THE CANADIAN MINING JOURNAL

VOL. XXIX. TORONTO and MONTREAL, June 1, 1908 No. 11

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada
Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Office Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

Business Manager:
J. J. HARPELL, B.A.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of THE CANADIAN MINING JOURNAL were printed and distributed, or an average of 3,822 per issue.

SPECIAL CONTRIBUTORS.

GEOLOGY: Dr. Frank D. Adams, McGill University; Dr. A. E. Barlow, late of Geological Survey of Canada; Professor Willett G. Miller, Provincial Geologist of Ontario; Dr. J. E. Woodman, Dalhousie University, Halifax, N.S.

CHEMISTRY: Dr. W. L. Goodwin, Director School of Mining, Kingston, Ontario; Milton Hersey, M.Sc., Official Analyst Province of Quebec.

MINERALOGY: Professor W. Nicol, School of Mining, Kingston, Ontario.

MINING: S. S. Fowler, M.E., Nelson, B. C.,; Frederick Keffer, M.E., Anaconda, B.C.; A. B. Willmott, M.E., Sault Ste. Marie, Ont.; J. C. Gwillim, M.E., School of Mining, Kingston, Ont.; J. Obalski, Inspector of Mines, Quebec; J. Bonsall Porter, M.E., McGill University; H. Mortimer-Lamb, Sec. Can. Min. Inst.; John E. Hardman, M.E., Montreal; Fritz Cirkel, M.E., Montreal; George W. Stuart, M.E., Truro, N.S.

METALLURGY: Hiram W. Hixon, M.E., Mond Nickel Company, Victoria Mines, Ontario; Stafford F. Kirkpatrick, School of Mining, Kingston, Ontario; A. P. Scott, Dominion Iron & Steel Company, Cape Breton.

COAL: Hon. Robert Drummond, Stellarton, N.S.

NATURAL OIL AND GAS: Eugene Coste, M.E., Toronto, Ont.

CEMENT: Manley Baker, M.A., School of Mining, Kingston, Ont.

CONTENTS.

ONTARIO MINING ADMINISTRATION AND POLITICS.

We have watched, with some degree of concern, the course taken by the partizan press of Ontario in criticising and defending the administration of mining law in this province. The organs of both parties have gone to regrettable lengths in misstatements and palpable untruths.

It has remained, however, for the Toronto Globe to cap the climax of recklessness. In its issue of May 22, in an editorial entitled "Government Claim-Jumping," it gives utterance to an unqualified condemnation of the mining policy of the Provincial Government. The editorial will inevitably affect public confidence in the mining industry. That it is inspired by political agitators and that its writer has either been an ignorant dupe, or has deliberately closed his eyes to the truth, are facts that he who runs may read. In any case the "Canadian Mining Journal" is called upon to correct the malicious untruths and half-truths thus put in circulation.

Firstly, it is germane to our subject to remark that it would become the Globe to maintain a discreet silence on topics pertaining to mines and mining. In fact it has little right to pose as the champion of right. Last year, when the mining fever was at its height, the Globe, despite full information as to the character of the projects it was aiding and abetting, continued to publish the most flagrant specimens of wild-cat advertisements. In this respect, in view of the Globe's actual standing and the rarified moral atmosphere in which it moves and has its being it was more offensive than its worst contemporaries. Only one Toronto daily chose the path of decency and honour—and that one was not the Globe. As between tainted money and serving the true interests of the people, the Globe chose the former atlernative. So much for the past.

Early in June an election is to take place. To the "Canadian Mining Journal" there is neither politics nor party. Hence, so long as the industry which it represents is not injured, the "Canadian Mining Journal" has no concern in the battle. But when, in the course of an election campaign, a newspaper attacks the very foundation of that industry, in its intemperate desire to discredit the work of a department, it is high time for us to speak.

The Globe states that the excuse made for "Government claim-jumping" is that the "discoveries were not made when the patents were obtained." In what sense this can be called an excuse we cannot see. Under

the present Mines Act discovery is essential. If the Government inspectors are not shown satisfactory evidence of discovery they are in duty bound to throw out the claim. This is an integral part of the Mines Act. Its operation has entailed hardships. It is by no means a perfect law. But it is law and is accepted and must be lived up to.

That the Mines Act is perfect is not claimed even by those who framed it. That the administration of the Department of Mines has been flawless is not to be urged for a moment.

On the other hand we speak whereof we know when we say that the inspectors, upon whose shoulders falls the onus of carrying out the letter of law, are straightgoing, carefully selected, professional men. For the benefit of the Globe we may add that these inspectors are chosen with absolutely no reference to politics. This is a rare and valuable feature and has an important bearing upon the administration of the law. Indeed it goes far towards rectifying manifest imperfections in present legislation.

The last few years have witnessed an expansion in the mineral industries of Ontario, for which the discovery of Cobalt is not wholly responsible. And the Bureau of Mines has done notable work before and since that epoch-marking discovery. Ontario does not lose by comparison with any other province of the Dominion. Let its Department of Mines be measured by these standards, and not by the criminally irresponsible abuse of the Globe.

There is in the far west a weekly that makes no pretensions to piety. Its humor is unconventional, possibly a trifle mediaeval. Often its columns are frankly objectionable. We need not make the comparison more invidious by giving the name of this knight-errant of journalism. But we may be allowed to express an open preference for the outspoken honesty of the western sheet as opposed to the unscrupulous, bitter, and deplorable partisanship of the psittaceous Globe.

SLOCAN ZINC ORES.

It is reported that, after long deliberation, the Supreme Court of the United States has reversed the decision of the Board of Appraisers in regard to the dutiability of zinc sulphide. This will end the interminable discussion as to the interpretation of the word "calamine." Whilst the appraisers were technically right in objecting to the classification of zinc sulphide as calamine, yet the logic of the situation demanded equal rights for either the carbonate, the silicate or the sulphide of the metal. Therefore the 20 per cent. ad valorem duty on zinc ores entering the United States from Canada is no longer to be collected.

From the Slocan zinc concentrates have been shipped as far as Wales. The United States smelters, however, have been the principal purchasers, and it was at the instance of the latter that the present question of duty was taken up and settled.

The difficulty has not been without incidental benefit. The Canadian smelter, now about to commence operation near Nelson, will aid in the development of the Slocan, especially in the case of small shippers. The removal of the ad valorem charge will encourage competition.

TWENTY YEARS' PROGRESS IN SOUTH AFRICA.

The recently elected president of the Institution of Mining and Metallurgy, Mr. Alfred James, in his inaugural address summarized the advances and improvements in the methods of mining and milling South African gold ores. Mr. James entered upon his first professional engagement in South Africa twenty years ago. His review covers the intervening period.

Twenty years ago the metallurgy of gold received but scant attention. Technical papers on the subject were rare. Practice generally was crude and mining and milling methods were largely rough and ready. In South Africa operators were confronted with the problem of extracting the gold from heaps of tailings assaying in places as much as 1 ounce per ton.

The advent of American mining engineers not only brought about an era of elaborate and expensive installations, but induced a spirit of eager competition that reacted beneficially upon all concerned. It is noteworthy that the best of the British engineers have more than held their own ground.

Amongst other evidences of change and improvement it may be noted that in 1888 comparatively few gold mines employed assayers. To-day the metallurgist is supreme. But success was gradual. The first filter presses were failures. Now they are an acknowledged necessity. Like instances are not wanting.

Mr. James sums up, as worthy of notice, the following improvements in mining and milling:

The sorting of waste rock from reef matter to be milled.

The use of separate crushing stations containing high capacity crushers.

The general adoption of mechanical transport for the ore from the mine to the mill.

The provision of bins of great storage capacity to provide against breakdown in mine or hoisting engine.

The provision of special water supply—usually with its acidity neutralized—for the mill.

The use of heavy stamps. In place of 850 pound stamps and a per diem output of 1½ to 2¼ tons per stamp, 1,500 pounds to 2,000 pound stamps with a capacity of 6 to 10 tons per stamp are not uncommon.

The use of long, unbroken silvered plates for mill amalgamation, and of shaking plates for forced amalgamation, after tube mills. At Waihi the plates are installed in a separate building.

The adoption of regrinding appliances. The cost of tube milling African sands is now reduced to 5½d. per ton re-ground. It is doubtful, however, whether tube mills are more economical in running than stamps for increas- output, as the consumption of power is high.

The provision of automatic weighing and sampling devices.

The introduction of the cyanide process for recovering gold from sands and slimes.

The use of improved mechanical roasting furnaces.

The provision of tailings wheels for elevating pulp. These are probably to be superseded by three-throw pumps of the type used for filter pressing.

The practical effect of these improvements may be measured by the fact that ores, formerly looked upon as impossible of commercial treatment, are now considered profitable. Thus ore containing 6 dwt. of gold per ton is now mined and milled at a good profit, and large plants have been erected to treat sand carrying less than 1½ dwt. of gold per ton and slime assaying only ½ dwt.

In concluding his thoughtful address, Mr. James makes a strong plea for the standardization of mine accounts. We heartily endorse this request. The need is universal.

HIGH GRADING.

In our last issue we made brief reference to the prevalence of "high grading" in Cobalt.

Circumstances have since arisen that make strong comment necessary.

On May 12th a Cobalt jeweller was arrested in Toronto. He had in his possession ore to the value of about eight hundred dollars. When questioned by his captors the man informed them that graft of this sort was so universal in Cobalt that he felt obliged to secure a share. The answer is naive. Also it is significant.

The Mine Owners' Association employed the detectives that captured this particular theif. Apparently the Association is the only active deterrent influence.

But why should not the workmen take it upon themselves to aid in suppressing this systematic looting? Would it not be wiser and better for the miners to indulge in some honest efforts to remove the blot of "high grading"? If the labor leaders were as active in their opposition to wrongdoing of this sort as they are in fomenting useless strife, there would be far fewer grievances and far less unnecessary friction.

A thief is defined in the dictionaries as one who deprives another of property secretly. Inadequate as this definition is, it serves the purpose well enough.

Judged by the moral standards nominally accepted in social life, many of our successful financiers, promoters and politicians are thieves. Occasionally a member of one of these classes oversteps the legal boundaries of right and wrong and is caught. Mostly, however, their operations are within the law, or cleverly evasive of the law.

In the learned professions there is no pronounced tendency to misappropriation. A doctor, an engineer or a lawyer loses caste if he is suspected of carelessness in handling the property of others. The commercial and industrial classes of Canada are as clean-handed as those of any other country in the world.

What are usually termed the laboring classes are not looked upon as displaying marked evidence of dishonest propensities. On the contrary, it is popularly believed that the honest toiler is the salt of the earth, and some varieties of modern socialism (much misused name!) inculcate the dogma that none but the laborer is honest at all.

Possibly in no calling is there such need of intelligence and resourcefulness as in mining. The good miner is, to our mind, one of the best types of producer. His work is not specialized to such an extent as obtains in modern manufacturing establishments. Neither is it beset with more dangers. But the dangers and the requirements are such as encourage a sense of personal responsibility. Initiative, adaptability and quickness of perception are developed in the efficient miner.

We repeat that, as a class, miners rank high in our social economy.

It is, therefore, much to be deplored that the dishonesty and greed of a number of Cobalt miners has brought dishonor upon an entire community, and particularly upon the workmen of that community.

And it should at once be recognized as an imperative duty on the part of every honest miner that he do his utmost to bring to justice each and every culprit. A pronouncement to this effect from the representatives of the labor organizations would be timely. The stigma should and must be removed and the workmen themselves can act most efficaciously.

JOURNALISTIC AMENITIES.

The Sydney Record recently paid this "Journal" the compliment of reproducing from its correspondence columns some remarks on the question raised by the appointment of the Eight Hours Day Commission in Nova Scotia, and in doing so it prefaced the extract by stating that the Glace Bay cor-

respondent of "The Canadian Mining Journal" "reflects the views of the Dominion Coal Company." This statement has been made by the Record previously, and we wish to be allowed to correct any false impressions that may arise if we permit it to go unchallenged.

The Glace Bay correspondent of this "Journal" reflects the views of no person but himself. These letters are, however, written from Glace Bay. Everything that emanates from Glace Bay must of necessity bear the impress of Dominion Coal, and while to one person this may be synonomous with the mark of the Beast, yet to another person it may suggest nothing beyond the operations of a business machine on whose efficient operation the welfare of some 30,000 persons directly depends. Everybody in Glace Bay is either the servant of the Coal Company, or the servant of the servants of the Coal Company. Correspondence from Glace Bay to an organ of the mining industry must have an inevitable tinge, but apart from this we plead not guilty to the Record's impeachment.

A corporation is not an entity, but an aggregation of parts. It is a commercial machine, ingeniously assembled and designed for one purpose only, namely, that of earning dividends on the moneys entrusted to it by the shareholders. A corporation may have a policy, and usually has a very well defined one, but it cannot hold any views, for that is the privilege of the individual. We take it that if the Dominion Coal Company were anxious to impress upon the public the rectitude of their policy they would not seek to do so through the medium of an anonymous correspondent to a technical journal that is read largely by a class whose policy is at one with that of the Dominion Coal Company. They have other and more telling means of publicity, and while we cannot but feel flattered at the Record's evidently high opinion of our perspicacity in this matter, we must make it very clear that our views are uninspired and original. Whatever bias we have is purely personal.

PREPARATIONS.

