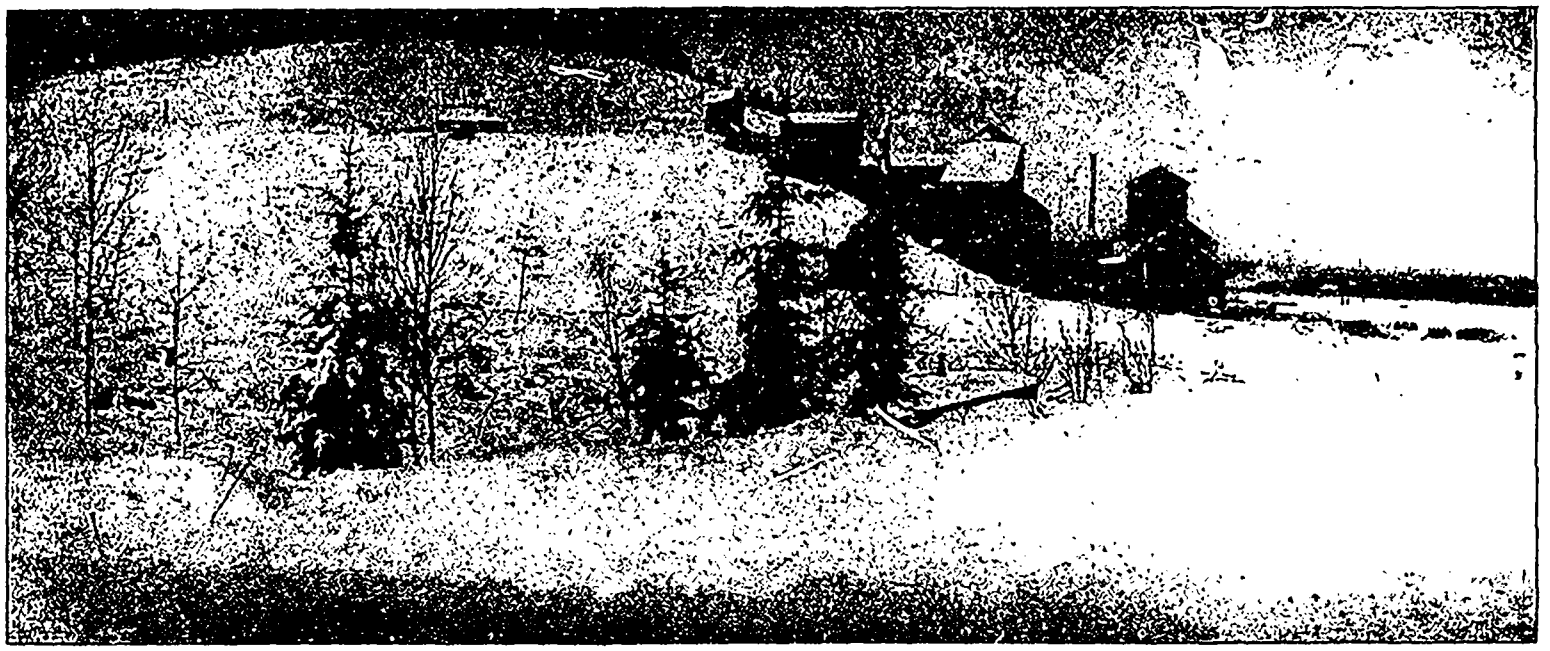
(2) Can. Min. Inst., Vol. V., pp. 233-225; Bur. Mines, Vol. XI., pp. 186-207.

(3) Bur. Mines, Vols. X., XI., XII.

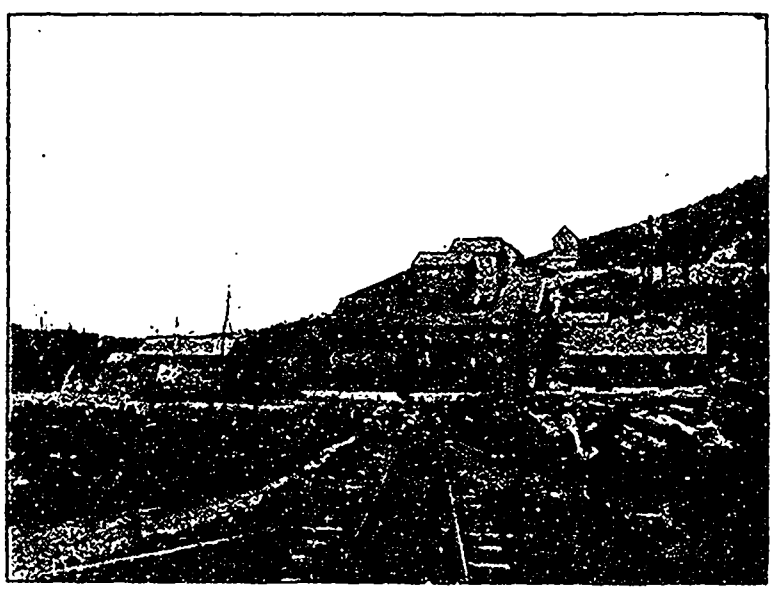
(4) "The Treatment of Auriferous Mispickel Ores," Can. Min. Ints., Vol. V.

CORUNDUM DEPOSIT ON CRAIG MOUNTAIN.

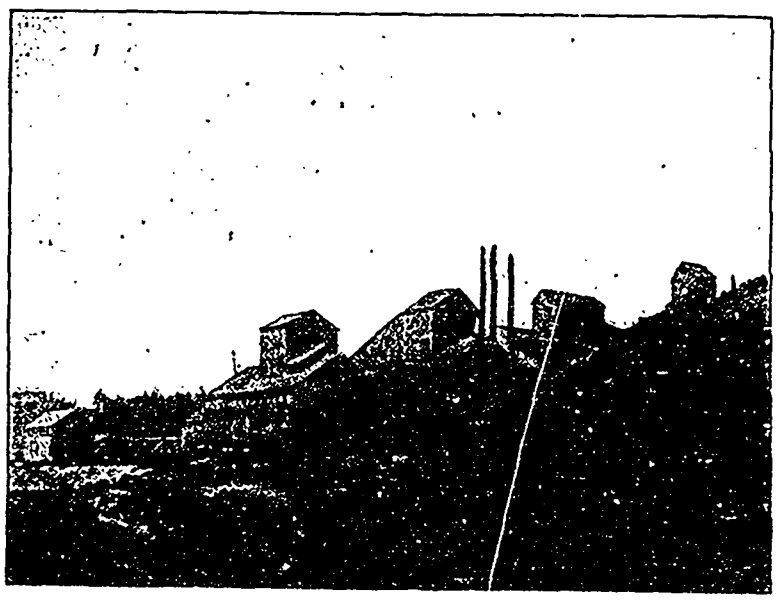
EASTERN QUARRY.



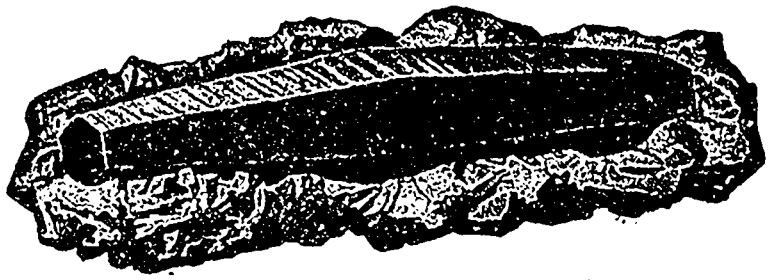
CANADA CORUNDUM COMPANY'S MILL AT CRAIGMONT, ONT.



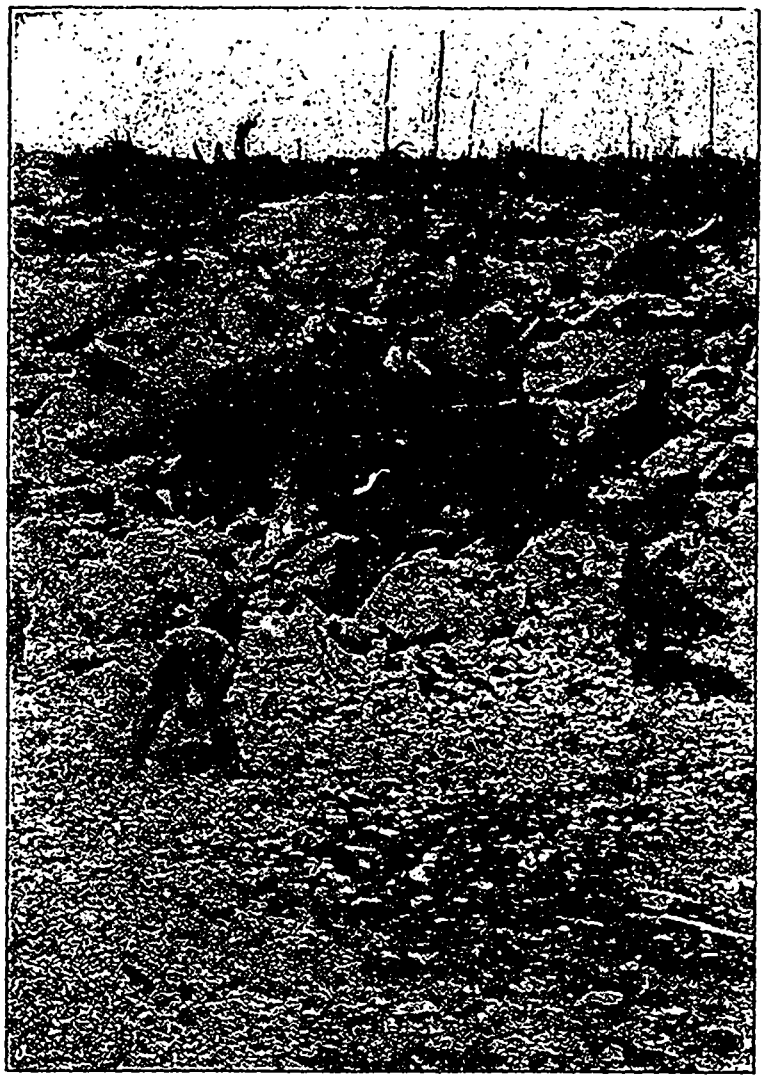
MILL AND TRAMWAY.



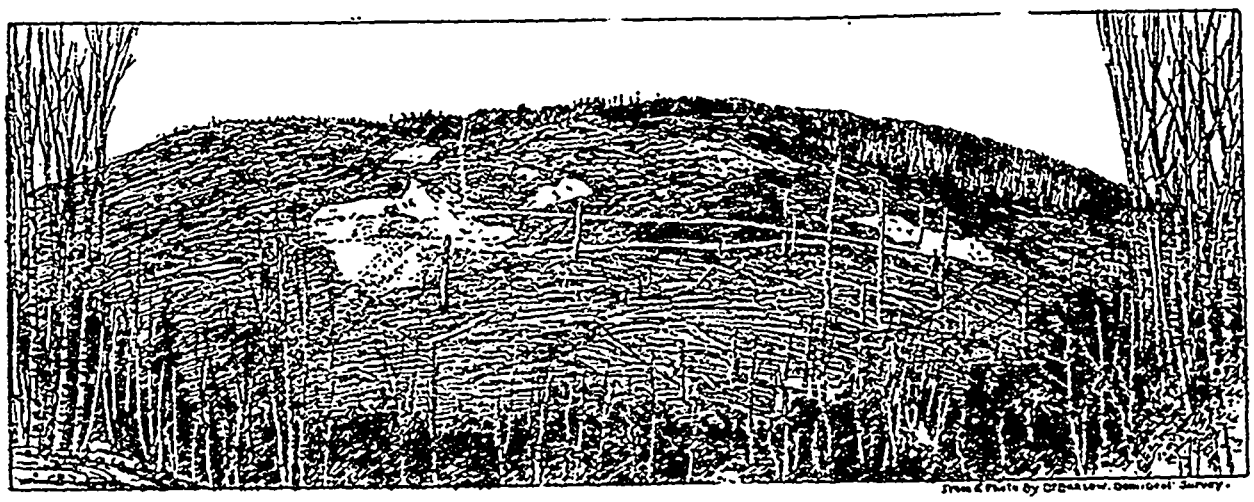
MILL, FROM THE NORTH-EAST.



CRYSTAL OF CORUNDUM.



ORE QUARRY, SHOWING MASSIVE CHARACTER OF ORE.