Arrangements are now completed with the Commissioners of the Canadian National Exhibition, to be held in Toronto from August 29th to September 14th, whereby a day is to be set apart for the mining industry. Ample space has been allotted for mineral and metallurgical exhibits. The Provinces are to be asked to aid in making a strong and impressive display. Mining corporations are also expected to contribute towards the success of this praiseworthy plan.

Manufacturers of mining machinery and supplies are particularly requested to spare no effort to make a fine showing.

September 4th is the day selected as "Miners' Day." On this day the British and European delegates, visiting Canada under the auspices of the Canadian Mining Institute, are to be in Toronto. Their presence will lend additional importance to the event.

Dr. J. O. Orr, the secretary of the Exhibition Commission, whose office is in the City Hall, Toronto, will give all information on request.

DR. ROBERT BELL.

It is reported that Dr. Robert Bell, Chief Geologist of the Survey Department, will soon be granted leave of absence for a number of months, to be followed by superannuation at the maximum rate. Dr. Bell has seen many years of continuous service. He is still vigorous and energetic and will, no doubt, continue his excellent professional labors unofficially. "The Canadian Mining Journal" wishes to extend the hope that Dr. Bell's well-deserved release from the burden of routine will be a period of profit and pleasure to himself and to his friends.

MINING IN THE PROVINCE OF QUEBEC FOR YEAR 1907

Mr. Obalski's annual report contains the usual summary of mining operations. The calendar year 1907 is covered by the report. We have already given a detailed list of the production of minerals. The increase over 1906, as noted before, is $371,370. We shall now take up the more important branches of the industry in the order followed in the report.

Iron.

The Canada Iron Furnace Company at Radnor, and the John McDougall Company at Drummondville, using mostly bog ore, produced a total of 10,047 short tons of charcoal iron. There was no important work done on the other iron deposits of the province.

Masses of hematite, occurring irregularly in a strip of ferriginous dolomite, in Dunham Township, County of Missisquoi, were examined. Picked samples showed 69.49 per cent metallic iron.

Magnetic and titanic iron ore was found in the Seigniory of Rigaud Vaudreuil, Beace.

Referring to the magnetic sands of the north shore, Mr. Obalski claims that they can be profitably concentrated into a product yielding 67 to 70 per cent. metallic iron, about 1 per cent. titanium and practically no sulphur or phosphorus. The applicability of the Grondal process is pointed out.

In the neighborhood of Three Rivers and at St. Malo, ochre is mined and calcined by three operations, the Canadian Paint Company, the Champlain Oxide Company, and S. W. Argall. Calcined ochre is shipped to Canadian and United States consumers. Some crude ochre also is shipped. For 1907 the output of crude was 2,700 short tons, worth $5,400; of calcined, 2,300 tons, worth $29,530. The work continued only throughout a portion of the year. Sventy-five men were employed.

Chrome Iron Ore.

Three companies worked the chrome iron ore deposits in the Township of Colraine—the Black Lake Chrome & Asbestos Company, the American Chrome Company, and the Canadian Chrome Company. A total of 40 stamps and 12 Wilfley tables make up the mill equipment of these companies. Seventy-six men are employed during periods of from 4 to 11 months. The output for the year was 5,721 long tons of 1st and 2nd class ore and concentrates valued at $63,130. A considerable amount of diamond drilling is being carried on.

Copper.

The mines in the Capelton region were regularly worked by the Nichols Chemical Company, and the Eustis Mining Company.

At the latter's mine a depth of 2,800 feet has been reached. Electric power is supplied from a waterfall two miles from the mine on the Coaticook river. Concentration works capable of turning out 200 tons of concentrate per 24 hours are installed near the railway. The equipment consists of 4 Blake crushers, 3 double rolls, and 8 Wilfley tables. The ore body in sight is large and variable in grade.

At the Nichols Company's Albert mine work was continued in Shaft No. 1. Sulphuric, nitric and hydrochloric acids and glauber salts are manufactured at the company's chemical works.

Several small promising prospects are being developed by other parties. Prospecting is being actively followed near Sherbrooke.

In the copper industry 250 men were employed. Twenty-six thousand four hundred and five long tons of copper ore were mined, valued at $160,455.

Gold.

The excitement produced by the discovery of gold in the Gilbert river in 1863 led to no important results, although an estimate places the amount of gold taken out between 1863 and 1878 as $2,000,000. Operations were then confined to a strip two miles long. Mr. Obalski urges the systemate prospecting of the district.

Near the close of 1906 auriferous quartz was found in the Township of Marstin. Assays by Dr. Milton L. Hersey showed from traces up to $10 per ton of gold. This is the first discovery of gold in quartz in apparently commercial quantity.

Asbestos.

The asbestos industry continued to flourish during the past year. The utilization of short fibres in the manufacture of boards has encouraged the opening of new mines, especially in East Broughton. Most of the companies used electric power furnished by the Shawinigan Water Power Company and the St. Francis Water Power Company.

At Thetford the King asbestos mine, the Bell mine, the Johnson mine and the Beaver mine are working regularly. At Black Lake the American Asbestos Company has acquired the mines of the Montreal & Glasgow Asbestos Company and of the Manhattan Asbestos Company, and now operates four independent mines. Other companies are the Johnson Company and the Standard Asbestos Company.

In Broughton, Colraine and Wolfestown Townships there is activity in asbestos mining. The Asbestos & Asbestic Company continue to employ about 400 in their mine and mills. Their power is partly supplied by the Shawinigan Water & Power Company. Their old quarry is 200 feet deep and is served by 18 cable derricks.

Of 1st class (crude), 2nd class (crude), fibre and paper stock the province produced 61,85 tons valued at $2,455,919. Asbestic was produced to the amount of 29,193 tons worth $27,292. Men employed, 2,141. Wages paid, $931,061.

Amber Mica.

The amber mica industry prospered during the year. Shipments increased and prices were good, especially for small mica. But towards the end of the year the demand suddenly ceased and the Ottawa trimming establishments were temporarily closed.

The Blackburn Company, working the Perkins Mill, was the most important producer. They also shipped a couple of hundred tons of phosphate.

Production of province—

	Pounds	Value
Total thumb trimmed	542,290	$197,739
Split	7,957	2,109
Rough called mica, 150 short tons, ...		24,030

Employees.—288.

Wages.—$108,600.

No white mica was mined during 1907.

Phosphate.

As mentioned above, phosphate was mined with mica in the Ottawa region by the Blackburn Brothers. This firm shiped 200 tons of 80 per cent. and 60 tons of 60 per cent. The Capelton Chemical and Fertilizer Company of Buckingham, used 35 tons of phosphate, and the Electric Reduction Company of the same place used 300 tons.

The total value of the phosphate, 408 short tons, was $3,410. Both companies named above imported phosphate from Ontario and the United States.

Graphite.

Much prospecting was done in Buckingham, Grenville, and Labelle districts. In the Buckingham region the Diamond Graphite Company, an American company, worked lots 12, 13 and 14 of range X and erected a mill on the property. The dry process of concentration is followed.

The Bell mine, operating lots 1, 2, and 3 of range V, Buckingham, took out a fair amount of ore. A mill is being erected.

The Buckingham Graphite Company, with mines and mill on lot 19 B, of range VIII, of Buckingham, did not work during 1907. A quantity of the previous year's products was shipped. Brumell's process is used here.

These were the only operating companies in Buckingham.

In the district of Grenville, and in the townships of Amherst, and Joly, there was some work done.

From the province 120 short tons of prepared graphite were shipped, valued at $5,000.

Natural Gas.

The Canadian Gas and Oil Company, whose office is in Three Rivers, sank a number of wells near Louisville, Yamachiche, and St. Barnabé. In thirteen of these gas was encountered in merchantable quantities. Gas was generally struck at a depth of 225 to 300 feet. The

bore-holes passed through clay, fine sand, and gravel before striking solid rock and gas. The producing wells are cased and connected with a distributing line. Pipe lines are laid to supply St. Barnabé, Yamachiche, and Louisville, and a 8-inch pipe line, 13 miles long, is laid to Three Rivers. The city pressure is reduced to 4 ounces.

The gas is clean and non-sulphurous. The supply is limited and deeper boring will have to be done to find more lasting reservoirs.

The report concludes with a list of companies operating in Quebec. Appended are reports of explorations north of Pontiac and on the surveyed townships of Lake Temiscamingue.

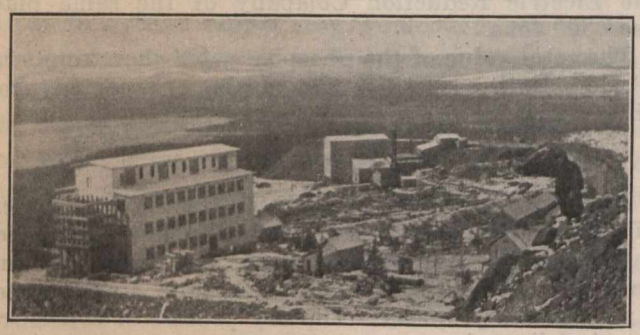
MINING IN THE EASTERN TOWNSHIPS OF QUEBEC.

By Fritz Cirkel, Mining Engineer, Montreal.

Mining in the Eastern Townships of the Province of Quebec is destined to play an important part in the mineral history of the Dominion, judging from the efforts which have been made for quite a number of years to increase gradually the capacities of the established mines or to open up new mines and add facilities for handling the output.

Asbestos and chrome iron are at present the staple articles of production; but there are other ores such as those of iron, copper, and last but not least, gold, to which little attention has been paid, and it is to be hoped that before long, earnest efforts will be made to test and exploit these deposits.

Copper deposits occur in a number of localities through the counties of Megantic, Leeds and elsewhere, the only copper mines being the Eustis and Nichols mines at Capelton, while some work was also done last year at the Ascott, Suffield and King mines. About



The 500-ton plant of the Dominion Mines Asbestos Co. and the Asbestos Plant of the Standard Asbestos Co., at Black Lake, P.Q.

32,000 tons of ore were produced of which about 8,000 tons were treated at Capelton for sulphuric acid and matte by the Nichols Chemical Company, which according to Mr. Obalski produced 374 tons of matte containing as an average 53 per cent. copper.

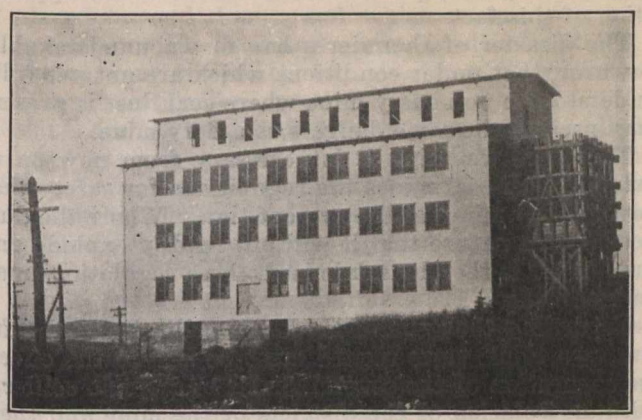
Considerable excitement has been caused by the discovery of gold in the vicinity of Lake Megantic, and it is reported that practically the whole territory, especially to the east of the lake, has been staked. The gold is reported to occur in quartz veins which yield in some cases satisfactory returns when assayed. However, no mining to speak of has been done, and it remains to be seen whether the mode of occurrence warrants the exploitation of the deposits on a large scale.

The asbestos industry forges ahead as usual, and, while it must be admitted that the recent financial depression has had its effect upon this market for some months past and has delayed the proper development of several new enterprises, still the outlook is most encouraging. Especially is this the case as regards the sale of fibre used in asbestos roofing slate, and asbestos board, an invention of importance in the construction of fireproof buildings. All the mines, some of which had closed down during the winter as usual, commence to gather in their full quota of men in order to resume operations. Mine labor, which at this time a year ago was scarce, seems to be plentiful, and there is now no difficulty of manning the mines and mills to their full capacity. In addition to the established mines at Thetford and Black-Lake, quite a number of new mines are opened up, especially in the East-Broughton district. This region has attracted considerable attention for some time past on account of the excellent fibre the mines produce. Careful exploration work carried on for the last two years has demonstrated that the productive serpentine belt has a far greater extent than at first supposed. The belt has not only been traced from Range 3 at East-Broughton up to Range 11 at Broughton, a total length of approximately 7 miles, but in almost every range work has been done to prove the productive character of the rock. Strange to say the serpentine occupies all lots, more or less, numbered "13" and the sinuosities of the boundaries of this belt with only one exception keep within the southern and northern limits of these lots. The following table will show the succession of outcrops and mines along the belt:

Lot 13, range 4; the Millar outcrops.
Lot 13, W.range 5; the Boston Asbestos Company, (mill under construction).
Lot 13, E. range 6; The Frontenac Asbestos Mining Company, (mill under construction).
Lot 13, W. range 6; The Quebec Asbestos Company, (in operation).
Lot 13, W.W. range 6; The Eastern Townships Asbestos Company, (in operation).
Lot 13, E. range 7; The Broughton Asbestos Fibre Company, (in operation).
Lot 13, W. range 7; The Tanguay Outcrops.
Lot 14, range 7; The Fraser mine, (not in operation).
Lot 13, range 8; The Taschereau and Bolduc Asbestos outcrops.
Lot 13, range 9; Outcrops of fibrous serpentine discovered.
Lot 13, range 10; Outcrops of fibrous serpentine discovered.

The "Boston Asbestos Company" operating on Lot 13, W. range 5, is at present constructing a mill for the treatment of about 250 tons of asbestos rock; this mill will be ready about the first of August; steam power

will be used, but it is the intention to replace this by electric power, if reasonable terms can be obtained from the electric power companies that intend to enter the field. The mill building is located at a distance of 500 feet from the asbestos outcrops, close to the track of the Quebec Central Railway; its size is 50 x 150; it will contain two cyclones and all modern appliances for the extraction of the asbestos fibre. Mr. A. A. Nor-



The new 500-ton Asbestos Separation Plant of the Dominion Mines Asbestos Co. at Black Lake, P.Q.

mandin of Boston is the general manager of this company. The area of the property is 85 acres.

Adjacent to the "Boston Asbestos Company's" property to the west, the "Frontenac Asbestos Mining Company," which controls an area of over 100 acres, is building a mill of a capacity of 300 tons ped day. The outcrops of fibrous serpentine, which are scattered all over the northwestern part of this property, apparently indicate that the productive fibrous serpentine covers a larger area than was originally supposed. Mr. H. Riehle, formerly of the "Union Asbestos Company," is the designer of the mill and is the manager of the company.

The "Quebec Asbestos Company" operating to the west of the "Frontenac," have been working during the winter with about 40 men, and are putting on a larger force of men with the advent of the summer season.

The "Eastern Townships Asbestos Company," which commenced to operate this mill last fall, has just been starting up again, after a shut down of about three months, due to repairs and alterations in the mill. The latter has been built during the summer season of 1907, inside six months, a rare accomplishment indeed considering the difficulties in transportation in that part of the country. Mr. P. Angers, N. P. of Quebec, is the energetic manager of this promising concern.

The "Broughton Asbestos Fibre Company" on lot 13, E. range 7, commenced operations in mine and mill in the middle of April, after a shut-down for about four months. This company, which was the first one in the district to prove the value of these peculiar ore deposits, have been operating their new mill during last year with great success; about 300 tons of rock were handled in the mill per day, producing approximately a carload or as an average about 25 tons of asbestos fibre per day. It may be said here that the success of this undertaking which at first had to surmount a great many difficulties, in in a large measure due to the untiring efforts of Co.. Williams, the manager of the concern.

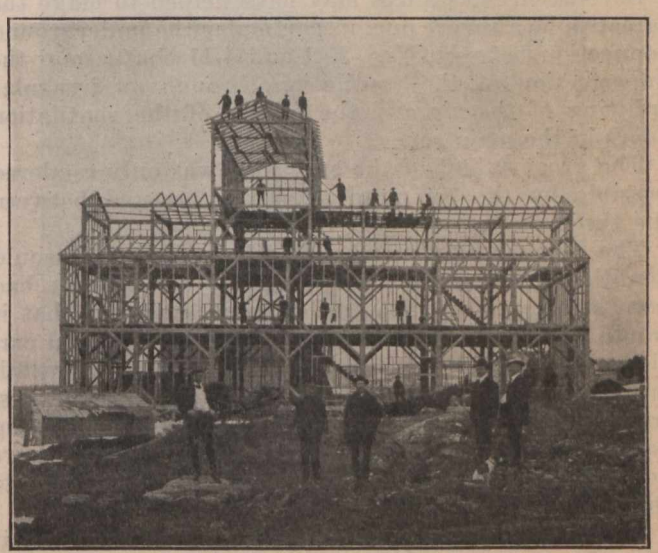
Further to the northwest from these properties, excellent outcrops can be noticed on the "Tanguay," and further west again on the "Taschereau" lot. Plans of a mill for this latter promising property for the treatment of about 300 tons of rock per day are being made, and all preparations are under way to begin work as soon as the snow disappears.

At Black Lake, the big 500-ton mill of the "Dominion Asbestos Company," is almost completed, and it is expected that this company will soon bring its products, which on account of some innovations in the mill system, are said to be of superior quality, on the market. The Greenshields asbestos property, forming part of the holdings of the "Black Lake Chrome & Asbestos Company" has been sold recently to Quebec parties, and a mill is to be constructed during the course of next summer.

The Johnson Asbestos Company, the pioneer company of the district, commenced operations in 1878. Its new 500 ton mill is now almost completed. Four mills are now run by the same company.

If all the mines and mills are built and developed as contemplated at present, there will be in the beginning of 1909 altogether 7 new establishments in operation, which will add to the present mill capacity of the district approximately 2,000 tons of asbestos mill rock per day, which at an extraction of 8 p.c., would yield an additional output of asbestos of about 180 tons. The total output of the districts for 1907, according to the statistics furnished by the "Mines Branch," amounted to 62,000 tons of a value of $2,482,984.

In the chrome iron industry the output will be considerably increased in the near future, owing to the completion of the new inclined shaft No. 1, of the "Black Lake Chrome & Asbestos Company." Large bodies of crude ore have been tapped through this new shaft, which has a depth of 320 feet, delivering from 30 to 40 tons daily of high class ore, beside a good deal of milling material. From present signs it appears that



New Mill of the Boston Asbestos Co. at East Broughton.

in this industry, great activity will be displayed during the coming summer season, as the inclemency of the weather during the past winter has had the effect of reducing the regular production. There are three operating companies in the field with a milling strength of 75 stamps. The production for 1907 amounted to 7,196 tons valued at $72,901.

REPORT OF THE FRENCH STATE COMMISSION ON THE COURRIERES EXPLOSION OF THE 10TH MARCH, 1906.

(Translated from the German: "Gluckauf," 15th February, 1908.)

The following report of the Commission appointed to enquire into the Courrieres explosion has been published by the Minister of Mines:—

The cause of the initial explosion which produced the main catastrophe has not been clearly ascertained, in spite of continuous and exact researches. It has been shown, however, that its wide extension over the whole of the underground workings of pits Nos. 2, 3 and 4-11, an area of three kilometres by one and one half kilometres, was due to a coal dust explosion, produced by a combination of circumstances.

Everything points to the origin of the first explosion in the Lecoeuvre Heading, but this cannot be stated with any greater certainty than the cause of its origin. Whether it was due to a sudden outbreak of gas, or to an explosion of powder, or to whatever cause, can only be surmised.

Under these circumstances no real connection has been found for which the coal company could be held responsible between the explosion and the use of open lights in the Lecoeuvre Heading, nor of the explosive Favier I, in the place of the prescribed "safety" explosive.

Also it is evinced by all signs that the fire in the Cecile seam had nothing whatever to do with the disaster. The importance of this fire has been extraordinarily overrated. All necessary measures for fighting this fire had been taken by the company, and there was no necessity to prohibit the descent of the workmen.

In this matter no particular blame attaches to anyone.

Several circumstances may have helped to make the catastrophe a severe one, in particular the underground connection between Nos. 2, 3 and 4-11 shafts, and the imperfection of the ventilation through an irregular splitting of the air and the failure of the ventilation doors in the main roads.

The great extent of the explosion was only rendered possible by the communication that existed between the three shafts.

The number of men who died by suffocation would doubtless have been lessened if the air current had been stronger and the ventilation so arranged that it would have restored itself after the explosion and carried off the deadly gases. Instead of this, the ventilating current was completely disordered by the destruction of the numerous trapdoors and the ventilating partition in shaft No. 3. But these fatal errors were not disclosed until the explosion drew attention to them.

As the workings at Courrieres were free from gas, it seemed unnecessary to divide the mine into limited districts or to regulate the ventilation, and in general, the communication between the various shafts appeared to be justified on the ground of safety, especially as affording a way of escape to those employed underground in the case of an inrush of water.

Referring to the coal dust danger, it had not been previously supposed that a coal dust explosion of such magnitude was possible. The only cases of coal dust explosion that have taken place previously in France have not extended for a greater distance than 80 to 100 metres; with the exception of the Decize explosion, which extended over 180 metres.

However deficient the layout of the mine may appear to-day in the light of experience, yet before the explosion the need for improvement did not appear. The decision of the authorities that the circumstances did not call for a prosecution is based on an appreciation of this fact.

The disaster of Courrieres has shown unmistakably, however, that under conditions which are not yet fully understood a non-gassy mine where coal dust is present may present the same dangers as a fiery mine.

Therefore we think it is necessary from now on to extend to all coal mines the regulations for safety that govern fiery mines at the present time. Where the dust is of such a nature that it will not readily explode and the danger is thereby minimised, these regulations may be modified.

Regarding the general layout of collieries in the future, we think more regard must be had to the effective separation of the several shafts of a single colliery, with an isolation of the districts of the mine and their ventilating currents, and a limitation of their extent in order to minimize as far as possible the effects of an explosion by confining it to the smallest possible area. In accordance with the Report of the Commission on Mine Gases in November, 1906, this separation should be effected by means of iron doors, which will open outwards only, and will withstand a pressure of up to five kilograms per square centimetre, and which can be closed from either side. Finally, more attention must be devoted to a methodical system of splitting the air current to assure that every point shall receive its quota of the ventilation.

In the future ventilation partitions shall be avoided, and the exhaustion of the seam shall not be forced unless it is accompanied by the presence of sufficient material to pack the goaf.

The use of open lights is forbidden in all the mines, and only permitted explosives with approved ignition apparatus are to be allowed.

The whole of these measures are to be effective in the coal mines of the Nord and Pas de Calais Basins. Steps will be taken to put them into effect in every coal mine in France.

The provision of breathing apparatus for rescue work is prescribed by the order of 15th April, 1907. The outstanding questions therefore are the dangers of coal dust explosions and the necessary safeguards to be adopted, together with the question of the use of so called safety explosives in fiery or dusty mines.

It was demonstrated by the recent explosion in the Saar district (Prussia) and also at Courrieres itself that appreciably long portions of roadway will, if sufficiently damp; tend to hinder the spread of an explosion. It is not, however, certain that the dampness produced by sprinkling will always serve to prevent the extension of an explosion.

It has further been shown that the operation of sprinkling at short intervals is more or less useless, for the reason that the evaporation set up by the air current will nullify the effect of the sprinkling in from two to three hours.

On the other hand, it has been proved at Courrieres, and especially in the thin seams, that where the system of working tends to bring down a certain amount of

roof shale and stone, and that where the mine dust consisted of an admixture of shale and coal dust, the explosion was not carried along. It would therefore suggest itself that an admixture of shale dust with coal dust or with some inert material may lessen the danger of explosion.

Before, however, any compulsory measures of this nature are promulgated, such as the sprinkling of more or less extensive roadawys, the utility of which is not yet placed beyond doubt, and which certainly is accompanied by difficulties and numerous disadvantages, it appears very necessary to give these questions a searching investigation.

Great care is needed in the matter of so called "safety" explosives, not only as regards the strength of the charge, but also with reference to the composition of the explosive itself, on which at the present time there are two directly opposite opinions. One view is that the resultant fumes of a detonated explosive should contain no combustible gases in order that they shall not pollute the atmosphere, nor increase its proportion of dangerous constituents. The other view is that an explosive should contain none of those gases that will aid combustion, as oxygen for example, as these gases by increasing the temperature of detonation, increase the danger of exploding a mixture of gas and coal dust.

It is therefore necessary to establish by an investigation what are the safest and at the same time the most useful explosives.

As the other recommendations are already or shortly will be the subject of new regulations, we consider that the Commission on Mine Cases, who have already studied the dangers of coal dust and the question of explosives, should be directed to undertake the work of investigation, to conduct the necessary experiments, and to publish their findings, not only as refers to sprnikling, but also in relation to the general recommendations that have preceded. Further, we recommend that as soon as possible they issue their report on the work they have already done in connection with explosives; but regulations governing the size of charges and the strength of explosives now in use, shall at once put into effect without waiting for the recommendations of this Commission.

As publications relating to the Courrieres explosion have appeared in other countries, and as many lessons are to be learned from the circumstances of the explosion, a descriptive account of this shall be printed in the Mines Annals. This work will be undertaken by Engineer Heurteau.

The final investigations into the fire in the Cecile Seam have established the fact that it was a fire of but small proportions that attacked the mine timber and destroyed about 2,000 kg. of timber. This fire was not for any length of time so important and disturbing as the signs it gave off in the commencement of the rescue work, seemed to indicate.

These evidences strongly influenced all the measures taken as they appeared to threaten an immediate danger, which, as a matter of fact, was not so important as it looked.

The overrated importance of these evidences of fire lamentably hindered the work of rescue.

The exploration work in No. 3 pit, for the temporary cessation of which the engineers who had charge of the work of rescue, have been blamed, occupied afterwards no less than 37 days, and this with much better materials and under more favorable circumstances than presented themselves at first.

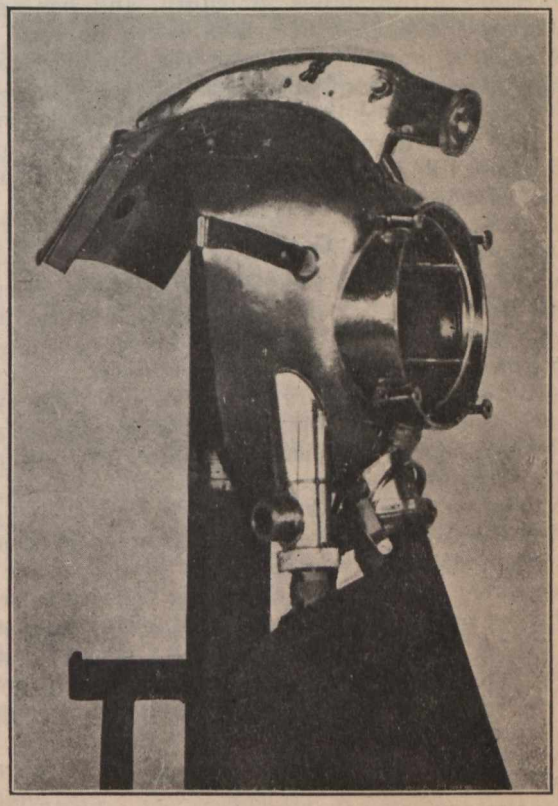
The restoration of the ventilation and the starting of the No. 4 pit fan, which were at that time so severely critized, are alone to be thanked for the steady improvement of the air to the south of shaft No. 3, as after events proved conclusively. It was through this that the thirty survivors were enabled to leave their place of refuge and reach the bottom of No. 2 shaft without being overcome by the after damp.