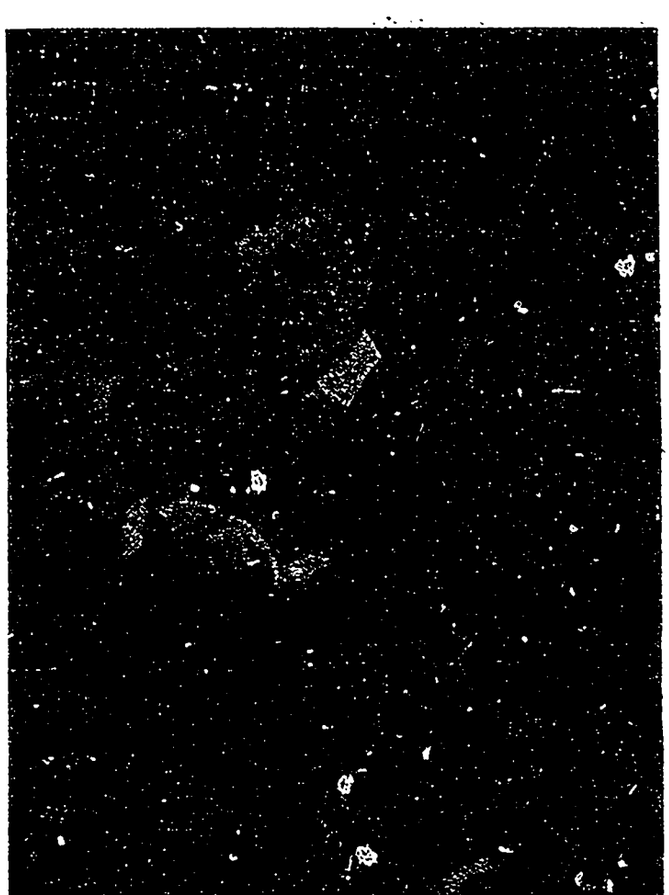


CRAIG MOUNTAIN, LARGEST KNOWN DEPOSIT OF CORUNDUM IN THE WORLD.

LOADING PLATFORM AT QUARRY.

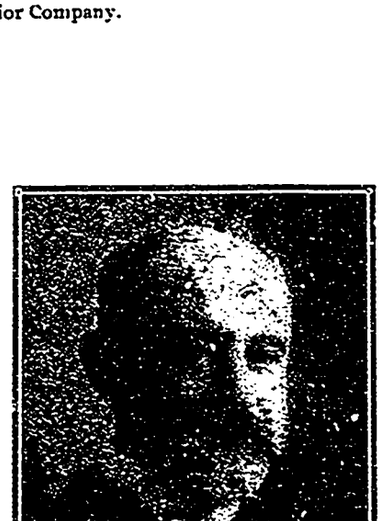
MR. D. G. KERR,
Manager, The Canada Corundum Co.

QUARRY CUT, CRAIG MOUNTAIN.



THE LATE CORNELIUS SHIELDS,
General Manager, The Lake Superior Company.

SENATOR MCGREGOR,
the new President of the Nova Scotia Steel and Coal Co.



THE LATE JOHN F. STAIRS,
former President of the Nova Scotia Steel and Coal Co.

gold content of the milling ore by amalgamation and cyanidation averaged from 88 per cent. to 90 per cent. during four and a half years' steady work. During the five year period of operation from 1899 to 1903, 35,877 tons of ore were raised and milled, from which the total value of the gold recovered was $181,907.55, and of the arsenic $128,975.50, making a grand total value of $310,883.05, or of $8.66 per ton.

During the year the mine of the Atlas Arsenic Co., which adjoins the Deloro, was further worked, and the ore treated in the 10-stamp mill, the concentrates going to the Deloro refinery for the extraction of arsenic.

The old 20-stamp mill, in its log building on the banks of the Moira River, about one mile below the Deloro, was a year or so ago bought by the Cook Land Company and set in operation again. It has stood here over thirty years, a most interesting contrast to the economic milling methods of to-day. The stamp batteries were very light, shaky affairs, with feed boxes of sheet iron bolted on behind. In place of crushers and automatic feeders all ore was broken by sledge and fed by hand. The cams had only one long arm, which operated stamps of about 700 lbs. weight, the daily capacity being a little over one ton per stamp. About a year ago, however, the whole plant was destroyed by fire.

Parry Sound.

The occurrence of gold in the Parry Sound area first attracted attention in 1894, in the ore of the McGown mine, which lies about two miles east of the town of Parry Sound. During the following lively exploration of the surrounding field more promise was, however, given of developing a copper than a gold area, since the gold is usually associated with the copper ores bornite, chalcocite and chalcopyrite. Laurentian gneiss and mica schist compose the country, throughout all of which scattered basic dikes have at a later age been ejected. Along more or less defined mineralized zones of the gneiss or schist, or less frequently in quartz veins, the gold and copper are found. In 1898 a 10-stamp mill was erected at the McGown mine.

Wahnapitae and Lake Huron.

In the Wahnapitae area there are as yet no producing gold mines, the only stamp mill, at the Crystal mine, on the east side of Lake Wahnapitae, having lain idle since the few runs made at the start, in 1897. This property has recently changed hands, and may, according to report, be re-opened this year.

An important discovery of gold was made last summer in the Huronian rocks in the township of Shakespeare, a short distance north of Webbwood. The metal was found, on what is now the Shakespeare mine, in unusually large nuggets, equal to anything from the gold fields of western Ontario, and in an ore body composed of quartz bands interlaminated with green schist. The existence of gold in this district, though reported before, had never been proved for certain until this find was made. Copper ores, on the other hand, occur quite frequently. Sudden discoveries of this kind are, on the whole, good for any district, and especially so for this one of ancient metamorphosed sedimentaries and of eruptive rocks, in which many minerals of economic importance may occur. From the predominance of these veins of copper pyrites interest in other minerals had somewhat lapsed.

Michipicoton and Lake Superior.

Michipicoton as a gold area was first brought to notice in 1897, and, partially aided by rumored finds of rich placer sands, a lively rush into the field followed, the route being by way of Missanabie, on the C.P.R. to the north. Now, access is had by steamer from Sault Ste. Marie in summer, and by sleigh from Ryerson near Missanabie in winter. The Grace was the first mine systematically developed and since the completion of its stamp mill, and the subsequent production during 1903 of gold bricks enthusiasm in the possibilities of the veins of the area has been considerably aroused. Already a number of other mines formerly only superficially tested have been developed fairly extensively. A stamp mill was last year erected at the Manxman mine and another is promised for the Mariposa.

The auriferous veins in the area are much alike throughout in their usual compositions of white, glassy quartz containing more or less intermixed streaks of black to light green schist (remnants of the country), with little or no sulphides of any kind. They are quite numerous and often of great width (30 feet or more), and confined for the most part to the Huronian series of rocks in the vicinity of the Laurentian granite and gneiss. A noticeable similarity exists between these altered traps, green schists, quartz porphyries, etc., of this Huronian area and the gold bearing rocks of western Ontario; and also between the characteristics of occurrence of the ore bodies in each.

Between Michipicoton and the western shores of Lake Superior isolated gold mines have been worked, at Jackfish for instance and at Rossport, but these have not reached a commercial basis of operation as yet.

Western Ontario.

In the western Ontario gold area during the earlier days of the industry each of the newly discovered gold areas was separately designated; but with the more general examination of the country, aided by the increased railway facilities, practically every section of this immense field has been reached and all these separated areas found, as far as their gold bearing possibilities are concerned, to merge into one. From Shebandowan Lake on the east, to the Lake of the Woods on the west, and north beyond the C.P.R. as far as Sturgeon and Minnietakie lakes, in an area about 240 miles long east and west by 100 broad north and south, auriferous veins or deposits have been found and more or less developed within comparatively short distances of one another. Even the supposedly barren Laurentian, comprising probably two-thirds of the area, contains auriferous veins and reefs, while the Huronian of the remaining one-third may be explored for gold with good chance of success throughout.

The first important find of gold in the area was made in 1871 at the Huronian mine in the township of Moss, where as early as 1883 a stamp mill was erected to treat the ore; but adverse circumstances, chiefly inaccessibility at the time, were, apparently, too much for its successful operation. The ore is unique in Ontario as containing the only known occurrence of sylvanite (gold-silver telluride). The Lake of the Woods area, according to the reports, was the next point of discovery of gold, in 1878 or earlier. As a result of the exploration of these two fields the whole of the west has been gradually opened up.

With regard to the structural geology of the area, I quote from Dr. A. P. Coleman's summary in the report of the Bureau of Mines, vol. VI., pp. 114-115:

"The gold area of Ontario is of an almost unique kind. In many respects no other gold region can be compared directly with it, and the laws governing its auriferous deposits should be worked out for themselves. On this account it will be useful to sum up our present knowledge of its geology. There is, perhaps, no other large gold region confined to rocks of so

ancient an age as the Archean, and something should, therefore, be said as to the arrangement of these rocks. In general, the excellent work of Dr. Andrew C. Lawson, formerly of the Canadian Geological Survey, now of California University, may be accepted as laying the foundation of our knowledge both of the Lake of the Woods and the Rainy Lake districts. The general principles worked out by him for these parts of the region are found to apply also to the Seine River, Manitou and other more recently discovered districts.

"As explained and mapped by Lawson, the region consists of Laurentian and Huronian rocks, the term Laurentian being used in a petrographical, not historical, sense, and the probable Huronian being called Keewatin. A group of more or less modified sedimentary rocks, consisting of sandstones, mica schists and gneisses, Lawson names Couchiching and places beneath the Huronian; but as they are seldom or never gold bearing, they require no further mention here.

(To be continued.)

Commercial Wet Lead Assay.

(Concluded.)

"Numerous trials were made by taking weighed quantities of pure lead sulphate, dissolving them in slightly acid ammonium acetate, diluting slightly, running in a slight excess of the standard chromate solution, and, after filtering and washing, determining the excess by 'hypo' titration. These tests have shown that the precipitation of the lead is in strict quantitative accordance with equation (1), so that in preparing the chromate solution with pure salt it will be found to check exactly its theoretical value when standardized against pure lead sulphate under the conditions of the assay.

"The accuracy of the standard having been determined against pure lead in solution as lead acetate, extended experiments were made to determine the possible interference of other elements, testing them in successive experiments by adding a different metal in the form of its convenient salt to each of a series of flasks, containing weighed quantities of pure lead sulphate; then digesting with nitric and sulphuric acids to complete white fumes; cooling; diluting with water; reheating in order to dissolve soluble sulphates; filtering; washing; returning the filter and its sulphates to the original flask; adding slightly acid ammonium acetate; and digesting a few minutes until the lead sulphate had completely passed into solution—all in the usual manner of wet lead-assays. These respective solutions were then diluted slightly with cold water, and titrated with the standard chromate and 'hypo' solutions, as described for the pure lead standard.

"These trials were made repeatedly, not only on artificially prepared charges, but later, on actual mixed ores, covering all conditions. The only possibly interfering elements are those which under these conditions do not go into solution readily as sulphates, and of these the calcium-barium-strontium series, tungsten and antimony, are the only ones commonly occurring. Lime, although troublesome to wash, causes no interference in the results for lead, though any lime that might be in solution in acid ammonium acetate; since calcium chromate is freely soluble. Barium and strontium salts remain insoluble as sulphates, and tungsten yields the insoluble tungstic oxide, hence the compounds of these three elements cause no interference. Antimony, when present in considerable quantity, caused the results to be slightly low. This was found to be due to imperfect solution of the lead sulphate in slightly acid ammonium acetate in the presence of the residual mixture of antimony oxides, varying from Sb_2O_2 to Sb_2O_4, and Sb_2O_5, depending on conditions. This difficulty was rectified by prolonging the digestion of the filter and its contents, and using slightly ammoniacal ammonium acetate for the digestion, in order to offset the acid nature of the antimony residues. The solution was then slightly acidified by the addition of acetic acid after dilution, and before adding the standard chromate. In none of these cases is it necessary after digesting with ammonium acetate to make a second filtration before adding the chromate; the flask with its contents and the remains of the filter, when cooled and diluted, are ready for the precipitation by chromate.

"In adding the standard chromate solution, it is desirable, if the lead content of the assay be known approximately, to add only a few cubic centimeters in excess, in order to minimize the washing and a lengthy back filtration. The filtration may be made directly after adding the chromate solution, using an ordinary 11 cm. filter of S. & S. No. 597, or No. 604, or any other fairly rapid and close paper; the lint present in the flask from the partial disintegration of the original sulphate filter serving to check any tendency of the lead chromate to pass through. For the reason that the total bulk of the solution is only about two funnelfuls, and the precipitate one that is readily washed, this operation consumes but little time, and a 250-cc. serves to accommodate easily the filtrate washings and the hydrochloric acid necessary to liberate the iodine in the back titration.

"In dealing with fair percentages of lead, the exact quantities of ammonium acetate and of water for dilution are not of great importance; but when only about 1 per cent. of lead, or less, is present, and it is desired to make the filtration for the back titration directly after adding the chromate, it is necessary to keep the bulk of the strong ammonium acetate solution used within 10 cc., and to dilute with cold water to a bulk not exceeding 50 cc., before adding the chromate. As had been proved by careful experiments in this laboratory, in passing far beyond these limits, the solution seems to be, on the one hand, too strong in ammonium acetate for the small quantity of lead present, and, on the other hand, too dilute in milligrams of lead per cubic centimeter for the complete instantaneous precipitation of the lead chromate, although, if the time can be afforded, the precipitation becomes complete on standing a few hours, even when widely past the limits given. From adding a large surplus of chromate solution, complete precipitation results at once, but such a surplus for back titration is not desirable in dealing with small or fractional percentages of lead. If desired, however, an excess of chromate solution can be added, and, after filtering, instead of a back titration (except in the presence of antimony), the funnel with its filter may be placed over a clean flask, and hot dilute HCl (1:1) added to the original precipitation flask, in order to dissolve the lead chromate precipitate therein contained, taking care that the remains of the sulphate filter do not retain any undissolved precipitate. This hydrochloric acid is then poured through the funnel to dissolve the portion on its filter, washing both flask and filter with warm water. This hydrochloric acid solution of the lead chromate, after adding a little potassium iodide, is ready for a direct titration with 'hypo' solution in the same manner as that for the back titration, and the results are perfectly concordant with those calculated from the back titration.

"The bulky residues present from the large ore charges usually used in low grade assays render this modification tedious, owing to the time necessary in washing these residues free from the excess chromate solution, and it will be

found more satisfactory to use the back titration with the slight surplus of chromate solution.

"Within the past few months I have had occasion to make several hundred wet lead-assays on ores and mill products from south-eastern Missouri of an average composition of about $CaCO_3$, 45; $MgCO_3$, 30; SiO_2, 8; Fe, 5; and lead, from 0.2 to 5 per cent., depending on the product. These assays were made in triplicate, by the chromate method above described, and very satisfactory accordance was obtained in each set, a triplicate series of the results obtained for the lead content, taken at random from the assay files, is given in Table I.

TABLE I.—Results of Lead Determinations by the Chromate Method:

Material Assayed.	I Per Cent.	II Per Cent.	III Per Cent.
Slimes, Lot No. 2	3.13	3.16	3.13
Middlings	0.50	0.52	0.52
Tails	0.19	0.19	0.20
Concentrates	56.20	56.00	56.20
Concentrates	34.10	34.20	34.00
Middlings	0.62	0.64	0.64
Tailings	0.22	0.24	0.24
Slimes	3.88	3.94	3.90

"In practice the method takes about the same length of time as the molybdate method on the same type of ore.

"After making some scores of assays in this manner on these heavy lime ores, it occurred to me that possibly the sulphuric acid feature might be omitted entirely, thus avoiding the tedious washing of the resultant bulky masses of calcium sulphate, without affecting the accuracy of the results. Experiments resulted in the following short cut method for heavy lime ores. To the ore charge of from 1 to 5 g. in a 250-cc. flask and from 3 to 5 cc. of strong nitric acid and 15 cc. of strong hydrochloric acid; digest until everything is in solution, and the excess of acid has been reduced to about 8 cc. The whole operation on the hot plate requires but 15 minutes. The flask is then removed, and slightly dilute ammonia is added slowly in slight excess, the neutralizing action being sufficiently vigorous to render the contents of the flask quite hot. Acetic acid of 80 per cent. strength is then added slowly, the flask being shaken vigorously, until its smell indicates a decided excess of acetic acid. Then 5 cc. of strong ammonium acetate is added to insure the solution of any lead compounds remaining undissolved by the ammonium acetate already formed in the flask.

"If the ore contains no antimony, or separated gelatinous silica, and if the siliceous residue in the bottom of the flask is only in slight amount (as is usual with heavy lime ores or with concentrates), add to the hot, undiluted and unfiltered solution an excess—about 10 cc.—of a 10 per cent. chromate solution. Under these conditions, the bulk of the contents of the flask will not exceed 50 cc.; and, after shaking and letting the precipitated lead chromate settle for about five minutes, the contents are filtered through a 11 cm. filter of any fairly rapid and close paper. If these directions are carried out, the lead chromate will be quite granular, and will show no tendency to run through. The precipitate in the flask and on the filter is washed several times with hot water containing about 0.5 per cent. of acetic acid until free from soluble chromates. The funnel with its filter is then set over the original flask, and hot dilute hydrochloric acid (1:1) poured through the filter, dissolving the lead chromate. Further additions of hydrochloric acid are made if necessary until all lead chromate is dissolved from the filter; then it is washed with warm water until free from chromate.

"The original flask now contains nothing but the hydrochloric acid solution of the lead chromate and the washings, which, after adding a small crystal from 0.5 to 2 g. in weight of potassium iodide, is titrated direct with standard 'hypo' solution whose value is known in terms of lead, the most suitable strength being that in which 1 cc. is equal to 5 mg. of lead. In this operation, by using only a small quantity of potassium iodide and having the solution fairly strong with hydrochloric acid, (about 50 cc. of hydrochloric acid, 1:1, in a total of 200 cc. of solution) and somewhat warm, any tendency of the lead to form yellow scales of lead iodide, and thus somewhat obscure the end reaction with starch, is completely checked, and the end reaction has the same sharpness as in the back titration of the originally described sulphate chromate method.

"This modification of the chromate method, as will be seen, does not consume, for heavy lime ores, more than one-half the time of the sulphate chromate method. It was so attractive that extended trials were made to see if its results in daily practice were concordant with the sulphate chromate method which had already been thoroughly tested. Several hundred wet lead-assays were run by this method in parallel with the sulphate chromate method not only on lime ores, but on siliceous ores, tailings, concentrates and artificially prepared charges containing various additions of possibly interfering elements. It is needless to give details of all the tests made; as to the influence of such possibly interfering elements, the results, verified by repeated trials, are as follows:

"1. No interference is caused by the presence of aluminum, iron, arsenic, calcium, magnesia, copper, cadmium, zinc, uranium, phosphorous, tungsten or vanadium, under the usual conditions of the assay, as previously described; the results being concordant with those of the sulphate chromate method.

"2. Manganese causes no interference, but remains in solution, provided the precaution is taken to have the digestion of the ore made with sufficient hydrochloric acid in the proper ratio to nitric acid in order to insure that all of the manganese will be transformed to chloride.

"3. Barium, if it passed into solution, would cause high results, because barium chromate is insoluble; but this element usually occurs as sulphate, and, under the conditions of the assay, it remains insoluble, and is therefore unaffected by chromate solution. Even if it occurred as a carbonate, there are usually sufficient sulphates formed from the oxidation of sulphides to cause it to separate out as the sulphate salt. However, to insure this reaction, it is only necessary, in dealing with ores containing barium, to add 1 or 2 cc. of a 10 per cent. solution of ammonium sulphate, along with the usual addition of ammonium acetate. The same considerations apply to strontium salts, should they be present in the ore, with this difference, that even if some strontium did pass into solution, it would only be precipitated as chromate from a highly concentrated solution.

"4. Bismuth, on the addition of ammonia, forms a hydrate, which, if in considerable amount, does not clarify completely with the addition of acetic acid; and, although this precipitate on solution in hydrochloric acid causes no reaction with potassium iodide, it is more or less bulky if present in large quantity, and it is troublesome mechanically in washing the precipitate of lead chromate. Therefore, in the presence of large amounts of bismuth, the sulphate chromate method is the more rapid.

"5. Antimony forms a residue of variable composition, which, if brought on the filter along with the precipitate of lead chromate and dissolved by hydrochloric acid, reacts strongly with potassium iodide and renders the assay un-

reliable, so that in the presence of antimony the sulphate chromate method, which is in this case perfectly satisfactory, must be used.

"6. Silver forms an insoluble silver chromate, which would be brought on the filter along with the lead chromate, and thus increase the weight of the latter by the quantity of the former present; and if this quantity is more than negligible it would entail a correction for silver, or would call for the use of the sulphate-chromate method.

"As a summary of the foregoing, it may be said :

"I. The sulphate-chromate method is applicable to the accurate determination of lead in all quantities, and in the presence of all commonly occurring elements.

"II. The modification of this method, by omitting sulphuric acid and bringing the ore into solution in nitro hydrochloric acid, with the precautions already cited, is applicable, except in the presence of antimony, or in the presence of considerable amounts of bismuth or silver; and it is a decided short cut in point of time for ores containing a high percentage of lime. For siliceous ores and products leaving so large a residue, or separation of gelatinous silica, by the initial procedure of this method as to render a preliminary filtration advisable before adding the chromate, the bulk of solution produced by this operation and its attendant washings becomes so large that, on adding the chromatic solution, the lead chromate, except on standing some time, does not separate out in a form sufficiently granular to remain completely on the filter, but tends to run through; in such cases the sulphate-chromate method will be found more satisfactory and more expeditious.

"The screen-test on the tailings from a heavy lime ore (Table II.) gives a good idea of the class of work that can be done on small percentages by the chromate method. The lead value, as given for each screen size, represents in each case the mean of three determinations, and the greatest variation in any instance was less than 0.33 per cent. Two of these determinations were made by the sulphate-chromate method, and one by the modified, or short-cut method. The assay value of the original tailings was 0.55 per cent., and the separate assays of the screen sizes, when afterwards multiplied by their respective weight percentages, amounted to approximately 0.57 per cent.

TABLE II.—Tests of Tailings from Dry Screenings.

Product.	Weight.	Weight.	Wet Lead.	Product of Screen. Size.
	Grams.	Per Cent.	Per Cent.	Per Cent.
Original tailings.....	2,000	....	0.55	.....
On 10-mesh.....	302	15.1	0.28	0.0422
On 20-mesh.....	722	36.1	0.30	0.1083
On 40-mesh.....	398	19.9	0.34	0.0676
On 60-mesh.....	140	7.0	0.41	0.0287
On 80-mesh.....	25	1.25	0.45	0.0056
On 100-mesh.....	54	2.70	0.76	0.0205
On 120-mesh.....	59	2.95	0.74	0.0218
Through 120-mesh.....	300	15.0	1.82	0.2730
Total.....	2,000	100.0	....	0.5677

"A wet method capable in ordinary routine work of yielding such a concordance in fractional lead percentages is, it would seem, worthy of consideration on the part of analysts.

Alumino-Thermics.

An exceedingly interesting lecture and demonstration was delivered at McGill University, on October 7th, on a new means of creating high temperatures. The lecturer was Dr. Hans Goldschmidt, of Essen-Kuhr, Germany, who is the discoverer of a method of producing high temperature by means of chemical reaction between metallic aluminum and peroxide of iron. Dr. Goldschmidt has given to this mixture, which contains the metal and the oxide in certain definite proportions, the name of Thermit, which has been registered as a trade mark.

If this mixture is ignited it burns rapidly (in a few seconds) and completely, producing artificial alumina (Al_2O_3) and metallic iron, which is of remarkable purity. The heat of this combustion is given at 3,000 degrees Centigrade, or far above the melting point of most substances, and to this fact is due the first application of the mixture as a means of welding rails for street car service, pipes, marine shafting, and for repairs to iron and steel construction of all kinds.

For rail welding it has been successfully used at Leeds, England, by Mr. J. S. McGregor, the engineer of permanent way of the City Tramways, and by Mr. Cole, the engineer in charge of the Singapore Tramways, India, as well as by the Electric Tramway Company of Berlin, which has, by this method, welded 13½ miles of track.

To the transportation engineer it most strongly appeals, but its possibilities in minor metallurgical work will be more interesting to readers of the Review. These are not few in number, if we may judge from the records submitted. By the use of ores of chromium, tungsten, manganese, molybdenum, etc., etc., in the place of iron oxide there have been produced metallic chromium, tungsten, manganese, molybdenum, cobalt, nickel, etc., etc. A number of novel alloys, such as lead-barium and manganese-boron have also been made but not, as yet, exploited.