From the findings of the Special Commission held by Chief Engineer Carnot, it came out in the enquiry, that the stoppage of the exploration work in No. 3 pit and the restoration of the ventilation were justified by the results. In particular, it was due to the restoration of the air current that the thirty survivors escaped from what would otherwise have been certain death.

F. W. G.

THE DRAEGAR HELMET.

The above is a photograph of a Draeger helmet fitted with an electric lamp. The arrangement will leave free the hands of the man wearing the helmet for other work. The battery forms a flap at the back of the head, and the whole arrangement appears very compact. We do not yet know what the weight of the lamp and battery is. This is an important consideration, for any marked weight on the head would soon become irksome. The Draeger people are also making helmets fitted with a device that will enable the wearer to speak to another man wearing a helmet or to persons outside the zone of unbreathable gases in which the wearer is working. In the latter case the rescuer will lay a thin telephone wire behind him as he advances, similar to the field telephones that were used by the Japanese in the late war. These additions are small but they all tell in the general efficiency of rescue work.



A RECENT DISCOVERY OF GOLD NEAR LAKE MEGANTIC, QUEBEC.

(Printed by permission of the Acting Director of the Geological Survey.)

Abstract of report by John A. Dresser.

A discovery of gold, which has recently attracted much attention in this district, has been made in the township of Marsboro, in the south-eastern part of the county of Compton, a few miles from the village of Lake Megantic. Lake Megantic station, on the Canadian Pacific Railway, between Montreal and St. John, is 175 miles from the former, and 307 from the latter place. It is also connected with Quebec city by the Intercolonial Railway, the distance being 115 miles. The place where the gold has been found is in the fifth range of Marsboro, principally upon lot nineteen. The distance from Lake Megantic station by road is about nine miles, but this can be shortened to less than six at seasons of the year when the lake can be crossed by boats, or sleighs.

The District.

Victoria bay, on the west side of Lake Megantic, and three miles from its northern end, is the most prominent irregular feature in its shore-line. The head of this bay is within a mile and a half of the gold locations. Victoria river, which empties into Victoria bay, is a stream some fifteen miles in length, and has several tributaries, the largest of which takes its head near Big Megantic mountain. Along the Victoria river a considerable number of prospecting licences have been lately taken out, the licence holders evidently considering that the discovery of gold in the rock of the neighboring hills is a favorable indication of the occurrence of placer deposits in the valleys.

Geology.

The areal geology of this district has been discussed by Dr. R. W. Ells, of the Geological Survey, in the annual report for 1886. The map accompanying that report shows the district to the northwest of Victoria bay—including the locality of the recently discovered gold and the valley of the Victoria river—to be occupied by sedimentary schists, and slates of Cambro-Silurian. They are dark or iron grey, fine grained sediments, with a good slaty cleavage. As their color would indicate, they contain small amounts of iron ore, and are somewhat micaceous. They give a rather even surface to the country, which in this vicinity is broken only by the prominent intrusion of Big Megantic mountain. So far as known, this is wholly a mass of granite. It rises abruptly above the surrounding country for 1,500 or 2,000 feet, and occupies between twenty or thirty square miles.

The area between the south end of Lake Megantic and the International Boundary Line, except for some granite hills, is occupied by rocks of a much earlier age; being a part of the Pre-Cambrian formation brought up from the folding of the White mountains. Large portions of it are known to consist of diabase and other basic eruptives. The intervening section is mapped as Cambrian. It is largely drift covered in the district in question.

The boundaries of the formations, and the strike of the rocks, are northeast and southwest: that is, parallel with the axes of the mountains on the southeast.

The surface of the entire district is generally covered by drift, which carries a large number of boulders—chiefly granite. Exposures of bed rock are few, and of small extent. Yet, the soil is not usually deep, and seems very evenly distributed.

Occurrence of the Gold.

At the time of the writer's visit, in April, 1908, no work had been done for several months, and the pits and trenches were filled with ice and water. Hence, samples showing a proper average of the fresh rock could not be obtained. The ground, however, was practically free from snow, and there was favorable opportunity for tracing out the relations and partial extent of the gold-bearing rock.

The rock which carries the gold in Marsboro is a fine grained granite, slightly porphyritic in structure, and it occurs in the form of dikes in the Cambro-Silurian slates. Three separate dikes were located. They were between fifteen and thirty feet wide—as far as could be ascertained—and all seem to be about vertical in position. One of them was traced by occasional exposures, for 600 yards. They have been much shattered and broken, and in places are quite schistose. In the cracks thus formed there are many small reticulating veins of quartz in some of which visible gold occurs. These veins are usually less than an eighth of an inch wide; although one, two inches in width was seen. The granite of the dikes consists of quartz, and feldspar, with a little muscovite, and in places contains grains of dolomite. Grains of chalcopyrite are frequently found in some parts of the dikes, and a little pyrite and galena are also to be ssen. The sulphides are, however, not limited in their occurrence to the little veins, as seems to be the case with the visible gold. The rock is often thickly spotted by iron rust; indicating that iron bearing sulphides were originally disseminated throughout much of the dike. No gold has yet been found in the slates on either side of the dikes.

In direction, the three dikes are practically parellel. Dike No. 1, on lot nineteen strikes N. 60 degrees W.; dike No. 2, which occurs on lot twenty and twenty-one, N. 55 degrees W; and dike No. 3, on lot twenty-one, strikes N. 60 degrees W. The direction of the cleavage of the slates in the few places where it could be seen, was found to coincide nearly, if not quite, with the dikes.

On dike No. 1, there are four exposures:

(A). A cutting about three feet deep has been made, exposing this rock at the edge of the woods which cover the western half of lot nineteen. Gold is reported to occur here.

(B). Two hundred feet northeast from A, a shaft has been sunk to a depth of twelve or fourteen feet. Visible gold can be occasionally seen in the rock of the wall, and of the dump. The shaft was largely filled with ice and water at the time of my visit. This is the place where the original discovery was made and Mr. Obalski's specimen was taken from this pit.

(C). A hundred feet northeast from B, is a cutting three feet deep, from which visible gold is reported.

A specimen taken from this place, showing no visible gold, and carrying a few grains of chalcopyrite, was assayed for mee by Mr. H. F. Strangways, M. Sc., at McGill University. The results obtained were:

Gold,	0.35 ounces at $20.00 equals ..	$7.00
Silver,	0.70 ounces at $0.60 equals ..	0.42
	..	$7.42

A, B, and C, are on lot nineteen and the width of the dike, as shown at these places, is between fifteen and twenty feet.

(D). Five hundred yards northeast from C, on the farm of Donald Smith, lot twenty, range four, the rock has been uncovered. This discovery disclosed the regularity in direction of this dike. There is no exposure of the rock between C and D; but it was found at the latter point by Mr. Smith, by carrying a line in the direction indicated by pits B and C, until his property was reached. Then, sinking through some eight feet of drift, he found the dike rock which is reported to carry gold.

A, B, and C are on the lands under lease to J. A. McIver and associates. The mining rights at pit D, are owned by Donald Smith.

On dike No. 2, no work has been done, and there are only two natural exposures some forty yards apart. The dike appears on lot twenty, a few feet from lot twenty-one, and running obliquely towards the boundary line. It probably enters that lot near the more northerly of the two exposures seen. Slate was found on both sides of it, but at some distance. This dike is not less than ten, nor probably more than thirty feet in width. It is 500 yards northwest from dike No. 1.

The mining rights on lot twenty are heid by Mr. McIver et al, and those on lot twenty-one, by Messrs. Gendreau.

On dike No. 3, which is forty yards northwest from No. 2, and thus is on lot twenty-one, a cutting apparently seven or eight feet deep has been made. The southeast wall is slate, that on the northwest has not been found. Mr. A. B. Gendreau, Lake Megantic, one of the owners, reports that the rock at this place yields a trace of gold.

Source of the Gold.

The gold has evidently been brought in by the granite of the dikes in which it is now found; since it iccurs in the rock as well as in the small veins. The subsequent shattering of the dikes by regional metamorphism, has afforded conditions for the concentration of the gold in the small veins in which visible amounts have been found.

Extent of the Gold-Bearing Rocks.

Thus far only three dikes have been found in this vicinity. But as little or no stripping has been done in search of them, since the natural exposures of bed rock are exceedingly few, and as the dikes yet found are near together, it seems likely that there are many others in the vicinity. Their number depends in a considerable measure upon the source of the dikes. Dikes are off-shoots from larger masses of related rocks which have filled cracks and crevices formed by the intrusion of the larger bodies. These dikes all trend directly towards Big Megantic mountain, some seven miles distant. This is an intrusive mass which has been thrust up through the surrounding slates, and, as far as known, is of granite, having a chemical, and mineralogical composition that could give rise to such dikes.

Alluvial Gold.

Following the announcement of the discovery of gold in the rock at Marsboro, a considerable number of licences have been taken up along the Victoria river. These appear to be held chiefly by placer miners from Beauce. It was late in the season when most of the licences were obtained and no work of importance has yet been done. With the lowering of the water in the early summer, the valley of the Victoria will probably b well prospected. At the time of writing no evidence of the value of these prospects is available.

Prospecting of the District.

It must be borne in mindthat the gold bearing rock at Marsboro is as yet known only in small amount, and that the proven occurrences of gold are few. While samples have been taken which appear to represent the general rock of the dikes, and hav been found to carry gold, they are after all only random specimens. Samples representative of each dike must be taken at many points before the commercial value can b distinctly asserted. At present there is no place exposed suitably, for the taking of such samples. The dikes are definite bodies, and can be easily uncovered by stripping, and fresh rock could be obtained at a few feet from the surface. Continuous specimens taken across the dikes at suitable intervals would soon make it easily apparent what the possibilities are for profitable mining.

The country is easy of access, and prospecting is not unduly expensive. Once recognizing the direction of the dikes, it is a comparatively simple matter to follow them, as was shown by the discovery of pit D, on dike No. 1, by Donald Smith. If the gold proves to be persistent and at all uniformly distributed in the rock, the district would admit of mining under favorable conditions. Labor in not highly expensive, timber is plentiful, water supply can be had at no great distance, and transportation difficulties are not excessive.

But first, the actual average values of the dike over long distances must be ascertained, and the mode of occurrence of the gold—whether evenly disseminated or unevenly distributed through various parts of the rock—must be found out. And these facts must be determined for each individual dike. Then, if these already found yield values to warrant it, the search for others should be made as already indicated.

Licences.

Prospecting licences giving an exclusive right to examine the property, with the privilege of securing mining licences or of buying mining rights in the Province of Quebec, may be obtained from the Hon. the Minister of Mines, Quebec. These licences are granted for three months, and are renewable at the discretion of the Minister. The licence fee in surveyed private lands as at Marsboro, is $2.00 per 100 acres, or fraction thereof; a similar fee being required with each renewal. On November 24, 1907, the following lots were held under prospecting licences in the township of Marsboro:

Range 1, lots 17, 18; range 2, lot 19; range 3, lots 18-22 inclusive; range 4, 18-22 inclusive and 28; range 5, lots 16-22 inclusive; range 6, lots 13-20 inclusive; range 7, lots 12-21 inclusive; range 8, lots 10-14 inclusive; range 9, lots 7-14 inclusive; range 10, lots 7-14 inclusive; range 11, lots 4-11 inclusive and lot 4; range 12 lots 6-10 inclusive.

MINERAL LOCATIONS ON MORESBY ISLAND—ONE OF THE QUEEN CHARLOTTE ISLANDS.

(Abstract of Bulletin No. 1, issued by the British Columbia Bureau of Mines.)

(*Continued from last issue.*)

To the north of the tunnel, and on the Cash Box mineral claim in the cliff, there is, over a length of 100 feet, an exposure of magnetite carrying a considerable percentage of sulphides, chiefly pyrrhotite with some chalcopyrite.

Harriet Harbor.

Harriet Harbor lies to the west of Ikeda Bay and to the east of Huston Inlet, and is separated from each by mountains which run out into the sea in narrow arms, not over a mile wide at the head of the harbor, but two or three miles long.

The townsite of Jedway, with a wharf, store, post office, and several cabins, has been located on the southwest end of Harriet Harbor, and here the office of the Deputy Mining Recorder of the district is situated. It was on the shores of this bay that the first of the more recent mineral discoveries of the district were staked, by Watson and Thompson, in 1905. These discoveries may be considered the origin of the present activity in Moresby Island.