The production of carbonless metals and alloys, and the applications in foundry and repair works, which present themselves as possibilities are worthy of note, and the Review presents the subject with the object of making known to its readers an agent now at their disposal for their investigations. Mr. William Abbott, 334 St. James Street, Montreal, is the Canadian representative of Dr. Goldschmidt.

MICA NOTES.

The Captain Adams Mica mine, on lot 2 in range VIII of North Burgess, is a new addition to later discoveries. Mica has been found in conjunction with phosphate, and lately a lead has been opened up, which bids fair to become a good producer. The mica occurs in a small vein of three feet in width near a band of phosphate intermixed with calcite, close to the contact with the gneiss. Eight men are at work. Operations were started on the Baby mine on lot 13, range V, Township of North Burgess, last February, by the new owners, Messrs. P. C. McParland and J. J. Smith. The main shaft has a depth of 95 feet, and is sunk on a solid mica vein, near the contact with gneiss. The vein on the surface is opened up for 60 feet in length to an average width of eight feet; at 45 feet depth the length of the opening is 50 feet, contracting to 25 feet at the bottom of the pit. The lead consists of calcite, a soft pale green pyroxene, micaceous matter and mica crystals—the latter of perfect shape and quality. The mine is operated with the aid of a small machinery plant, consisting of boiler, steam hoist, derricks, machine drills and a Cameron pump.

The Hanlan mine on lot XI. concession VI. is now owned by the General Electric Company of Schenectady N.Y., and has been developed to a large extent. The main workings consist of an open cut from the surface, following the strike and the dip of the vein between a belt of pyroxene and a gray gneiss. The depth of the shaft is 120 feet, with a clean stope of 150 feet length in the bottom. At fifty feet north of the main workings another pit was sunk some time ago to a depth of 20 feet, and still further north other outcrops indicate the continuance of the vein in that direction; to the south the vein can be followed for a distance of over 200 feet, when it disappears under a swamp. The mine is equipped with a small machinery plant; a large boarding and store house, and stables, etc.

The Byrnes mine, lot 11, concession VII., is an old phosphate property, and has also been taken over by the General Electric Co. The mica found on this property is of a dark black color, and shows a marked difference from any other mica found in the vicinity. The principal opening on this property is a long cut with a strike N.W. 40 deg., in pydoxene along the contact with micaceous and hornblende gneiss, and to a depth of nearly 100 feet. It is the intention of the owners to test this property thoroughly with a Diamond drill.

The principal mine in Ontario, and one which has yielded a considerable tonnage of mica is the Lacey Mine, situated about four miles from the village of Sydenham and comprising lot VII of Loughboro Township, Frontenac County. This mine is now owned by the General Electric Co. The main workings consist of a shaft 165 feet deep divided into six levels; the horizontal extension of the underground workings amounting to over 200 feet. An air shaft connects with the main workings by a drift at a depth of 50 feet. The shaft mouth is timbered with 6 x 6 collar to a depth of 25 feet. All these workings open up a large deposit of mica imbedded in pyroxene. The deposit is remarkable on account of the large-sized mica crystals found all through it, and on account of the peculiar character of the deposition of the mineral. The formation surrounding the main shaft of the Lacey

mine has been thoroughly tested by trenches, open cuts and diamond drilling. The mine is equipped with an efficient machinery plant, consisting of air compressor, a double cylinder hoist, several pumps, and all the accessories for mining on a large scale. In busy times there are from 80 to 100 men employed. The camp consists of a new commodious boarding house, dry house, store house, stables and house for foreman.

The mica from the mine is roughly cleaned and trimmed, and then sent by scow over the lake to Sydenham, where the company operates large trimming works, where from 20 to 25 persons, and during the busy season upwards of 50, are employed. After the mica is cleaned it is sent to the cutting establishments of the company at Ottawa.

In Quebec a number of mica mines are in operation, but owing to the present slackness in the demand most of them are working with half the number of persons usually employed.

The Blackburn mine, near Perkin's Mills, which operates lot 10 in 11th range of Templeton, is one of the large producers of mica in Quebec. The workings comprise an open quarry 200 feet long and 100 feet wide, with a depth of 60 feet, also a vertical shaft which is now being sunk to 280 feet. The main vein has been worked to the 240 feet level, and consists for the greater part of large chain-like accumulations of mica crystals, imbedded in a matrix of soft green pyroxene, intermixed occasionally with calcite and phosphate. There is a force of 60 men now employed, and the mine is fitted with an efficient machinery plant. Air is used for drilling and pumping. Mine and camp are lighted by electricity from a 60 light dynamo. The mica is roughly cobbed at the mine and then shipped to Ottawa, where the company operates a mica trimming works. Here the mica is prepared for the market, by being thumtrimmed, knife trimmed or thin split according to demand. Forty hands are continuously employed at the Ottawa factory.

The Wallingford Mica Mining Co. is operating its mines, situated near Perkins' Mills and on Battle Lake, in the Township of Templeton, with a force of about 60 men. The mine near Perkins' Mills has been operated continuously for mica for over ten years, and has been one of the largest Canadian producers of mica. The main vein, where most of the work has been done, is a contact deposit between a soft pale green pyroxene and a grey and reddish gneiss, the matrix is mostly calcite and pyroxene, and pockets of phosphate are also met with occasionally. The main openings have a length of 125 and 200 feet respectively. The underground works consists of drifts along the mica vein, and crosscuts from the bottom of 125 foot shaft to another parallel deposit, the outcrops of which appear on the southern side of the shaft. There are several hundred tons of mica of the smaller sizes stored, which were extracted some six years ago when these sizes were not in demand. The mine is equipped with adequate machinery, and all accessories for the employment of 75 men, with commodious camp for the accommodation of 50 men. The mica is roughly culled at the mine and then sent to the cutting works owned by the company at Ottawa.

The Battle Lake property belonging also to the Wallingford Mica Co., is remarkable on account of its production of large sized mica. It comprises lot 4 and 5 range XIII, Township of Templeton. The productive mica deposits occur on the north shore of Battle Lake. The main workings consist of a longitudinal opening near the lake of fifty feet length, thirty feet wide, with an average depth of twenty feet. There is also a pit sunk to a depth of forty feet, following a vein of mica which sends out spurs into a soft pale green pyroxene. The mine is equipped with a small machinery plant, and a spacious boarding house for the accommodation of thirty miners.

Mr. C. A. Johnson, of Toronto, recently bought the property operated formerly by the Wakefield Mica Co., Limited. The main workings are on lot 16, second range of Wakefield, and consist of a shaft sunk on the hanging wall of a well defined vein or lead. The depth of the shaft is 85 feet, and the depth of the open cut from which this shaft starts is also 75, making in all a total depth of 160 feet. The main constituents of the vein are calcite and mica, occasionally intermixed with pyroxene and apatite. This shaft has yielded several hundred tons of fine commercial mica. The mine is equipped with an electric plant for hoisting and drilling purposes. The mine is in shape at present for operations on a large scale.

The Laurentide Mica Co. Ltd., of Ottawa, are pushing work on lot 19, range VII, in the Township of Hull, recently acquired from Brown Bros., of Cantley. A large amount of work has been performed on this property since the company came into possession of the same in February last. The principal opening is 58 feet in length, 22 feet deep and 30 feet wide. Three horse derricks are in use, and a machinery plant is now being installed. The whole property has been systematically developed to determine its value. The mine has a large boarding house for the accommodation of 75 men, cobbing-shed, office dwelling and store house. Fifty men are steadily employed. All the mica mined is roughly cleaned and culled, and sent to the mica cutting establishment at Ottawa, operated by the same company.

There are six mica cutting factories in operation in this country, the largest of them being in Ottawa. The General Electric Co. is working with a force of 80 girls in their spacious building on Isabella Street, Ottawa. These modern quarters are fitted with the best splitting and cutting apparatus, run by an electric motor. The electricity is supplied by the Consumers Electric Light Co. The rough culled mica coming from the mines in Quebec and Ontario is again subjected to a thorough cleaning process; the mica is split, thum-trimmed, graded into different sizes, then cut by machine knives, operated by girls. These knives, compared with those formerly employed, have the advantage that, by reason of their peculiar mounting, an acc impossibility. These works handle all the output of the mines worked by the above company. In busy times from 400 to 500 girls are employed. All the waste mica, consisting of small-sized mica sheets has been stored away, in expectation of new requirements in the market for this size.

The Laurentide Mica Co. moved, last month, from their shops on Victoria Island into their modern two-storey brick establishment on Duke Street in Ottawa. This spacious building measures 88 x 98 feet; all the machinery is run by electricity, and is fitted up for the employment of upwards of 500 girls. In the upper story is the trimming and thin splitting department, while the ground floor contains the different store rooms, machine cutting department, office and shipping room. At present only 100 girls are employed, the company handles the output of its mine at Chelsea and of the old Brown Bros. mine, but expects to have several other mines in operation before long. Of other mica cutting establishments may be mentioned: Blackburn Bros., who employ 40 girls; Wallingford Bros., Messrs. Munsell, the Stils-Eddy Co., all located at Ottawa, and Kent Bros. at Kingston.

BOOK NOTICES.

Messrs. John Wiley & Sons have just published in a neat little volume three addresses of the distinguished metallurgist, Dr. James Douglas. The address on "The Characteristics and Conditions of the Technical Progress of the Nineteenth Century" was Dr. Douglass's presidential paper, read at the California meeting of the American Institute of Mining Engineers in September, 1899, and is a thoughtful presentation of the progress of the century then just closing. The other two addresses, delivered before the students of the Missouri and Michigan Schools of Mining, are notable for their keen criticism of many points in modern technical practice. The older man, as well as the student, will obtain many subjects for thought by the reading of this book. It is on sale, at the price of $1.00, by the publishers.

The publishers of "Page's Magazine" announce that hereafter the magazine will be issued as a weekly under the name of "Page's Weekly." Page's Magazine is one of the newer English Engineering Magazines which has rapidly reached a large circulation by reason of the excellence of its articles and illustrations. The range of topics is well illustrated by the last issue on the monthly basis; an article on Technical Education, two on power plants, one on hydraulic power for mining work, one on portable steam engines, with descriptions of new turbine motors, the latest wire wound gun, and copious news notes in the various branches of engineering, all make up an intellectual feast for the engineer, who may pick such bits as are of particular importance to him.

Mining Share Market.

In the mines there has been but little movement during the month, the transactions in shares were very small, and there is no speculation worth recording. St. Eugene and Canadian Gold Fields are firm, on the prospect of the former having a dividend in sight. It is reported that the returns from Moyle are very satisfactory, and that at the annual meeting next month a very satisfactory report will be issued. A good deal of Granby has changed hands; the buying appears to come from the same source, viz., Americans who have established a fixed price and who take all stock offered.

In the industrial shares there has been considerable activity and fluctuation in prices. Dominion Iron & Steel common advanced to 15, but has since reacted, owing to speculation receiving a check, due to the labor troubles. The demand for the preferred shares is steady and chiefly by investors; the same may be said of the bonds.

Nova Scotia Steel is at the moment neglected, the small boom in the stock inaugurated a few weeks ago has petered out, interest in the local market having drifted into other securities.

The following list shows the quotations for the month ending Saturday, October 29th, 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	.06	.05
5.00	Cariboo Hydraulic	.75	—
1.00	Centre Star	.25½	.25
1.00	Deer Trail Consolidated	.02	—
1.00	Giant	.03½	.01
10.00	Granby Consolidated	3.75	3.62½
10.00	Montreal and Boston	1.00	—
1.00	North Star	.02	—
1.00	Payne	.04	.03
1.00	Rambler Cariboo	.17	.14
1.00	Republic	.03½	—
1.00	St. Eugene	.45	.41½
1.00	War Eagle	.12½	.11
1.00	White Bear	.04¾	.04¼
100.00	Nova Scotia Steel (common)	.62	.61
100.00	Ditto ditto (preferred)	—	1.05
100.00	Dominion Coal (common)	.55½	.56
100.00	Ditto ditto (preferred)	—	—
100.00	Dominion Iron and Steel (common)	.14½	.14
100.00	Ditto ditto ditto (preferred)	.42½	.42
——	Ditto ditto ditto (bonds)	.75½	.75

PERSONALS.

Mr. James Liddicoat has been appointed Deputy Mining Recorder at Fort Steele.