Copper Queen.—Probably the best known claim on this harbor is the Copper Queen, now held under bond by J. S. McMillan, of Seattle. The claim is situated on the southwest side of Harriet Harbor, some 5,000 feet from the water and 880 feet above it. On this claim, as on most of the claims in the district, the mineralisation consists of magnetite carrying variable amounts of copper pyrites, and upon the percentage of this latter mineral found depends the value of the deposits. When visited, the only development work done consisted of a large open pit in a small draw, made to expose and develop an exposure of magnetite found in a bluff on one side of the "draw." The work had succeeded in exposing a very considerable body of magnetite in a country rock, which appeared to be a much altered diabase. In the side of the cut there was exposed, dipping at an angle of 48 degrees, a body of magnetite 6 feet thick, of which the lower 4 feet 6 inches was almost solid magnetite, containing irregularly distributed bunches and stringers of copper pyrites. The upper 1 foot 6 inches of the ore body, although chiefly magnetite, was more mixed with rock matter and appeared to the eye to carry a lower percentage of copper. This face stood exposed for a height along its slope of 25 feet, with indications that it continued down under the dump and into the hill for some farther distance; at its highest point the ore body came out practically to the surface. An average sample of the exposed face of the ore body was carefully chipped off across the whole six feet exposed and at different places in its length; this sample assayed, copper, 1.4 per cent., with traces of gold and silver. Some 50 to 75 tons of mineral was piled up on the dump, and this also was roughly sampled, giving about 1.5 per cent. copper.

Some little distance up the creek from the open cut, and also about 300 feet to the east, are bodies of limestone, although none show in contact with the ore body.

Iron Mountain.—The Iron Mountain is another claim in the immediate vicinity, held by J. S. McMillan. On this but little actual development has been done, but stripping has exposed a similar body of magnetite of considerable size, showing copper pyrites along its margin.

Moresby Island.—The Moresby Island mineral claim lies somewhat to the south of the Copper Queen and is also held by J. S. McMillan. This claim overlaps to a considerable extent the Tate mineral claim, owned by T. J. Watson, as to the merits of which dispute no opinion is expressed. The first open cut seen showed a country rock consisting of a decomposed diabase or diorite, with a considerable quantity of secondary red garnets, in crystalline form, all showing copper stain and a small percentage of copper.

In the second open cut, near where a fine grained igneous dyke, of later origin, cuts through the country rock, there is a strong impregnation of iron pyrites and nearby a small seam of copper pyrites, while a certain amount of copper carbonate occurs in the rock matter, but no considerable body of ore has been exposed. A sample was taken of the exposed face of the cut, which gave, upon assay, copper, 2.7 per cent., wet assay, with traces of gold and silver. The face of the cut is about 10 feet long and 10 feet high, and was in at the bottom only 6 to 8 feet.

Reco.—The Reco mineral claim, held by J. S. McMillan, is located nearer the bottom of the hill, only 200 feet above and a quarter of a mile from the water. The country rock here is a much altered diabase, in which a deposit of magnetic iron, about three feet thick, is seen dipping into the hill at an angle of about 40 degrees, accompanied by a black hornblendic dyke and overlaid by a close grained silicious rock. The magnetite carries sulphides of iron and copper, the copper contents in the exposed face of the magnetite being estimated at from ¾ to 1 per cent copper. The exposure was visible for some 50 feet up the bed of the creek and was fairly uniform in character.

An inclined shaft had been sunk on the deposit and 3 sets of timbering, 5 feet apart, set up, below which the shaft is reported to have been sunk about 6 feet, but as it was full of water it could not be examined. A 16 h. p. boiler and a steam drill were on the ground, covered by a rough board shed. This boiler had formerly been used in prospecting the claims farther up the hill.

Huston Inlet.

Huston Inlet lies immediately to the west of Harriet Harbor and is a fine bady of navigable water. Some little prospecting has been done on its eastern shore, on the range of hills which separates it from Harriet Harbor, but the locality must as yet be considered as unexplored. The few recorded claims are quite unprospected and undeveloped, only a little surface scratching having been attempted.

Burnaby and Copper Islands.

Red Haven.—The Red Haven mineral claim on the south side of Copper Island, a claim recently re-staked by Abe Johnson and so named by him, is of interest as having been on the spot upon which Francis Poole and his party did their work in 1862-3, and where, about

five years ago, a prospector named Abe Heino, having re-located the property, did considerable work, the remains of which are still visible and excite in visitors much curiosity as to "what he was driving at."

Geologically, the island is similar to that portion of Moresby Island immediately to the south, and some two or three miles distant. The sedimentary rocks are so cut up by later volcanic rocks as to give the appearance of the limestones being the intrusions and the volcanics the country rocks.

In a little cove running into the island some 30 to 40 feet, with nearly perpendicular walls and a rocky floor, submerged at high tide, a tunnel was driven from the level of the rock floor for a distance of 35 feet, and from this tunnel a cross-cut had been started off to the right, towards the water, for some 10 feet. The work had been done along a limestone diabase contact, along which was visible a little magnetite carrying some copper pyrites, but in no place was the mineralization sufficient to be of any importance. The present owner has done no work on the property. The property is interesting, as showing what Poole spent two years upon, while so many much more promising showings were "sticking out of the ground" within three of four miles, on the larger island.

Sea King.—The Sea King mineral claim is a recent staking on the southwest side of Burnaby Island, by Captain Locke, of steamship "Princess Beatrice." On the beach, between high and low water, there is exposed a contact of limestone and fine grained trap, along which stands, exposed by action of the waters, a contact deposit of magnetite, from two to three feet wide, dipping at an angle of 80 degrees to the west. The magnetite carries some iron pyrites and a small percentage of copper pyrites.

In a small gulch, a short distance to the west, there is a light gray colored igneous dyke, fairly crystalline, and showing some horneblende, having a width of four or five feet, containing some stringers of calcite and also some magnetite and copper pyrites. Some little surface stripping had recently been done, with an idea of tracing out the contact, which was found to contain some copper pyrites.

Klunkwoi Bay.

On Saturday, August 31st, thanks to the courtesy of Mr. Ikeda, of the Ikeda Bay mines, the writer was loaned a gasoline motor boat with two men, and a start was made for a group of claims situated on Klunkwoi Bay, at the north end of Darwin sound, and inside of Lyell Island. The passages inside of Burnaby and Lyell Islands were taken, as being more protected from wind and sea. This inside passage is at all seasons suitable for a small boat, although the channel inside Burnaby Island is only a fathom deep at low water and is most tortuous and difficult to follow. The distance from Ikeda Bay to Klunkwoi Bay is about 45 miles, and the run was made in less than eight hours.

Swede Group.—None of the claims in this section of the island has been long staked, the first being the Swede group, staked in January, 1907, by Larsen, Pearson and Rogers. The group consists of eight claims, the Excelsior, Pearson, Larsen, Keystone, Bob, Anaconda, Seattle and Homestake mineral claims. The claims are so located as to cover a small peninsula projecting into Klunkwoi Bay and separating two smaller bays or fiords. This peninsula is not over 2,500 feet across and rises to a height above the water of about 1,000 feet, the average slope of the hillside being about 46 degrees, and this steep slope continues under the sea level, giving deep water at which any vessel can lie almost along the shore line. Although the claims had only been located for about six months, it was found that the owners had done a very considerable amount of development work which, as far as it had progressed, proved more than encouraging. The work consisted of a number of open cuts running horizontally along the hillside at intervals from the sea level to a height of 700 feet above. These cuts are on the Larsen claim, and may be said to have prospected a strip of hillside about 250 feet wide extending from the shore up to an elevation of 700 feet. The line of these cuts continued over the hill on to the south slope, has been further prospected on the Anaconda claim, and found there to be similar in all respects; therefore, it is to be presumed that the mineralized zone is continuous over the peninsula along the line prospected in a N. 63 degrees E. direction.

A short distance to the west of the workings a fault plane has cut across the peninsula, the line of its break showing clearly on the mountain side. To the west of this break the prospectors claim not to have found mineral, but it is suspected their investigation has not been thorough, as the geological conditions are the same on either side of the break, and it has not been a channel of infiltration of mineral. The country rock right across the peninsula appears to be uniform and the same, a much altered diabase,[1] cut by a few later trap dykes, which, however, do not appear to have any effect upon the mineralization.

As far as disclosed in the cuts, the 4 or 6 feet of rock lying next the surface contain very little mineral, but when this depth is reached the rock is found to become impregnated with copper pyrites and occasionally bornite, and this impregnation in the deeper cuts appears to be growing greater with the depth as far as the work had proceeded; this is, at the greatest, a depth of some 15 feet. Sometimes the chalcopyrite occurs in little granules, peppered all through the rock, and again it occurs in little veinlets, constituting an ore difficult to estimate the copper contents of by the eye.

Samples were taken from the most extensive of the open cuts, viz., the one at an elevation of about 75 feet above the sea level; of these a general sample gadded off the face over a distance of 75 feet horizontally, and for the height of the cut, except the upper "barren" six feet, gave upon assay better than 2 per cent. copper, with traces of gold and silver.

Another sample, taken by the writer, and which was intended to represent ore as it would be roughly handpicked, gave copper 5.7 per cent., silver 0.2 ounces to ton and trace of gold.

A third sample, taken from the south slope of the peninsula from an open cut on the Anaconda claim, gave 2.9 per cent. copper, with traces of silver and gold.

The occurrence of the mineral is such as to render hopeless any form of water concentration, and the ore would have to be smelted direct, but for such treatment it is admirably suited, as the gangue matter is self-fluxing and very easily melted.

To summarize the situation, the claims have not as yet been developed sufficiently to absolutely prove their ultimate value. They are still only prospects, but the success attending the development done commands attention and gives promise of an exceedingly large, but low grade, deposit of copper ore. The location of the

properties is ideal for the cheapest kind of mining, and the facilities for cheap transportation by vessel could scarcely be improved upon.

The grade of the ore, as already noted, is low, probably not higher than 2 or 3 per cent. copper, with little or no gold and silver values, but the fact is that the values have increased with depth, so far as development has proceeded.

Last Chance Group.—The Last Chance group of six claims, the Last Chance, Goodenough, Jumbo, All Right, No Doubt and Star, owned by Messrs. Wintermute, McEachern and Jones, lies to the southwest of and adjoining the Swede group near the shore of the next bay to the south. These claims are more recently located than the Swede group and have not had the same amount of development work done, but such as has been done, a couple of large open cuts, discloses conditions almost identical with those found in the Swede group, and, as the ore found is also in direct line with the mineralized zone on the Swede group, it is fair to suppose it to be a direct continuation of the Swede group deposit. The most important development work has been done on the Last Chance claim, at a distance of 1,600 feet from the bay, at an elevation of about 200 feet, and consists of an open cut in rock 45 feet long in a N. and S. direction, across the ore body, and has a face of six feet in depth. A general sample, made up of small pieces broken off the ore already mined, gave, upon assay, copper 2.7 per cent., silver 0.4 ounces to ton, and trace of gold.

The country rock has been classed, after microscopic examination, as a "Porphyritic diabase."[2]

As far as the development has gone, these claims give promise similar to the Swede group, and the camp as a whole indicates the presence of very large quantities of low-grade copper ore. The deposits are so admirably situated for cheap mining and transportation, the character of gangue matter is such as to permit of very cheap smelting, so it is estimated that such ore is well within the commercial limit and can be treated at a profit, despite the fact that there is no appreciable quantity of gold or silver present.

The formation in which these deposits occur would appear to extend for a considerable width east and west, and is found again to the northwest on the shores of Skidegate Channel, near the Narrows, constituting a large area of territory which may prove productive.

On Septemeber 2nd, the trip northward was resumed in the gasoline launch to Skidegate, a further distance of 45 miles, a stop being made at the Old Shaft, some seven miles south of the Sand Spit.

Old Shaft.—The Old Shaft, judging by the size of trees growing on the old dump, was sunk some 40 or 50 years ago, but by whom it is not known, nor does there seem to be any Indian tradition regarding it. The property has recently been taken up again by Shelden and Shabbard, who have bonded it to D. R. Young and associates, who were unwatering it, employing one white man and two Indians. At that date the shaft had been unwatered to about 90 feet depth, and the foreman reported having sounded it for a further depth of 45 feet. Some short distance above the 90 foot mark, two cross-cuts had been found, one to the east and one to the west, extending about twenty-five feet from the shaft. The shaft had not been cleaned out, so, of course, nothing was visible in it as to ore.

The country rock in the vicinity, as exposed on the beach, is an agglomerate, in which a fissure was seen a few inches wide, carrying copper pyrites in quartz. Selected samples of clean mineral assayed 10 per cent. copper and two ounces of silver to the ton. This fissure led directly to the old shaft, distant only a few feet, and it was evidently on this fissure that the shaft had been sunk and along which the two cross-cuts had been driven. The fissure, as seen on the beach, was too small to be of any importance, and the old dump exhibited no commercial ore.

Gold Harbor.

Mr. John McLellan, a British Columbia assayer, has been working during the past summer at Gold Harbor, a bay of Moore Channel, on the west coast of Moresby Island, just south of Skidegate Channel. It was at this point the Hudson Bay Company, in 1852, found and mined a deposit of gold bearing quartz. Mr. McLellan examined the old workings but could find no continuation of the values, though he discovered in the vicinity another small quartz vein carrying gold in considerable proportions. He reports the vein as being rich but very small; he erected last season an arrastra driven by water power and managed to extract a certain amount of gold, bringing a small "brick" to Victoria.

---

[1]Microscopic examination made by Dr. Dresser, of McGill University (4,613).—This is a massive, dark green, fine grained rock, showing spots of epidote, and a few grains of pyrite and pyrrhotite. It is found to consist essentially of plagioclase, feldspar and pyroxene. There are also present accessory magnetite, as well as the secondary minerals, chlorite and leucoxene. No quartz or olivine could be found. The structure is ophitic, and the rock is consequently a diabase.