Mr. F. J. Smith, the editor of the Moyie Leader, has been appointed Deputy Mining Recorder at Moyie.

Dr. Borgstrom from Finland, has been appointed assistant in Mineralogy at the School of Mines in Kingston.

Mr. John McKane, formerly well-known in Rossland, is a resident of Tonopah, Nevada, where his mine has turned out to be exceedingly productive.

Mr. Milton Hersey, the well-known chemist of Montreal, has returned to Montreal after attending the meetings of the American Chemical Society in New York.

Mr. J. M. Bell, who was in the employ of the Ontario Government during the summer, making an investigation of the iron ranges, has returned to Cambridge, Mass.

Mr. T. D. MacFarlane, who for some time has been a clerk in the Gold Commissioner's office at Dawson, has been appointed Mining Inspector for the Yukon Territory.

Mr. R. W. Brock, professor in the Kingston School of Mines, has been appointed an arbitrator in connection with the proposed amalgamation of Centre Star, War Eagle, Le Roi and other Rossland properties.

Senator James D. McGregor, of New Glasgow, will probably succeed Mr. Stairs as President of the Nova Scotia Steel & Coal Company. Senator McGregor, who is vice-president of the Company, has been acting president since the demise of Mr. Stairs.

Mr. C. C. Starr, formerly of the firm of John Starr & Company, has been appointed sole representative for the Maritime Provinces of the Canadian Westinghouse Co., Limited, with offices at 134 Granville Street, Halifax.

At the opening meeting of the Iron and Steel Institute of G. B., held in New York on Oct. 24th, the Institute conferred its Bessemer gold medal upon Mr. Andrew Carnegie. Mr. Carnegie is the first American to hold the office of President of the great British Institute.

Mr. E. R. Faribault, C.E., and Mr. J. A. Robert, of the Geological Survey, have received gold medals from the jury of the St. Louis Exposition for the glass model exhibited which represents the geological structure of the Goldenville, Nova Scotia, gold district. The model is ingeniously constructed of glass, lighted from within by electricity, and exhibits a mile in length of the district to a hypothetical depth of 2,000 feet. The actual workings are shown to a depth of 475 feet.

Mr. R. L. Broadbent, of the Dominion Geological Survey, was also awarded a gold medal as collaborator of the exhibit, of which he had charge for the Dominion Government.

The following appointments have been made to the teaching force of the Michigan College of Mines, Houghton, Michigan: Arthur Alexander Koch, Ph.D., University of Basel, instructor in Chemistry; Chas. Franklin Bowen, M.S., University of Wisconsin, and Eugene Thomas Hancock, B.S., University of Wisconsin, instructors in Geology and Mineralogy; Charles Hamilton Hoyt C.E., Thayer College of Engineering, instructor in Civil and Mining Engineering; Durward Copeland, B.S., Massachusetts Institute of Technology, instructor in Metallurgy and Ore Dressing.

The funeral of the late Mr. John F. Stairs, ex M.P. of Halifax, whose death we referred to in our last issue, took place on the 28th ulto., from his late residence, and was the largest funeral in Halifax for many years. The local press spoke of the cortege as the largest and most representative tribute to an honored fellow citizen paid by the men of all classes in Halifax "since the death of Howe," Nova Scotia's greatest son. Indeed, not only did his fellow townsmen, but men from every portion of "the Province by the sea" solemnly hasten to show to the world the honor and the respect in which they held the captain of industry and patriotic citizen who had gone, in the prime of life, and in the very zenith of his usefulness, to his last long rest.

An echo of the great explosion at Fernie, B.C., comes from England in the shape of an announcement from the North of England Institute of Mining and Mechanical Engineers that the Greenwell medal has been awarded to Mr. Wm. Blakemore for his paper on the Fernie explosion. We have been favored with a copy of the letter addressed to Mr. Blakemore, which we take pleasure in reproducing:—

North of England Institute of Mining and
Mechanical Engineers,
Newcastle-on-Tyne, September 29, '04.

Wm. Blakemore, Esq.

Dear Sir,—I have great pleasure in advising you that the Council of the Institute has awarded to you a G. C. Greenwell medal for your paper upon "The Fernie Explosion," and this medal will be presented at the general meeting of the Institute to be held on October 8th, and should you be unable to be present perhaps you would kindly depute some one to receive the medal on your behalf. I shall be pleased to act in that capacity should you so desire.

Yours faithfully,
M. WALTON BROWN, Secretary.

INDUSTRIAL NOTES.

The Canadian Copper Company has received a gold medal for its exhibit at the St. Louis Fair.

The Wetherill Separating Co., manufacturing magnetic separating machines, have received a gold medal from the St. Louis Fair. The Canadian agents of this company are Robert Gardner & Son, 40 Nazareth Street, Montreal.

The Chrome Steel Works, manufacturers of chrome steel shoes and dies, and other fixtures for gold and silver stamp mills, also welded chrome steel and iron plates for safes and safety vaults, who have been located in Brooklyn, N.Y., for a great many years, have removed to Chrome, New Jersey, where an extensive plant, covering several acres, has been installed. Parties who have dealings with the Chrome Steel Works will do well to make a note of the change.

Toronto has entered the field of locomotive manufacture. On the 25th inst. the Canada Foundry Co. turned out a large freight engine for the use of the C.P.R., which is one of many ordered by that company from the Canada Foundry Co. With the Toronto works turning out locomotives, the Locomotive and Machine Co., of Montreal, and the Kingston Locomotive Works, ditto, and the proposed works of the Grand Trunk Pacific Company and the Dominion Bridge Company, Canada will be in a position to fill more than local orders.

MINING NOTES.

NOVA SCOTIA.

Attempts are making by some English capitalists to open up the deposit of coal at Cochrane's Lake, Cape Breton.

The shipments of coal from the Cumberland Railway & Coal Company in the month of September were 37,933 tons.

The semi-annual meeting of the Mining Society of Nova Scotia will be held on Wednesday, November 9th, in the City Hall, Halifax.

Some parties at Barrasois, Cape Breton, are mining an ore consisting of specular iron and brown hematite, and which it is claimed averages over 60 per cent. metallic iron.

It is reported that a Halifax syndicate, which is already interested in mining at Cheticamp, has recently purchased the copper smelter formerly owned by the Copper Crown Company, at Pictou, N.S.

The Nova Scotia Steel & Coal Company has been authorized by its shareholders to make an issue of consolidated six per cent. gold bonds to the amount of $3,900,000, of which $1,500,000 will be offered at once.

The Londonderry Iron & Steel Company have purchased the iron deposits at Torbrook, N.S., and are resuming shipments to the furnaces at Londonderry. At present the output is running from 50 to 100 tons per day.

The Halifax Board of Trade has formed a Mining Committee with Mr. A. McNeil as chairman, and Mr. Waldon as secretary. At a meeting held on the 19th of October the secretary was instructed to procure copies of all mineral maps, plans and official data to be kept as records. The committee will collect detailed information regarding the iron ores and resources of Nova Scotia, as well as the ores of other metals found in abundance in that Province.

Writing to the Halifax "Herald," a correspondent suggests that in view of the deep interest shown by the late Mr. J. F. Stairs in the cause of education, he having been, in addition to filling many other high offices, president of the Board of Governors of Dalhousie University, that funds be raised for the endowment of a chair in Dalhousie to be called the "John F. Stairs" professorship. As the inauguration of the School of Mining in connection with the University was almost entirely due to his action, it would seem fitting that such endowment of a chair to bear the name of the lamented president, should be made; and the Review understands that steps are being taken by the friends of Dalhousie, and the friends and business associates of Mr. Stairs to so commemorate his life and work.

The shipments of coal made by the Dominion Coal Company, Ltd., in September amounted to 276,454 tons.

The outputs of the various collieries during the same month were:

	Tons.
Dominion No. 1	45,612
" No. 2	28,557
" No. 3	24,179
" No. 4	48,134
" No. 5	74,958
" No. 7	14,842
" No. 8	21,367
" No. 9	18,085
	275,734

NEW BRUNSWICK.

Recent attempts to locate graphite in the vicinity of St. John, N.B., are said to have been successful, the prospectors having come across deposits near the St. John side of the Falls bridge. The Review has not yet learned of the extent of the find, or of the probable outcome.

Mr. Frank Denton, K.C., of Toronto, has secured the lease of a large territory in New Brunswick, which is supposed to be oil-bearing. It lies in Albert County, on the south bank of the Petitcodiac River. Some four wells have already been sunk in this territory which have produced some oil, and the neighboring counties of Kent and Westmoreland are being exploited. We are informed that Mr. Denton and associates have secured abundant capital for the exploitation of their territory.

QUEBEC.

On the authority of Mr. Obalski, Inspetcor of Mines for Quebec, we announce that fine samples of asbestos have been found in the country west of Lake St. John near the head waters of the Nottoway River, about 190 miles from Roberval. The discovery was made by a Mr. McKenzie, and the asbestos fibre brought in shows a length of two, three and four inches.

Local papers have assumed the correctness of an item emanating from Sherbrooke, P.Q., to the effect that Mr. Henry M. Whitney, former president of the Dominion Coal Company, has purchased the asbestos mine owned by King Bros. at Thetford Station. The price reported is $1,500,000. It is a matter of current knowledge that the King mine has been on the market since the death of the late Mr. James King, and that it has been offered to English people for about $1,250,000. The rumor lacks confirmation.

ONTARIO.

The Redeemer Mine, near Dryden, is to have a 10 stamp mill which will be operated by water power.

The talc mines at Madoc are producing large quantities of the mineral, which is reported to be satisfactory in grade.

The students of the Kingston School of Mines recently spent four days in examining mining property in North Hastings and vicinity.

The Black Donald Graphite Mine, near Calabogie, which was flooded two years ago, has been pumped out by the Globe Refining Company.

The mica property of Mr. J. D. King, near Cantley, Ontario, has been sold to the Westinghouse Electric Company, of Pittsburg.

J. F. Black, of Sudbury, has sold a nickel-copper territory in Lavack Township to a syndicate of Philadelphia and Sault Ste. Marie people for $70,000.

It is reported that the Lake Superior Company are considering the possibilities of erecting a copper smelter for the sulphuretted ores of the Sault Ste. Marie district.

The Lake Superior Company started its coke blast furnace about the middle of the month, and is reported to be running satisfactorily; the charcoal blast furnace will go into blast shortly.

Power to the extent of 1,000 horse power is being developed on Moon River to be transmitted and utilized in the copper mines of the Parry Sound district; if there are any such mines worth developing.

The boundary line dispute between Mr. C. E. Smith and the Madoc Mining Company is reported to be settled, and operations will therefore be resumed at the pyrites mine which is at Bogart, Hastings County.

Our correspondent reports that the Baden Powell Gold Mine, on Eagle Lake, has enough ore on the dump to keep running a five stamp mill for twelve months, and that the Northern Light Mines Company is erecting such a mill.

Diamond drills are at work on the Temagami Iron property which belongs to Messrs. O'Connor, Caldwell and Mulock, and also on the property of the Lake Superior Company in Creighton Township which adjoins the Gertrude mine.

The discovery of oil on Manitoulin is not new; many years ago a company shipped several hundred barrels of oil which was obtained from a spring, or natural outflow, near the lake shore. The enterprise was abandoned on account of trouble with the Indians.

Reports from the Loon Lake iron district say that one bed is 20 feet thick and the other from 30 to 40 feet in thickness; the hematite analysis from 50 to 60 percent. metallic iron, with very low phosphorus. The better grade of ore is pronounced of Bessemer quality.

The Helen Mine, at Michipicoten, is now making an output of about 1,000 tons of iron ore each 24 hours. Open cast working is to be abandoned and mining done underground. The ore which is being produced is being shipped for the greater part to the United States to satisfy old contracts.

The Goldrock Mining & Milling Company, of Wabigoon, has been reorganized, and its head office transferred from Detroit to Columbus, Ohio. The president of the new company is Mr. Samuel L. Black, Probate Judge of Franklyn County, Ohio. The new management has not been named.

The Cook mine in Hastings County has had some ore tested at the Atlas Arsenic Company's mill, which gave a result of from $10 to $12 per ton. This yield is in excess of anything hitherto found on the property, and will yield a profit in gold outside of whatever profit may be realized from the arsenic.

A 3,000 electric horse power plant is being developed on the Vermilion River, fourteen miles west of Sudbury, by Ottawa gentlemen who have already expended upon it $100,000. Cochrane & McVittie are developing also a 4,000 horse power water power on the Wahnapitae River, thirteen miles from Sudbury.

The German-American Company which has recently been organized with a capital of $75,000, has secured rights on 2,000 acres of mineral lands in Burgess Township. The company is at present mining apatite or phosphate of lime of good quality, which it is shipping to Germany. At present some fifty men are employed.

A rich deposit of nickel is reported to have been discovered at Fort Matachewan on the Montreal River. This deposit is reported to be 20 feet in width and to intersect the course of the Montreal River. The mass has been stripped for some distance, and shows up well to a depth of 60 feet. The discovery is within the limit of the Temagami Forest Reserve.

In consequence of restrictions, on both land and water, regarding the carriage of high explosives, the Hullard Company (which is boring for oil in Manitoulin Island) is now erecting a nitro glycerine factory on the island. The drilling of holes is steadily going forward, and these holes will be plugged to be afterwards shot when the glycerine factory is in operation.

The Ontario Pipe Line Company has contracted with the Canadian Drilling and Development Co. to drill thirty wells in the counties of Lincoln, Haldimand and Welland, to be completed by the first of May next. The Ontario Pipe Line Co. is also to furnish Hamilton with a supply of natural gas which will probably come through the Pittsburg Syndicate operating at Dunnville.

The British American Development Co., operating a pyrites mine at Queensboro, Hastings County, is producing considerable quantities of iron pyrites. The deposit has a width of 20 feet, and the percentage of sulphur is high. Should a permanent market for the product be obtained steam machinery will be installed, and possibly the local manufacture of sulphuric acid be undertaken.

The Huronian Company, organized by Col. Robert M. Thompson, of the International Nickel Company, contemplates the installation of a large electrical plant at Turbine, on the Spanish River. The plant is to furnish power to be transmitted to the smelters of the Canadian Copper Company at Copper Cliff, which is only thirty miles away. The first installation will be of 6,000 horse power.

The opening of Corundum mines in Renfrew County by the Corundum Refiners, Limited, has caused quite an increase of population at the place where the company is erecting its new mill near Palmer Rapids. The village is called Jewelville, and a post office has been established. Contracts for some thirty houses for the workmen have been let, but the new mill will not be ready to operate before the spring of 1905.

The Chief Justice of Ontario has refused a compelling order to state a special case in the action of Rowell and Mitchell vs. The Consolidated Lake Superior Company in order that the case could be reviewed in a higher court. Judge Johnston, as referee, had given the plaintiffs $119,000 damages for being dispossessed of the Helen Mine, of which Rowell and Mitchell were lessees. In consequence of the Chief Justice's refusal the award for damages stands.

The Craig Mining Company at their mine near Marmora, has put in a Rand air compressor of the capacity of sixteen drills, together with boilers and other necessary machinery for vigorously pushing work at the mine. The vein is from 12 inches to 13 inches wide at the bottom of the shaft, and it is reported that values increase as depth is attained. The principal shareholders live in Newark, N.J.; Mr. W. A. Hungerford is the local manager.

In the case of Stephens vs. Flint Lake Mining Company, the Court of Appeal has dismissed the appeal of the defendants. The defendants constitute an extra provincial company carrying on operations at Flint Lake, and the verdict recorded against them in the District Court of Rainy River amounted to $1,302.73 for work and materials. The Court of Appeal has given them the right to apply to the District Court to reduce judgments by such sums as may have been returned.

The current newspaper articles which speak of the possibility of the United States Steel Corporation establishing a plant in Canada have lent some credence locally to the belief that the Northern Iron & Steel Co. will be purchased by the U. S. Corporation. It will be remembered that the Northern Iron & Steel Company is the name of the concern which recently bought out the old Cramp Steel Works at Collingwood. The rumors are too vague and indefinite to stamp anything as authentic at the present time.

Reports upon the Eagle Lake gold district are promising, according to Mr. W. E. H. Carter, Provincial Inspector of Mines. The properties lie on the west end of Eagle Lake, and results running as high as $40 per ton have been obtained from selected ore run through a two stamp mill. The quartz veins of this area are confined to a granite formation lying on the southeast side of a contact with greenstone; the quartz veins in the trap on the northwest side of the contact have not shown gold in paying quantities.

An echo of the Charbonneau scandal is heard in the action which has been entered at Toronto by the Banque Broquard, of Paris, France, on behalf of itself and the shareholders of the Gold Run Klondike Mining Co. against the Canadian Gold Mining Concession Co. of Ottawa, and Madame Melinda Charbonneau, of Dawson City. The action asks for a declaration that the claim known as the Creuger Concession, granted in 1900, is the property of the Gold Run Klondike Mining Company. Creuger, who discovered the claim, assigned his interest to Madame Charbonneau, who reassigned it to the Canadian Gold Mining Concession Company. The Banque Broquard affirm that Madame holds it only as trustee for the Gold Run Klondike Company.

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

Lease dated 13th September, 1900, to Ernest E. Gatensburg, of Rat Portage, for mining location M. H. 324, being an island in Eagle Lake, in the District of Rainy River, for the term of ten years.

Lease dated 26th September, 1900, to Ernest E. Gatensburg, of Rat Portage, for mining location M. H. 257, being land under the water of Eagle Lake, east of mining location M. H. 257, in the District of Rainy River, for the term of ten years.

Lease dated 13th September, 1900, to Ernest E. Gatensburg, of Rat Portage, for mining location M. H. 323, on the shore of Eagle Lake, in the District of Rainy River, for the term of ten years.

BRITISH COLUMBIA.

It is rumored that the Whitewater and Whitewater Deep mines are to be amalgamated.

The Great Northern Railway is now taking 500 tons of coal daily from Fernie, and 350 tons daily from Morrisey.

The year's clean up of the Consolidated Cariboo Hydraulic Company is reported at the disappointing figure of $85,000.

The Bluebird Mine at Sandon has started to stope ore; the mine has a reserve of rich ore which is to be taken out at once.

The old Jumbo mine, near Rossland, made a strike of rich ore in one of its levels during the month; its extent is yet unknown.

Mr. A. H. Kelly, manager of the Reliance Mine on 49 Creek, near Nelson, reports the mill of the company as nearly completed.

Local papers state that the Byron N. White Company (Slocan Star) will build a zinc concentrator at Nelson.

An unexpected strike of high grade galena is reported from the Foghorn mine, near Ymir. The width of ledge is given at eight feet.

The Canadian Smelting Works at Trail will secure water for the smelter from lakes in the vicinity of Rossland at an expense of from $8,000 to $10,000.

The C. P. R. has surveying parties along the Columbia River between Golden and Fort Steele, endeavoring to obtain a location line for the Kootenay Central Railway.

Ymir is becoming quite a stamp-mill town; there are fifty stamps dropping at the Ymir mine, ten at the Queen, four at the Wilcox with another ten to be erected, ten at the Second Relief, and ten at the Porto Rico.

The Oyster-Criterion mill of the Great Northern Mines, Ltd., cleaned up a gold brick of the value of $4,000, as the result of one month's run. It is reported that the company is to add ten stamps to the existing mill.

The Phoenix branch of the Great Northern Railway is being rapidly pushed, the contractor having over 1,600 men on his pay roll. The rails were laid to the Granby smelter by the 15th inst., and ballasting is now going forward.

Estimates for this year's output of the Boundary district, based on the tonnage for the last nine months, are put at 800,000 to 850,000 tons, of an average value of $5.00 per ton. This would give a gross yield of $4,000,000 to $4,250,000, against $3,654,000 for 1903.

Reports from the Paradise Mine, Wilmer, B.C., are to the effect that shipments of lead carbonates are steadily going forward. On No. 4 level a good bunch of concentrating galena ore has been found, of which the galena carries very high values. The erection of concentration works is under consideration by the owners.

The early locations of the "Two Friends" and "Black Prince" in the Slocan district have now been consolidated for about one year, and the development work done has shown some high grade galena on the Two Friends. New management and additional funds have produced a showing quite satisfactory to the shareholders.

A Nelson correspondent sends the improbable story that Edinburgh capitalists are subscribing $100,000 for the purpose of building a 100 ton smelter at Slocam City, that freight and treatment charges on the ore to the Hall or Trail smelters may be reduced. We fancy more than $100,000 will be required for any such purpose.

The Lucky Jim Mine during the month completed a shipment of 1,000 tons of zinc ore to the Kootenay Ore Co., at Kaslo, which averaged between 50 and 60 per cent. of metallic zinc. At a time when zinc is bringing five cents per lb. against 2½ cents per lb. for lead, Kootenay ore mines are not likely to neglect their chances.

The concentrating plant of the Alice Company at Creston is completed. The ore comes over a Riblet tramway from the mine to the mill ore bins, whence it is delivered to a Blake crusher and Gates rolls. From the rolls it passes through three revolving screens of different mesh and the product is fed to jigs. The undersize is fed to a classifier then to spitzkasten, and finally to Overstrom tables.

The Bulkley River in the Babine Range, near Babine Lake, is one of the most recent booms attempted in B. C. Reports are received to the effect that bituminous coal, gold-bearing copper minerals and free gold are to be found in abundance. The coal is largely owned by the Cassiar Coal Company, and the suppositious choice of the Grand Trunk Pacific for the Bulkley Valley is the probable basis for the boom.

The Hunter V. Mine, in consequence of the contemplated erection of a crushing and concentrating plant have been obliged to build a waggon road from Porcupine Creek to the mine. Among the possibilities are the installation of an electric power plant to drive the machinery and to be operated by the water-power of Porcupine Creek. Mr. R. W. Brigstock, the superintendent, has been engaged in making the necessary surveys.

A discovery of some importance to B. C. was made early in the month at Matsqui, near Vancouver. A Mr. F. S. Macluro, when digging in the side of a hill slope, came upon a body of blue clay, of fine texture and plasticity, the analysis of which corresponds closely with that of the best English fire clays. Should the burning tests show the clay to be free from shrinkage, cracks and fluxing. B. C. will have a local source of supply for all refractory material needed.

The Imperial Coal & Coke Company, whose areas are on Fording River, a tributary of the Elk, have been working twenty men, under the superintendence of Mr. W. R. Wilson, for several months past, chiefly in exploring the outcrops. This company is putting in a winter camp for tunnelling work. Seventeen seams of coal have been uncovered, ranging from four to thirty feet in thickness, and the tests are said to be satisfactory. This property adjoins that of the C.P.R., and if the latter should construct a branch line it will serve both.

The Standard Mining Co., operating the Hunter V. Mine at Ymir, have decided to put in a concentrating plant in consequence of a change in the character of their ore. The mine belongs to a Nelson syndicate, and was financed in Montreal and Scotland. The ore is low grade, but of enormous extent. It is worked as a quarry, and values have ranged from $3.50 to 4.00. Recently the ore has become more silicious and the values have increased, hence the proposed change in the method of handling At present the ore is shipped in bulk, either to the Hall mines smelter or to Granby; the tonnage shipped is about fifty tons a day.

The C. P. R. have done a considerable amount of development work on their coal claims on the Upper Elk River, fifty to sixty miles north of Fernie. The result of the season's work will shortly be known, but from the fact that surveys have been made for a branch line from Michel it is reasonable to conclude that the first promise of this important find has been fulfilled. A winter camp has been established and work will be continued in the several tunnels which have been started. The seams are, in the opinion of experts, a continuation of Fernie seams, and as was expected the coal at the face of the tunnels is cleaner than the first samples taken from the outcrops. Several recent analyses give as low as seven per cent. in ash, and may still improve, in which case clean coke is assured.

YUKON.

The Yukon filled with ice on the 24th of October, and navigation for 1904 has closed.

Application for 2,000 inches of water from Australia Creek has been made by the Gold Run Klondyke Company, for use on its properties situated on the right limit of Dominion Creek.

The first ice seen this fall in the Yukon was noticed on Sunday, the 18th of September. The first ice in 1903 was seen on October 13th, thus making this fall season nearly a month earlier than last year.

Press reports credit R. G. McConnel, of the Geological Survey, with the statement that the Mount St. Elias range, in the Western Yukon country, will be found to contain valuable gold deposits.

The purchase price of Gold Hill claims sold by A. B. Palmer to the White Channel Gold Hill Hydraulics, Limited, is stated to have been $562,500.00. The new company has a capital of $575,000.00, and the inference is that the bulk of the price was paid in shares.