[2]As result of microscoic examination, Dr. Dresser, of McGill University, reports: "The rock is fine grained and of a uniform green color. The slide is found to be much decomposed. Feldspar is present in a few phenocrysts and in more numerous small lathe-shaped crystals of plagioclase. There are numerous grains of augite and epidote with much chlorite, the latter being in larger irregular masses. It is a Porphyritic diabase.

DIABASE AND GABBRO.

The diabases are principally composed of plagioclase, augile, magnetite, and sometimes olivine. They have a somewhat wide range in composition. Silica may be present from 49 per cent. to 57.5 per cent.; alumina from 12 to 18 per cent.; ferric and ferrous oxides together from 8 to 13.5 per cent.; magnesia up to 11 per cent.; lime up to 11 per cent.; the alkalies up to 6.5 per cent. There are, of course, many minor constituents.

The gabbros consist mainly of plagioclase and pyroxene, with various admixtures of other minerals. Silica ranges from 45 to 56 per cent.; alumina from 13.5 to 30.5 per cent.; ferric oxide up to 3 per cent.; ferrous oxide up to 15 per cent.; magnesia up to 16 per cent.; lime up to 17 per cent. Alkalies and other minor constituents are present in small amounts.

SAMPLING OF MINE DUMPS.*

By Henry S. Munroe.

It frequetnly happens that mine dumps contain low grade ore, originally rejected as too poor for treatment which later, under more favorable conditions, may be worked with profit. The old waste dumps may thus constitute an important asset of the mine, the value of which must be accurately determined. The sampling of such waste dumps presents a difficult problem. Portions of the dumps which have accumulated during periods of active development; for example, during the sinking of a shaft or the driving of a tunnel, may be absolutely barren; while other portions representing the growth during periods of wasteful or careless management, may be very rich. In any case the distribution of values is likely to be very irregular. If the dumps be formed in the ordinary way, by dumping cars at the top of the bank, the stratification, and therefore the zones of rich and poor material, will be in inclined layers. Moreover, as the cars are dumped at the top, the larger pieces tend to roll to the bottom of the slope, while the fine stuff lodges and remains near the top. The upper portion of the dump, as containing most of the fine material, is therefore likely to be rich; and the bottom, consisting of lumps and coarse material, is in general poorer than the average.

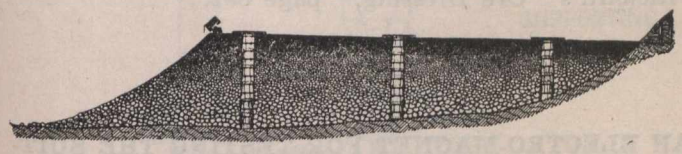


FIG. 1. Longitudinal section of a mine dump with shafts sunk for sampling.

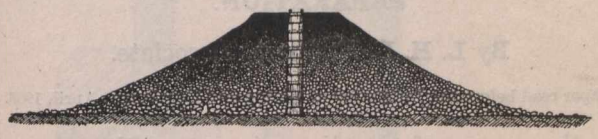


FIG. 2. Cross section of a mine dump with sampling shaft.

Figures 1 and 2 are intended to illustrate this sizing effect, which has been purposely exaggerated in the drawings. In practice many large lumps will remain in the upper part of the dump and some fine stuff will be caried down the slope. The outside of the dump represents in most cases the later additions only, and the material deposited in earlier years is deeply buried. Finally, the dumps will contain much ore and rock in very large lumps and a due regard to the effect of such large pieces on the value of the sample taken, will necessitate handling large quantities of material. For example, if we adopt the inch-ton sampling scale,* the presence of ten inch pieces would indicate one hundred tons as the minimum total weight of samples to be taken. Or even if we take a two-and-a-half-inch-one-ton sampling scale, the presence of many lumps 25 inches in diameter will lead to the same result.

The usual method of sampling a dump is to take numerous small samples from the sides and top, which are either assayed separately or united to make one or more large samples. If this method be followed the points to be sampled should be determined by measurement, either at the corner of 25-foot squares, or better, in some cases, located on contour lines at uniform distances apart. In either case the samples should be given weight in the final average in proportion to the amount of ore that they may represent in the original pile, bearing in mind the probable concentration in values at and near the top of the dump. If the samples be located on contour lines, those on each contour may is essential. If the crushing be done by hand, with be combined and averaged separately, and the value

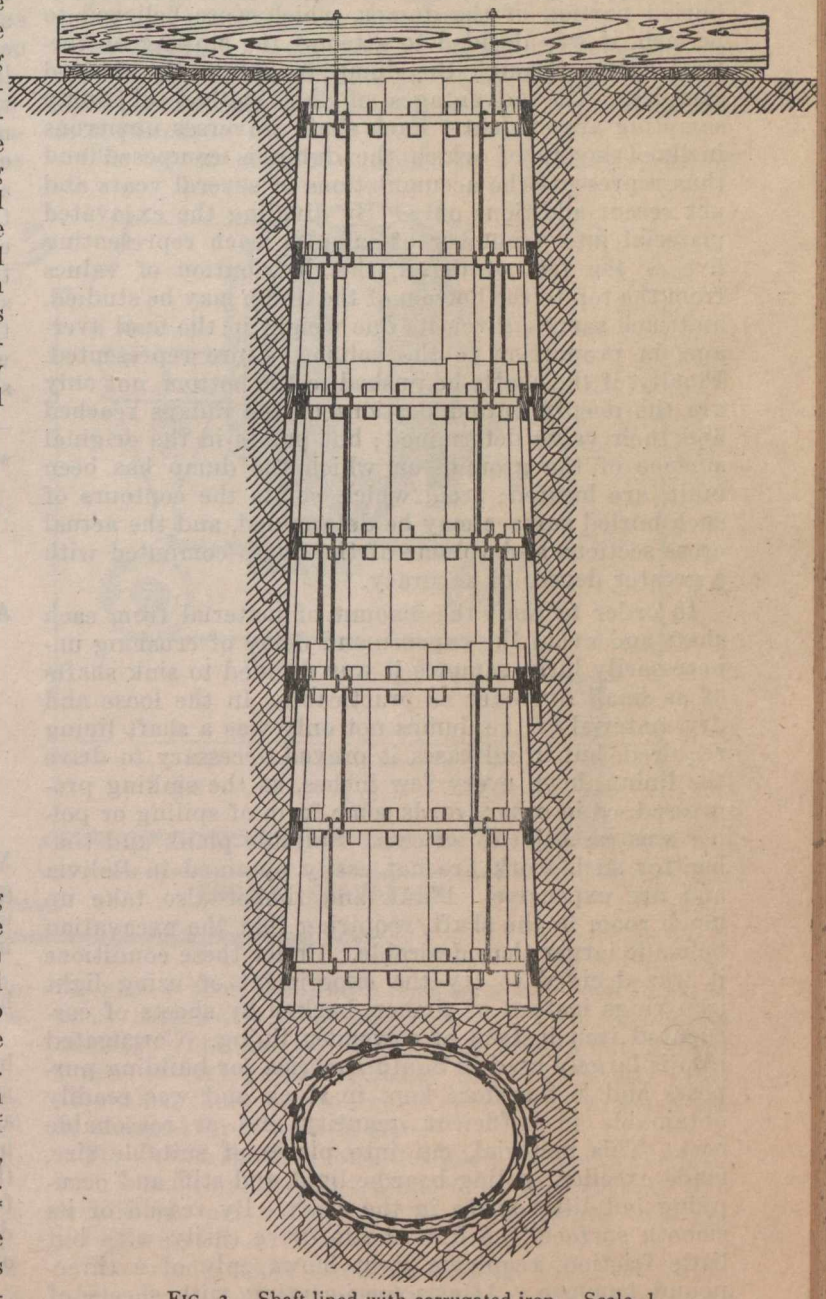


FIG. 3. Shaft lined with corrugated iron. Scale $\frac{1}{34}$.

for each contour averaged on the basis of the horizontal dump area represented.

In dump sampling, on account of the large amount of material to be worked down, a small crushing plant hammers and by mortar and pestle, a large force of men is necessary and the effective protection of the

*School of Mines Quarterly, Columbia University.

samples is made difficult. The crushing machines should be somewhat larger than the usual laboratory size and should have a capacity of several tons per day. The crushing plant may be installed at some central point where power is available and where the necessary counter shafting can be erected. Such a plant will be expensive, but in an important examination may save its cost several times over.

Last year the writer had to determine accurately the value of some very large dumps at a mine in Bolivia. In order to avoid the sources of error incident to sampling in the ordinary way, and to reach the deeply buried portion of the dumps, which were believed to be rich, it was decided to attempt the sinking of vertical shafts through the dump to obtain the desired samples. The advantages of this method of dump sampling are evident. Each shaft traverses numerous inclined layers of which the dump is composed and thus represents the accumulations of several years and not recent additions only. By dividing the excavated material into a number of samples, each representing five or ten feet of depth, the distribution of values from the top to the bottom of the dump may be studied, and each sample given its due weight in the final average, in proportion to the volume of ore represented. Finally, if the shafts be pushed to the bottom, not only are the deeply buried portions of the dumps reached and their value determined; but points in the original surface of the ground, on which the dump has been built, are located; from which points the contours of such buried surface may be determined, and the actual cross sections and volume of the dump computed with a greater degree of accuracy.

In order to limit the amount of material from each shaft and avoid the expense and delay of crushing unnecessarily large samples it was decided to sink shafts of as small diameter as practicable. In the loose and dry material of the dumps not only was a shaft lining required, but in all cases it proved necessary to drive the lining down every few inches, as the sinking progressed, or in other words some form of spiling or poling was essential to success. Suitable plank and timber for such work are not easily obtained in Bolivia and are expensive. Plank and timber also take up much room in the shaft, requiring that the excavation be made larger than desirable. Under these conditions it was decided to try the experiment of using light iron rings instead of timber, backed by sheets of corrugated iron instead of a wooden lining. Corrugated iron is largely used in South America for building purposes and is therefore kept in stock and was readily obtainable in sufficient quantity and at reasonable cost. This material, cut into pieces of suitable size, made excellent poling boards, light and stiff and occupying but little space in the shaft. By reason of its smooth surface, the iron sheets drive easily with but little friction, requiring light blows only of a three-pound hammer. After experimenting with sheets of different sizes it was found that the best results were obtained with pieces about five feet long and a foot or less in width. To support this corrugated iron lining, elliptical rings of ⅜ by 1 ½inch bar iron were used, the ends being welded together. The rings were made of elliptical rather than circular form to permit the large bottom rings of each set to be passed through the smaller upper rings. Also the elliptical form, for equal areas, gave the workmen more room for pick work and shoveling. These rings were supported by hooks of ⅜ inch rod as shown in the sketch, Figure 3. After experiment with rings of different sizes, the dimensions indicated in the figure were adopted, the middle ring being 32 by 28 inches and the upper and lower rngs respectively two inches smaller and larger each way. A shaft of these dimensions can be sunk rapidly and gives a sample of manageable size. With small men it proved practicable to use rings of less dimension than this. In one case a shaft was sunk successfully to a depth of 22 feet with rings averaging 22 by 28 inches. In all, 9 shafts were sunk in 8 weeks' time, the deepest being about 60 feet. This system of shaft lining, though composed of light material, possesses considerabls strength and stiffness. The overlapping of the corrugated sheets and the double rings, tightly welded together where the sections join, add much to the strength of the lining. The hooks are elements of weakness as these will straighten out at about one-fifth of the ultimate breaking strength of the rods. The strength of these hooks may be increased by always inserting the point of the upper hook in the space between the ring and the corrugated iron sheets, and by fastening the point of the lower hook to the rod with a slip ring. The work of shaft sinking will be facilitated by having on hand extra hooks, shorter and longer than the standard length.

---

*Richard's "Ore Dressing," page 852.

AN ELECTRO-MAGNET FOR TESTING THE SUITABILITY OF AN ORE FOR MAGNETIC SEPARATION.

By L. H. L. Huddart, Associate.

Paper read before the Institution of Mining and Metallurgy, April, 1908.

In the course of the discussion upon the paper by Mr. Amos Treloar and Mr. Gurth Johnson, it was suggested that any sketches describing a suitable small electro-magnet would be welcome to those interested in the separation of minerals magnetically.

The following note is therefore contributed in the hope that it may be of some little use.

The sketch shown illustrates an apparatus that has been found to be convenient for the quantitative determination of the separation to be expected in treating a given ore by means of a powerful magnet. In general, better work will be done by a laboratory apparatus than by a full-size machine. At the same time, the performances of the former will have a fairly constant difference from that of the latter, so that a good idea of the way to proceed with a given ore will be obtained.

Sampling.—A small machine will deal with only a small quantity, and to obtain representative results of value it is essential that the sample used should be a fair one of the whole ore. As much care should be taken in obtaining the sample as is ordinarily employed in preparing ore for assay.