The Norwood ditch on upper Bonanza has been completed. Siphons have been employed in crossing all the depressions, thus saving length of ditch. These siphons are made of sheet steel, twenty-four inches in diameter. The head afforded by the ditch is four hundred feet .

The new Government road on Sulphur extending from 31 to 80 below, a distance of about five miles, was finished Sept. 15th, and will be a great convenience to the miners of Lower Sulphur, who have been practically isolated in the summer so far as getting supplies, etc., to their claims.

A correspondent of the Vancouver "News Advertiser" writing from White Horse, makes use of the worn excuse that miners are leaving the Yukon because legislation is "unfair;" legislation in the territory may be inadequate, or it may be corrupt, but it is as "fair" for one man as another.

A new road is to be built on Clear Creek, from Barlow to Discovery, a distance of about fifteen miles. Clear Creek is the worst creek in the Yukon District for overflowing its banks, causing the necessity of wading waist deep in midwinter. During the summer months supplies are taken in via steamer to McQuestion, a distance of about 24 miles, and then packed across on horses when the trail is hard and dry, at a cost of from 10 to 11 cents a pound.

Figures obtained from the comptroller at Dawson show that so far in 1904 royalty has been paid on $8.500,000 of gold sent out, or exported. These figures do not include Forty Mile nor White Horse districts, returns from which for September had not been received. The gold exported thus far is as follows:

January	$85,895.55
February	107,417.10
March	138,740.40
April	60.00
May,	836,606.10
June	2,697,598.70
July	1,300,250.55
August	1,539,518.40
September	1,887,646.80
Total	$8,593,733.60

FOREIGN.

For the month of August, the consumption was 9,352 tons against 6,150 tons for August, 1903.

The Finnish asbestos industry is confined to three or four deposits situated in the centre of Finland.

The German consumption of foreign copper for the first eight months of 1904 was 68,872 tons, an excess of 19,742 tons over the same period for 1903.

The amount of iron ore to be forwarded from the Lake Superior mines this season will reach 20,000,000 tons, some 8,000,000 tons less than the record in 1902.

The yield of gold from the Rand for the month of September totalled 312,286 ounces, valued at $6,632,500.00, which is practically the same as for the month of August. The importation of coolie labor does not seem to have been productive of results as yet, though its effects are looked for very shortly.

COAL NOTES.

The shipments of the Dominion Coal Company for the nine months ending September 30th, 1904, aggregated 2,354,779 tons, as against 2,418,128 tons for the same period in 1903.

During the first nine months of this year the receipts of coal at Boston from Great Britain amounted to only 401,958 tons; in 1903 for the same period Boston imported 1,074,035 tons.

Dominion No. 1 colliery made almost a record output this month; in one day's work there were 2,300 tons put out, which is the record since the fire, and nearly up to the record before the fire occurred.

Construction work on the Fernie and Morrisey branch of the great Northern Railway has uncovered forty feet of coal on the Morrison claim, near Morrisey, B. C. The land is owned by the Western Oil and Coal Company of Vancouver.

The International Coal & Coke Company is now producing over 500 tons per day. The work now nearing completion will enable an output of 4,000 tons daily to be handled if such an amount should ever be needed. The bulk of the output now making is sold to the Canadian Pacific Railway.

The anthracite mines near Banff, Alberta, are shipping about 300 tons daily; of this amount 200 tons are of sizes larger than nut, and 100 tons are of smaller size. Between 400 and 500 men are employed at the mines, but the majority of these are tradesmen used in construction work. The bulk of hard coal shipments go to the Province of British Columbia.

Operations at the collieries of the French company operating at Blairmore, B.C., were discontinued on the first of October in compliance with peremptory orders from Paris. The announcement was a surprise inasmuch as large amounts of French capital have been invested, and the property was doing well. It is surmised by the officials at Blairmore that orders to suspend operations are the result of an internal disagreement among the officials of the company in France, but no authoritative reason has leaked to this side.

NEW COMPANIES.

ONTARIO.

The Niagara Quarry Company Limited. Head office, Orillia, Ont. Capital, $40,000. Provisional directors:—James Brockett Tudhope, William Hugh Tudhope, William Thompson, George Thompson and Andrew Craig of Orillia.

New York Lake Erie Oil & Gas Company, Limited. Head office, Windsor, Ont. Capital, $1,000,000. Provisional directors:—John Wurtele Lovell, Alice Wurtele Lovell, Alfred Henry Clarke, Alexander Robe. Bartlet and Agnes Waldie McGregor, Windsor.

The Canada Process Company, Limited. Incorporated 5th of October, 1904. Capital, $50,000. To manufacture products from all kinds of metals, minerals or compositions. Head office, Toronto. Provisional directors:—George L. Sherlock, James M. Neil and George H. Campbell.

The Senator Mill Manufacturing Company, Limited. Incorporated 28th of September, 1904. Capital, $100,000. To manufacture machinery for the reduction and manufacture of rock ore, quartz, cement and other refractory substances. Head office, Toronto, Ont. Provisional directors:—James K. Griffin, John Ridley and William St. Clair

The Canadian Lead Company, Limited. Head office, Toronto, Ont. Capital, $1,000,000. Provisional directors:—William Henry Eccles, Harry Arthur Bouter, John Henry Vamplew, Neil Sinclair and Frank Morison, Toronto, Ont.

Ballarat Mining Company, Limited. Head office, Toronto. Incorporated 5th of October, 1904. Capital, $300,000. Provisional directors: —James Stellar Lovell, William Bain, Robert Gowans, Ernest McNeil and Richard Richardson.

The Crown Oil Company, Limited. Head office, London, Ont. Capital, $300,000. Provisional directors:—D. S. Robb, London, Ont.; Clara McDowell, B. I. Baker, Josephine W. Brake, of Buffalo.

The Northern Construction Company Limited. Incorporated 7th Sept., 1904. Capital, $200,000, in shares of $100. Head office, Toronto, Ont. Provisional directors:—Alex. R. Mann, Archibald Cameron McKenzie, Wm. Henry Moore, Francis Annesley and Albert Mitchell, Toronto, Ont.

The following companies have been granted Provincial licenses:

The New River Consolidated Coal & Coke Company, incorporated in New Jersey, with T. W. Holistead, of Toronto, attorney.

Minnehaha Mining & Smelting Co., incorporated Arizona. Hugh Dalston, of Wabigon, attorney.

Big Master Mining Company, incorporated in New York. Philip Edward MacKenzie, of Rat Portage, as attorney.

BRITISH COLUMBIA.

The Revelstoke Land Company, Limited. Incorporated 23rd September, 1904. Capital, $50,000.

Greenwood Strathmore Mines, Limited. Incorporated 22nd September, 1904. Capital, $150,000.

Digest of Recent Patents: Mining and Metallurgical.

CANADIAN.

Sept. 20, 1904.

770,286.—Mining Machine. William E. Hamilton, Zanesville, Ohio. A mining machine comprising a movable platform, a radial frame pivotally mounted on said platform, cutting mechanism and breaking mechanism mounted on the forward end of said frame, and loading mechanism movably mounted on said movable platform and detachably connected at its forward end with the forward end of said frame in such manner that the said loading mechanism projects beneath and moves with said breaking mechanism.

770,624.—Gas Producer. Walter O. Amsler, Pittsburg, Pa., assignor to The Amsler Engineering Company, Pittsburg, Pa. The combination with the combustion-chamber, of a water-sealed trough below the combustion-chamber, a centrally-disposed cylindrical casing extending upwardly from the bottom of the trough, and a series of gratings supported by the cylindrical arranged in the form of a hollow frustum of a cone.

770,498.—Mine Car. William E. Hamilton, Zanesville, Ohio, assignor to Hamilton Manufacturing Company, Columbus, Ohio, a corporation of Ohio. A mine car comprising side and end walls, one of said walls having an opening therein, adapted to receive a part of a loading-machine, and means on said wall normally projecting into said opening to engage said part to couple said car and loading machine together.

770,289.—Amalgamating Machine. Frederick J. Hoyt, Chicago, Ill. The combination with a bowl, mercury therein, a semi-submerged body floated in said mercury, held centrally in said vessel, but unsupported, at its axle ends, of a charging spout over said body.

770,503.—Process of Forming Coal Briquets. Eli H. Larkin, St. Louis, Mo. A process which consists in mixing approximately three per cent. of crude petroleum with about ninety-seven per cent. of coal slack, then adding starch paste in about the proportion of two pounds of starch in paste form to substantially one hundred pounds of the petroleum-treated slack, and finally pressing the mixture into lumps or blocks.

770,283.—Ore Concentrator. Abel Guionneau, Denver, Col., assignor of two-thirds to Charles M. Fueller and Robert J. Cory, Denver, Col. A reciprocating table-concentrator, a flat, smooth table surface provided with several rows of inverted conical cups extending from the head-end portion of the table throughout a portion of each table's length, each row of cups connected together with a sunken groove or riffle.

770,561.—Switch-off Device for Endless Conveyors. Frederick O. Crowley, Oswego, N.Y. In combination with an endless conveyor, a guide or switch-off device upon or in close proximity to the conveyor, and having an inlet in one end for receiving the articles to be fed and its other end deflected laterally to the sides of the conveyor whereby the articles are fed by the belt from the inlet and diverted from the belt by the guide.

Sept. 27, 1904.

771,025.—Manufacture of Zinc White. Jacques Oettli, Lausanne, Switzerland, assignor to the firm of Syndica pour l'Exploitation des Inventions du Professeur Oettli, Berne, Switzerland. A process which consists in subjecting zinc plates to the action of electrolysis in a solution of one per cent. sodium sulphate of a temperature of approximately 60 C. obtained by means of a current of ten amp. per square decimeter.

771,107.—Ore Washing or Concentrating Machine. Enos A. Wall, Salt Lake City, Utah. An ore-concentrating machine or table adapted to receive actuating impulse from the head end, in combination with an operating rod or bar attached to the head of the table a buffer-bar through which the rod passes, a spring on the rod at the inner side of said buffer-bar and a buffer-block secured to the rod or bar at the outer side of the buffer bar or timber to receive and resist the impact of the spring and suddenly stop the forward movement of the table at its head end as it moves in the direction of the tail, and means for retracting the operating rod against the spring and suddenly releasing it.

770,796.—Apparatus for Separating Ore. Henry F. Campbell, Boston, Mass., assignor by direct and mesne assignments, to National Magnetic Separating Company, a corporation of Maine. The combination in a magnetic separator, of a magnet; means, presenting an unobstructed surface at a due distance below the magnet, and through an uninterrupted field of such magnet, and to pass it, spread in a film of substantially uniform thickness on the surface beneath the magnet, and means for causing the particles of ore to be mechanically agitated under the magnet in a direction other than that of travel of the ore.

770,910.—Cooling Device for Blast Furnaces. Ludwig-Keyling, Berlin, Germany. The combination of a box in which the upper opening of the furnace is situated a plate situated in this box vertically above the upper opening of the furnace, the diameter of this plate being larger than the upper opening over the opening of the furnace, a water nozzle situated vertically above the plate, an annular channel situated around the top part of the furnace in the box and means for connecting this channel with the outside.

771,058.—Method of Extracting Moisture from Air for Blast Furnaces or Converters. James Gayley, New York, N.Y. The method of feeding the air-blast to blast furnaces or converters which consists in feeding the air into a refrigerating chamber, distributing it therein in a current directed successively in varying directions, artificially cooling the air in the chamber to reduce its moisture to a small percentage, supplying the dried air to a blowing machine and feeding the dried air therefrom under compression into the furnace or convertor.

Oct. 4, 1904.

771,277.—Process of Concentrating Ores. Alice H. Schwarz, New York, N.Y., assignor to Schwarz Ore Treating Company, a corporation of Arizona. A method which consists in mixing a melted fatty matter which is solid at normal temperatures with the ore, then solidifying the fatty matter and separating the gangue from the values entrained in the fatty matter while the latter is solidified.

771,454.—Apparatus for Extracting Gold from Auriferous Sand, etc. Robert Blake, Madison, N.J., assignor to Eliza Blake, Madison, N. J. The combination with a tank adapted to contain a lower body of mercury, and having a discharge located in a relatively elevated plane of a horizontal cylinder transversely within said tank, and adapted to have its lower portion immersed in the mercury, provision for supplying material to the tank, in front of the cylinder, a pivotally-suspended arm depending within the upper portion of the tank at the rear of the horizontal cylinder and between the latter and the discharge, said arm provided with a series of teeth extending transversely across the tank, the length of the arm and teeth conjointly being such that the teeth in their lowest position will be above the mercury, and means for actuating said cylinder for immersing the material in the mercury and causing said material to pass beneath the cylinder, and for oscillating the arm for causing the teeth to move back and forth in the path of an arc solely above the plane of the mercury surface.