Reduction.—The size of particles will depend upon the nature of the ore and the method of occurrence of the minerals which it is desirable to separate. They should not be too fine to commence with. Careful ex-

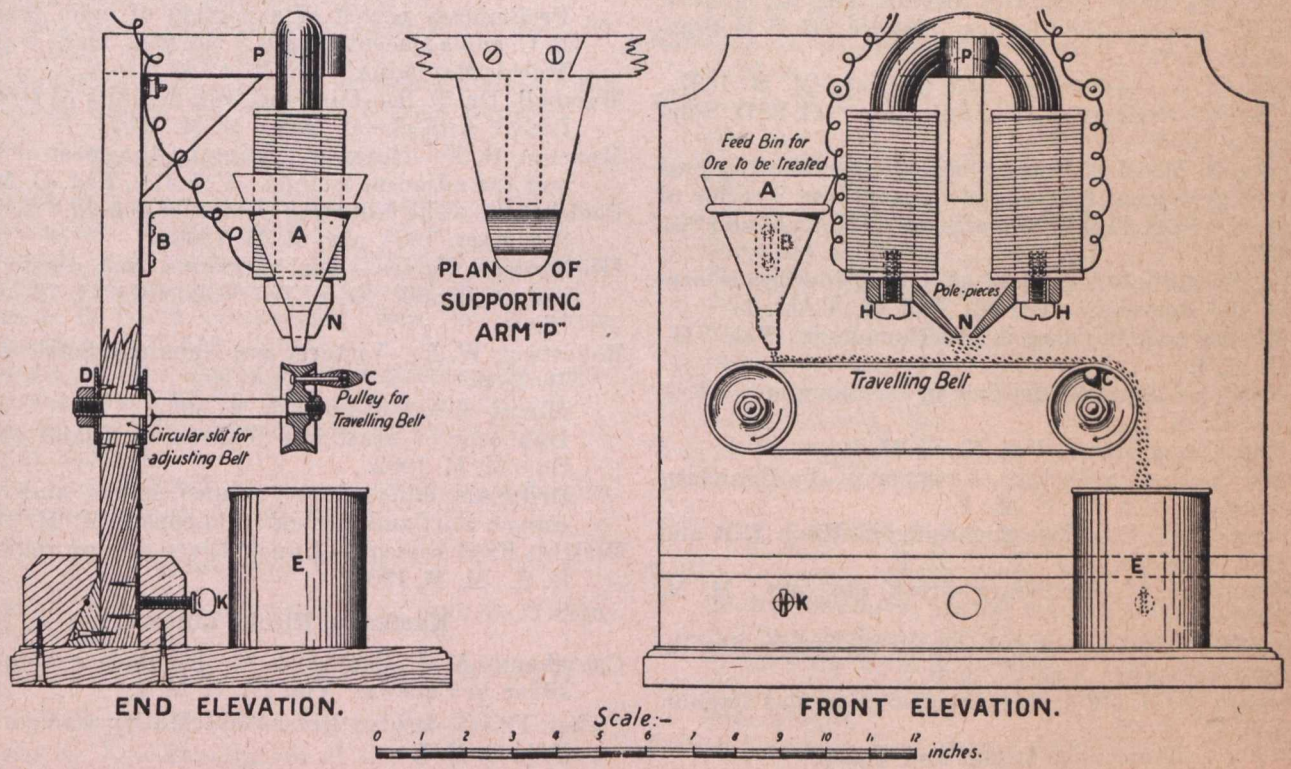
amination of the material that passes the magnet and falls into the hopper, E, will show to what extent further reduction is necessary. It is often useful to look at the discharged particles under the lower power of a microscope.

Further experiments should be made to find out to what extent the separation should be divided into stages.

Magnetic Field.—The most suitable strength for the magnetic field into which the sample will pass as it is carried along by the belt can be found by experiment. Commence with a low field, and extract the more permeable minerals first.

Such minerals as magnetite and magnetic pyrites should be taken out first with an ordinary horseshoe magnet.

The Apparatus.—The machine, as shown in the illustration, consists essentially of a 6-inch soft iron electromagnet, with 1-inch core, fitted with brass bobbins



wound with 18 B.W.G. copper wire. Two special pole pieces (N) are provided; they are slotted to allow of the adjustment of the air gap.

The magnet is suspended from a bracket on a hardwood stand, the back of which is secured to the base by means of two pinching screws (K). The arrangement shown in the sketch was designed to give a rigid, yet easily dismounted, attachment.

Upon the same stand there is also mounted a copper hopper with a support slotted to allow of vertical adjustment. This hopper feeds on to an endless belt running on two grooved pulleys, one of which has a small handle, C. These pulleys have about ¾ inch adjustment in each direction, to permit of the belt being placed into the required position beneath the pole pieces.

Method of use.—After suitable reduction, the sample (or part of it) is put into the hopper, A. The rate of feed to the belt depends upon the height of the spout above it; in this manner the feed can be adjusted to some degree of nicety.

The endless belt is driven by hand by means of the small handle, C, and the ore travels slowly beneath the pole pieces.

The distance of the belt below the poles can be varied by slackening the nuts, D, which clamp to the back the small shafts upon which the pulleys run. A suitable distance is found by trial. The ore that is not picked up by the magnet is carried on and falls into the hopper, E.

After running a short time, if there is much magnetic material present, it will have to be removed from the pole pieces, which is conveniently done by placing a piece of stiff paper, or sheet copper, beneath the poles and switching on the current.

The strength of the field is varied by loosening the screws, H, and moving the pole pieces closer or further apart, according to whether a stronger or weaker field is required.

The current may be supplied by a hand dynamo, off the mains, after a suitable resistance has been inserted, or by means of a secondary battery. Two cells do admirably. The battery is the most convenient, and, in a case, is very portable; but of course it is only available when there is a source of current by which it can be charged from time to time.

The sketch shows a form designed for use in the field, with a hand dynamo of 3 amperes at 10 volts and 3,000 revolutions per minute. A pocket ammeter to 5 amperes is useful.

The whole takes down and packs into two boxes, which are about one man's load, and can easily be transported by carriers. The cases are carefully fitted, so that no movement is possible within them.

The form of instrument which has been described was made for the author's use in Africa.

Those who are interested in this subject will find useful information in the admirable paper by Mr. T. Cook, A.R.C.Ss.I., F.G.S., on the "Use of the Electromagnet in Petrography." (Science Progress, No. 5, July, 1907.)

A Partial Bibliography of Publications Referring to the Geology and and Mineral Resources of Alberta, British Columbia and the Yukon.*

By J. C. Gwillim, Kingston, Ont.

(*Continued from Last Issue.*)

Boundary and Similkameen.

Bauerman, H.—Report upon the Geology of the Boundary line west of the Rocky Mountains, also geological cross-section. G. S. D. 1882-3-4.

Brock, R. W.—Reports G. S. D. Summaries 1901-02, also geological map No. 828.

Ore deposits of the Boundary Creek district. Vol. V., C. M. I.

Geology of the Franklin district, Vol. X., C. M. I.

Camsell, Charles.—Similkameen district. G. S. G. Summary, 1906.

Carlyle, W. A.—Report on Yale district. M. M. 1897.

Daly, R. A.—Geology of Boundary Line. G. S. D. Summary, 1903.

Dawson, G. M.—Preliminary report upon the physical and geological features of the southern interior of B. C. G. S. D. 1877-78, also maps No. 127 and No. 363.

Keffer, Frederic.—A method of mining low grade ores in the Boundary district. Vol. V., C. M. I.

Mining and smelting in the Boundary. Vol. VII., C. M. I.

Notes on diamond drilling in the Boundary. Vol. IX., C. M. I.

The Emma Mine. Vol. X., C. M. I.

Ledoux, A. R.—Production of copper in the Boundary district. Vol. V., C. M. I.

De Pencier, H. P.—Mine timbering in Knob Hill and Old Ironsides. Vol. V., C. M. I.

Robertson, W. F.—Boundary Creek, etc., etc. M. M. 1900.

Scott, O. N.—Ore deposits of Copper Mountain, Similkameen district. Vol. V., C. M. I.

Wickware, F. G.—The B. C. copper mine and smelter. Vol. IX., C. M. I.

Vancouver Island and Coast.

Best, W. F.—Notes on the economic minerals of Vancouver Island. Vol. V., C. M. I.

Brewer, W. M.—West Coast, Vancouver Island. M. M. 1899.

Mineral resources of Vancouver Island. Vol. VI., C. M. I.

Bornite ores of B. C. and Yukon. Vol. VIII., C. M. I.

Copper ore on Vancouver Island. Vol. IX., C. M. I.

Further observations on, etc., Vol. X., C. M. I.

Carlyle, W. A.—Nanaimo district, B.C. M. M. 1900.

Carmichael, Herbert.—Report, map, and reference list of claims, Southern Vancouver Island. M. M. 1899.

Nanaimo division, Queen Charlotte Islands and Skeena River division. M. M. 1901.

Quatsino Sound. M. M. 1903.

Mount Baker mines. M. M. 1904.

West Coast of Vancouver Island, Great Central Min, etc. (bulletin). M. M. 1906.

Daly, R. A.—International Boundary, Mount Baker, etc. G. S. D. Summaries 1901-1902.

*Dawson, G. M.—North Vancouver Island and adjacent coast, with map. G. S. D. No. 235.

Ells, R. W.—Preliminary report on Graham Island. G. S. D. Summary 1905, and No. 743.

Haycock, Ernest, and Webster, Arthur.—West coast of Vancouver Island. G. S. D. Summary, 1902.

*Kirsopp, John Jr.—The coal fields of Cook Inlet, Alaska and the Pacific coast. Vol. XX., Trans. Mining Engineers.

Le Roy, O. E.—B. C. Coast, Texada Island, etc. G. S. D. Summary 1906.

Preliminary report of a portion of main coast of B. C. and adjacent islands. No. 996. G. S. D. 1907.

Marble Bay mine. Vol. X., C. M. I.

Marshall, Dr. T. R.—Coal and iron deposits of Graham Island, with sketch map. M. M. 1902.

Moncton, G. F.—Notes on mining on the coast of B. C. and the adjacent islands. Vol. III., Fed. C. M. I.

Poole, H. S.—The Nanaimo Comox coal field. G. S. D. Summary, 1905, also M. M. 1906.

*Richardson, James.—Coal measures, east coast, Vancouver Island. G. S. D. Vols. 1871-72, 72-73, 76-77.

Robertson, W. F.—Victoria and Nanaimo districts. M. M. 1899.

Mount Sicker camp. M. M. 1902.

Iron ores of coast and Vancouver Island (bulletin). M. M. 1902.

Britannia mine; Sooke copper mines, and Vancouver Portland Cement Company. M. M. 1904.

Wright, Fred Eugene.—Unuck River mining region of B. C. M. M. 1906.

Kamloops, Nicola, Lillooet.

Colquhoun, A. J.—Notes on the occurrence of quicksilver in Canada. Vol. II., C. M. I.

Cirkel, Fritz.—Bridge River Gold Mining Camp. Vol. VII., C. M. I.

Dawson, G. M.—On Kamloops district. G. S. D. Summary, 1894.

*Kamloops map sheet. Separate Report.

G. S. D. No. 573, with economic and geological maps.

Ells, Dr. R. W.—On the Nicola coal fields. G. S. D. Summary 1904. (Also Johnson R. A. A. on Aspen Grove and Aberdeen).

Moncton, G. F.—Gold bearing lodes of Cayoosh Creek. Jour. Fed. M. I., Vol. II.

Satchell-Clarke, F.—A few notes on gold dredging on Thompson and Fraser Rivers, etc. Vol. V., C. M. I.

Selwyn, A. R. C., Dr.—On the route from Kamloops to Yellowhead Pass. G. S. D. 1871-72.

Cariboo-Stuart Lake and Skeena River.

Bowman, Amos.—Report upon Cariboo with maps of the creeks. G. S. D. 1887-88, or No. 263.

*Dawson, G. M.—Exploration of Blackwater, Nechaco, Stuart Lake, Quesnelle and Cariboo, also map. G. S. D. 1876-77.

---

* Read before the Canadian Mining Institute, Ottawa Meeting, 1908.

Expedition from Port Simpson to Edmonton via Peace River. G. S. D. 1879-80.
Hydraulic Mining in B. C. Journal General Mining Association of Quebec. Vol. II.

Dick, W. J.—Hydraulic Mining in Cariboo. Vol. X., C. M. I.

Carlyle, W. A.—Cariboo district of B. C. M. M. 1897. (Special Report.)

Carmichael, Herbert.—Mineral locations, Portland Canal district. M. M. 1906 (bulletin).

Hobson, J. B.—Auriferous gravels of B. C.—Vol. II., G. M. A., Quebec.

Leach, W. W.—The Telkwa mining district.
G. S. D. Summary 1906, also M. M. 1906.
Some notes on the economic geology of the Skeena River. Vol. X., C. M. I.

McEvoy, James.—Hydraulic Mining in B. C. Journal G. M. A., Quebec, Vol. I.

Merritt, W. H.—Gold bearing reefs and placers of Northern B.C. Vol. III., Fed. C. M. I.

Robertson, W. F.—Report upon Cariboo district. M. M. 1902. (Special Report.)
Northern Interio Plateau between Fraser and Skeena Rivers. M. M. 105. (Special Report.)

Omenica and Peace River.

Dawson, G. M.—From Port Simpson to Peace River and Edmonton. G. S. D. 1879-80.

*McConnell, R. G.—Omenica district with map. G. S. D. No. 574, also Summary 1894, and M. M. 1897.

Musgrave, E. C.—A prospecting trip in Northern Omenica. Vol. III., C. M. I.

Robertson, W. F.—Essington to Edmonton, also fine photographs. M. M. 1906. (Special Report).

Selwyn, A. R. C., Dr.—Exploration of Peace River. G. S. D. 1875-76.

Valleau, Commissioner F. W.—A special report upon Omenica district. M. M. 1901.

Cassiar and Yukon.

Brewer, W. M.—Bornite ores or B. C. and the Yukon. Vol. VIII., C. M. I.
Further observations on the copper deposits of B. C.
The Yukon and Alaskan Coast. Vol. X, C. M. I.