771,646.—Process of Obtaining Metals. Franz von Kugelgen, Holcombs, Rock, Va., and Heinrich Danneel, Breslau Germany, assignors to the Willson Aluminum Company, New York, N.Y., a corporation of New York. A process which consists in electrolyzing a haloid of an alkali in the presence of an oxid of metal, thus obtaining the metal, an oxid of the alkali and the halogen, and maintaining a supply of the haloid and the oxid by adding fresh quantities thereof as they are decomposed.

771,684.—Dumping Car. Swan F. Swanson, Pueblo, Colo. The combination of a car body provided with an outlet, a door closing said outlet and carrying a stiffening-strip having extended portions, sliding pivoted catches to engage said extended portions to hold the door closed, a crank shaft for actuating said catches, and means for actuating the crank shaft.

771,438.—Conveyor. Thomas McDonald and Willie McKee, Youngstown, Ohio. A conveyor, two movable frames, each frame having a set of supports for the material being conveyed, and means for effecting a curved movement of each frame for the purpose of giving a positive forward motion to the material being conveyed.

Oct. 11, 1904.

771,994.—Drying Apparatus. Frederick Meyer, Chicago, Ill. A drier comprising a rotary drum having two annular rows of shelves secured within same, one of said rows being disposed nearer to the centre of the drum than the other, the inner row having two alternating sets of shelves, the shelves in one of said sets being disposed radially of the drum, and the shelves of the other set being disposed tangentially, the shelves in the outer row being spaced from the shelves in the inner row to permit the contents of the drum to be dropped from the outer shelves to the inner shelves and to return to the outer shelves through the revolution of the drum.

771,872.—Furnace for the Manufacture of Steel. Gustav Gin, Paris, France. A furnace structure, and a hearth inclosed by and movable relatively to said furnace structure, the hearth having two non-carbon electrodes to connect it with a source of electrical energy and having an open channel in which the iron is placed to be treated while at rest, the electrodes being the terminal points of the channel.

771,857.—Pneumatic Gold-Separator. William Broadbent, Salt Lake City, Utah. The combination with the tank of two side casings with feed openings therein, a depression provided with an opening and closure therefor in the bottom of each side casing, a shaft extending through the side casings and tank carrying adjustable conveyor-blades within the side casings, sprocket-wheels on said shaft for driving it from a second shaft, and carrying perforated buckets, and means for delivering short puffs of air within the side openings near the bottom of the depressions.

771,909.—Mineral or Ore Washing Jig. Charles J. Hodge, Houghton, Mich. The combination of a driving shaft, a pair of eccentrics through which said shaft passes, and which are adjustable transversely of said shaft, a fly-wheel mounted on said shaft between said eccentrics and a crank connection between said fly-wheels and each of said eccentrics.

772,152.—Coal Mining Machine. Joseph F. Joy, New Eagle, Pa. A mining machine, a stationary frame comprising channel-beams and angle irons arranged there below, and frames connected to said beams and irons, a frame slidingly mounted on said stationary frame composed in part of centrally arranged angle irons, the bases of which slidingly engage said end frame and the webs of which form supports for the means whereby the same may be driven.

772,041.—Dump Car. Frank K. Hoover and Arthur
City, Mo. The combination with a truck and an inclined track or way mounted thereon, of a car body, and a single pair of wheels journalled on opposite sides of said car body respectively and in the same vertical plane transversely of the truck, said wheels being mounted and arranged to travel on said track or way and forming a moving pivot on which the car body may tilt.

771,833.—Apparatus for Mercurial Alkaline Processes. Charles W. Roepper, Germantown, Pa., and Willis E. Harmon, Mechanics Falls, Me., assignors to American Electrolytic Company, a corporation of Delaware. The combination of an amalgamating compartment; a demalgamating compartment; a main partition between the two, and a passageway under the partition; the bottom of the amalgamating compartment sloping downwardly from this passageway toward its other end.

Oct. 18, 1904.

772,846.—Gas Seal for Metallurgical Furnaces. Samuel Stewart, Brighton, and Harry Hughes, Woodward, Ala. A gas seal for metallurgical furnaces, comprising a plurality of sliding gates tapered at the ends to fit snugly together when in the closed position, a series of shafts geared together, and a crank on each shaft pivotally connected to one of said gates, and means for rocking one of said shafts.

772,699.—Ball Grinding Mill. Meter J. Davidsen, Copenhagen, Denmark. A ball grinding mill, consisting of a drum provided at some distance from its ingoing end with a row of openings, a screen extending beyond said row of openings and beyond the opposite end of the drum, a deflector on the shaft of the drum adjacent to the head of the same, apertures in said head adjacent to the deflector for returning the tailings for regrinding them in the end of the drum opposite to the ingoing end without mixing them with the material fed at the ingoing end of the drum.

772,472.—Filter-Press. James W. Neill, Salt Lake City, Utah. The combination of a cylinder adapted to contain the material to be filtered, a plunger working therein, means for reciprocating the plunger, means for reciprocating the cylinder, a valve controlling the passage of the material to be filtered to the interior of the cylinder and means actuated by the plunger for opening and closing said valve.

772,569.—Conveyor. Orlando Kling, Denver, Colo., assignor of one half to Herbert George, San Francisco, Cal. A conveyor, in combination, moving trucks or supports, receptacles movable independently of and mounted upon said supports or trucks, means for automatically tilting the receptacles while moving, and means co-operating with the bodies of the moving trucks or supports during their travel to prevent tilting thereof during the tilting movement of the receptacles.

772,723.—Blast Furnace. Andrew Latto and James C. Callan, Braddock, Pa. The combination with a blast furnace, of a conduit communicating with the blast furnace near the top thereof, and a dust-collector composed of a curved elbow, a downwardly-extending tube, angularly disposed plates arranged in said elbow and having spaces between the plates communicating with the open air.

772,389.—Ore Drainage and Leaching Tank. Jean F. Webb, Denver, Colo. A metallurgical filter, an outer imperforate tank separated by an annular space from an inner drainage and leaching tank with perforated sides and bottom covered with suitable filters, and having within its circumference the perforated lower end of a hollow compartment or stand-pipe, through which liquids or compressed air may be introduced into said tank and forced by pressure to pass outwardly through the filters and perforations thereof, and having pipes through which the flow of such liquids or compressed air may be reversed from the said hollow compartment or stand-pipe into the said annular space and be forced by pressure to pass inwardly through the perforations and filters of said tank.

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 lessees and licensees whereby they can acquire promptly, either by arrangement with the owner or by arbitration, all land required for their mining works.

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

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

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

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

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

THE HON. A. DRYSDALE,

Commissioner Public Works and Mines,

HALIFAX, NOVA SCOTIA.

PROVINCE OF QUEBEC

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

GREAT MINERAL TERRITORY

Open for investment in the Province of Quebec.

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

ORNAMENTAL AND STRUCTURAL MATERIALS IN ABUNDANT VARIETY.

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

Mining concessions are divided into three classes :—

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

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

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

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

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

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

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

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

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

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

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

The fullest information will be cheerfully given on application to

THE MINISTER OF LANDS, MINES AND FISHERIES,

PARLIAMENT BUILDINGS, QUEBEC, P.Q.

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.

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

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

PLACER MINING

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

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

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

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

DREDGING IN THE YUKON TERRITORY

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

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

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

PLACER MINING IN THE YUKON TERRITORY.

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

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

The person or company staking a claim must hold a free miner's certificate.

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

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

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

Work must be done on a claim each year to the value of at least $200.

A certificate that work has been done must be obtained each year; if not, the claim shall be deemed to be abandoned, and open to occupation and entry by a free miner

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

PETROLEUM

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

Department of the Interior.

OTTAWA, February, 1904

JAMES A. SMART,

Deputy of the Minister of the Interior.

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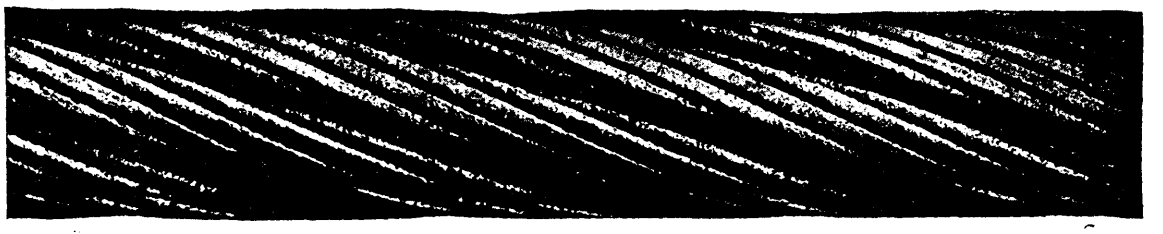

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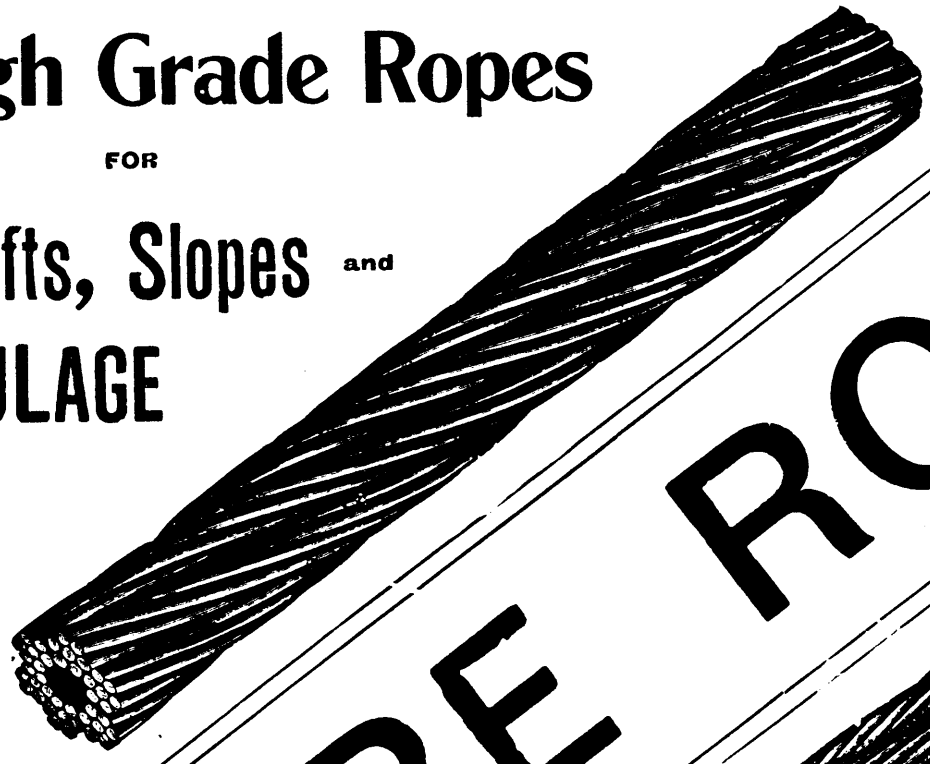

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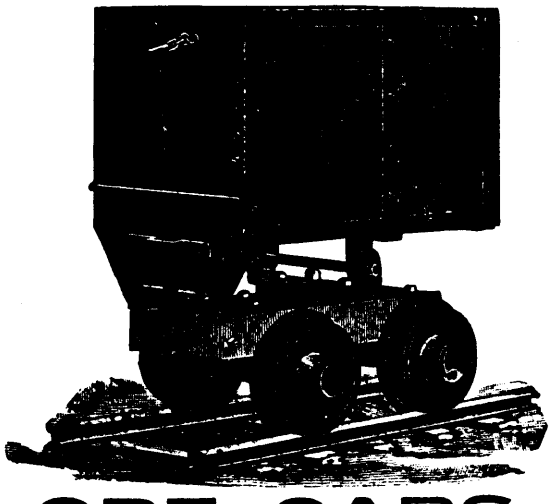

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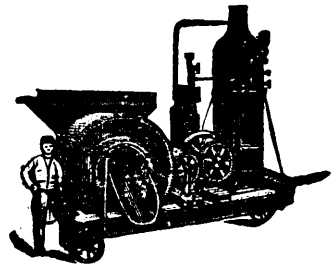

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