*Dawson, G. M.—Exploration of the Yukon an dportions of Northern B. C., with maps. G. S. D. 1887-88, or No. 260.

Cairnes, D. D.—White Horse and Yukon (Windy Arm discoveries). G. S. D. 1906.
Notes on recent developments in quartz mining in the Yukon. Vol. X., C. M. I.

Carlyle, W. A.—Cassiar district of B. C. M. M. 1897.

Camsell, Chas.—Peel River in the Yukon and McKenzie districts. G. S. D. Summary 1905.

Carmichael, Herbert.—Mineral Locations on Portland Canal. Bulletin No. 2. M. M. 1906.

Gwillim, J. C.—Report on the Atlin district. G. S. D. Summaries 1899-1900.
*Separate report on Atlin with map. No. 743, also in Vol XII., 1899, G. S. D.
Notes on the Atlin district. Vol. III., C. M. I.
Characteristics of the Atlin gold fields. Vol. V., C. M. I.

Keele, Jas.—Duncan Creek mining district, Yukon, also sketch map. G. S. D. Summary 1904.
Stewart River district. G. S. D. Summary 1905.

McConnell, R. G.—Liard River. G. S. D. 1889, also resume in M. M. 1897.
Klondike district. G. S. D. Summaries 1898-99-1900.
Yukon district, 1901-02-03-04-05-06. Summaries G. S. D.
Preliminary Report on the Klondike gold fields. No. 687, with map No. 688. G. S. D. Summary 1900.
McMillan River with map. G. S. D. Summary 1902.
Kluane mining district with sketch map. 1904.
White River and Windy Arm districts, 1905.
Old Valley gravels of the Yukon. Vol. III., C. M. I.
Note on the Windy Arm silver bearing veins. Vol. IX., C. M. I.

*Report on Klondike. Vol. XIV., G. S. D. 1901.
Gold values in Klondike high level gravels. No. 979. G. S. D. 1907.

Ogilvie, W. M.—Gold mining in the Yukon. Vol I., Fed. C. M. I.

Robinson, A. W.—Stewart River gold dredge. Vol. VI. C. M. I.

Robertson, W. F.—Atlin and Bennett divisions. M. M. 100.
Notes on Windy Arm mineral locations. M. M. 1905.

Tyrrell, J. B.—Dalton Trail and Klondike. G. S. D. Summary 1898.
The gold bearing alluvial deposits of the Klondike. Trans. M. & M. Vol. 8.
Placer mining in the Klondike. Trans. Inst. M. E., 1906.
Concentration of gold in the Klondike. Economic Geology, June, 1907.

Wright, F. Eugene.—Unuk River Portland Canal. G. S. D. Summary, 1905. Also in M. M. 1906.

British Columbia (General).

British Columbia Report of Minister of Mines.—Containing statistics, annual reports from the mining divisions and special reports on various districts by the Provincial Mineralogist, the Provincial Assayer, and others. W. F. Robertson, Provincial Mineralogist.

British Columbia Year Book.—Containing a resume of mining operations and reports of mining districts. R. E. Gosnell, Victoria.

British Columbia Mining Record.—A Monthly Journal, chiefly devoted to B. C. Mining. E. Jacobs, editor and manager, Victoria.

Canadian Geological Survey Summary Report.—Usually containing six or seven reports upon Western geology and mining.

Cairnes, D. D.—Prospecting in Western Canada. Vol. VIII., C. M. I.

Dawson, G. M.—The mineral wealth of British Columbia. Part II. G. S. D. 1887-88.

Loring, F. C.—Mining law and its bearing on the development of mines and mineral districts. Jour. Fed. C. M. I. Vol. III.

McDonald, Bernard.—Mining possibilities of the Canadian Rockies. Vol. VI., C. M. I.

Merritt, Major W. H.—The occurrence of free milling gold veins in B. C. Vol II., C. M. I.

Gosnell, R. E.—Mining in British Columbia. Bulletin No. 19. Bureau of Provincial Information, Victoria.

AIR-HAMMER DRILL CONTEST.

(Kindness of Mr. A. A. Cole, Mining Engineer T. & N. O. Commission.)

Nipissing Mine, May 7th, 1908.

Name of machine.—Waugh No. 8 C.
Weight of machine.—60 pounds.
Hole.—Vertical, up.

TIME.

Drills.	From Start. Min.	Sec.	Drilling. Min.	Sec.	Changing Steel. Min.	Sec
		0	.	..	.	..
1st.	2	30	2	30	.	..
	2	50	.	..	.	20
2nd	5	30	2	40	.	..
	5	30	.	..	.	25
3rd	8	30	2	35	.	..
	9	00	.	..	.	30
4th	9	20	.	20	.	..
Total	9	20	8	05	1	15

Hole collared to start, 2½ inches.
Total depth drilled, 40¾ inches.
Net depth drilled, 38¼ inches.
Air pressure at start, 105 pounds.
Air pressure while running, 100-101 pounds.
Size of first drill, 1 13-16 inches.
Size of last drill, 1½ inches.
Inches drilled per minute, 4.10.

Nipissing Mine, May 7th, 1908.

Name of machine.—Sullivan D. 21.
Weight of machine.—70 pounds.
Hole.—Vertical, up.

TIME.

Drills.	From Start. Min.	Sec.	Drilling. Min.	Sec.	Changing Steel. Min.	Sec.
	.	0	.	..	.	..
1st.	2	35	2	35	.	..
	2	45	.	..	.	10
2nd.	4	25	1	40	.	..
	4	38	.	..	.	13
3rd.	6	30	1	52	.	..
	6	50	.	..	.	20
4th.	8	25	1	35	.	..
Total	8	25	7	42	.	43

Hole collared to start, 3 inches.
Total depth drilled, 58¼ inches.
Net depth drilled, 55¼ inches.
Air pressure at start, 105 pounds.
Air pressure while running, 100-101 pounds.
Size of first drill, 1¾ inches.
Size of last drill, 1¼ inches.
Inches drilled per minute, 6.56.

Nipissing Mine, May 7th, 1908.

Name of machine.—Murphy No. 3.
Weight.—60 pounds.
Hole.—Vertical, up.

TIME.

Drills.	From Start. Min.	Sec.	Drilling. Min.	Sec.	Changing Steel. Min.	Sec.
		0	.	..	.	..
1st.	1	40	1	40	.	..
	2	05	.	..	.	25
2nd.	3	45	1	40	.	..
	4	00	.	..	.	15
3rd.	4	30	.	30	.	..
	4	48	.	..	.	18
4th.	5	38	.	50	.	..
	5	52	.	..	.	14
5th.	6	45	.	53	.	..
Total	6	45	5	33	1	12

Hole collared to start, 3½ inches.
Total depth drilled, 40⅜ inches.
Net depth drilled, 36⅞ inches.
Air pressure at start, 105 pounds.
Air pressure while running, 102½ pounds.
Size of first drill, 1½ inches.
Size of last drill, 1¼ inches.
Inches drilled per minute, 5.46.

Nipissing Mine, May 7th, 1908.

Name of machine.—Murphy No. 3.
Weight.—60 pounds.
Hole.—45 degrees above horizontal.

TIME.

Drills.	From Start. Min.	Sec.	Drilling. Min.	Sec.	Changing Steel. Min.	Sec..
	.	0	.	..	.	..
1st.	1	30	1	30	.	..
	2	10	.	..	.	40
2nd.	3	15	1	05	.	..
	3	40	.	..	.	25
3rd.	4	05	.	25	.	..
	4	55	.	..	.	..
4th.	5	30	.	35	.	..
Total	5	30	3	35	1	55

Second time for steel to be used.
Hole collared to start, 1 inch.
Net depth drilled, 37¾ inches.
Net depth driled, 37¾ inches.
Inches drilled per minute, 6.86.

Note.—The Sullivan machine is constructed so as to dispense with the collar on the shank of the steel. A striking block is inserted between the hammer and the steel. This is a slight sacrifice of efficiency for cleanliness.

CANADIAN MINING INSTITUTE.

Members elected at council meeting, May 2nd, 1908: H. S. Badger, M. E., Richardson Mines, N. S.; J. W. Bryant, M. E., Box 665, Victoria, B. C.; J. T. Fee, M. E., Cobalt, Ont.; Geo. L. Fraser, Mine Superintendent, Cobalt, Ont.; B. W. Lawson, Cobalt, Ont.; G. F. McNaughton, Cobalt, Ont.; A. H. Sancton, M. E., c/o Mussens Limited, Cobalt, Ont.; Bert. N. Sharp, M. E., Orient, Washington, U. S. A.; Robt. Turnbull, C. E., 23 Luke street, St. Catharines, Ont.; C. G. Williams, M.E., Cobalt, Ont.

Associates:—L. O. Armstrong, 221 Milton street, Montreal, Que.; Spencer Benerman, Midway, B. C.; C. L. Campbell, Box 85, Cobalt, Ont.; W. Teese Curran, Mine owner, 300 St. James street, Montreal, Que.; E. L. Douchette, Room 53, 112 St. James street, Montreal, Que.; G. A. MacPherson, M. E., Niagara Falls, Ont.; D. B. Rochester, Cobalt, Ont.; Robt. T. Walker, Cobalt, Ont.

Application has been received for membership from Mr. A. G. Larson, Superintendent of the Le Roi Mining Company, Rossland, B. C.

The following applications have been received for membership in this Institute during the past week:—A. G. Larson, Superintendent Le Roi Mining Company, Rossland, B. C.; R. P. Williams, Rossland, B. C.; Fred S. Peters, foreman Le Roi mine, Rossland, B. C.; W. S. Rugh, accountant Le Roi mine, Rossland, B. C.

INDUSTRIAL PAGE.

The Western Fuel Company of Nanaimo, B. C., have recently ordered from the Robb Engineering Company a 600 horse power 24 inch by 42 inch Robb-Armstrong Corliss engine for driving one of theim mine ventilating fans.

The Dominion Iron and Steel Company have recently ordered from the Robb Engineering Company one 20 inch and 28 inch by 36 inch tandem compound Corliss engine for endless haulage at their mines in Wabana, Newfoundland.

The Longest Narrow Gauge Light Railway in the World.—This descriptive pamphlet, a reprint from Engineering of July 19th, 1907, is issued by Messrs. Arthur Koppel, light railway engineers, 27 Clements' Lane, London, E.C. It gives an account of the Otavi Railway in German Southwest Africa, constructed for the Otavi Mines & Railway Company by Messrs. Arthur Koppel. It is the longest narrow gauge light railway in the world. It connects the Otavi copper district with Swakopmund, the only available shipping port, a distance of 361 miles. The construction was started in August, 1903, and was completed towards the end of 1906. During this period the rising of the Hereros complicated the labor question. Italian workmen were secured, but trouble again ensued. Finally Italian and Ovombo workmen completed the task. The whole story of construction is a modern romance.

Bulletin No. 1065, Side Dump Cars—The Atlas Car & Manufacturing Company, Cleveland, Ohio.—The varieties of the Atlas Car Company's side dump cars are illustrated in this bulletin. These are modifications of their Standard No. 217 car. Except two scale charging cars, equipped with scales for the weighed various classes of material used in smelters, concentrators, blast furnaces, etc. (Nos. 217-W and 217-OW.), these cars are all either-side-dumping. The steel bodies with malleable iron rockers and corners braced with steel forgings are strong and rigid. The frames are made heavy enough to guarantee a substantial factor of safety over the maximum load.

In No. 217-S, with capacity from 1 to 2 yards, the malleable iron rockers are recessed on both sides to engage the bale. The car can thus be hold in a semi-dumped position, which greatly facilitates loading. In this position the distance from top of rail to edge of loading side is but 22 inches. Special types are the Side Dump Electric Motor Car, Scale Charging Car, and One Side Rocker Dump Scale Car.

Sullivan Stone Channelers—Sullivan Machinery Company, Chicago, U.S.A.—Catalogue No. 61.—The channeler consists of a reciprocating engine, operated by steam or air power, mounted on a standard, and driving a steel bit, or gang of bits, fastened to the lower end of the piston rod. The standard is mounted on a frame or car, which runs on a track and is propelled back and forth by a feed engine. By cutting a narrow slot to any needed depth into the rock the channeler separates a portion of the whole mass without shattering. In quarrying the stone is channeled in four or even six sides and waste is entirely avoided.

Channelers are suited to quarrying marble, sandstone, limestone, slate, and soapstone. They are of three types—"rigid head" machines for vertical cutting, "swivel head" for marble and slate, and a third type for undercutting or horizontal channeling.

The catalogue describes the work and equipment of these machines.

The cutting capacity of the channelers is indicated by the fact that, under 100 pounds steam pressure, the Sullivan "VX" machine will cut sixty to seventy-five feet per day of Vermont or Pennsylvania slate. In soft Virginia soapstone the cut is from 150 to 250 feet per day. The total weight of the different types of channelers, including equipment, but without boiler, ranges from 23,300 pounds to 5,740 pounds.

EXCHANGES.

The Colliery Guardian,May 1st, 1908.—It is pointed out by the Colliery Guardian that ambulance work in the mine should precede rescue practice in the experimental gallery. "With regard. . . .to the saving of life in the coal mine, there is need for something more than the ability to wear a given pattern of breathing apparatus, and to perform a certain amount of laborious work under such conditions. The rescuing party must be trained to work together with a common object, rather than indivdually to vie with one another in penetrating long distances into the mine. . . . .By ambulance work in the mine, we do not mean the ordinary routine drill of a St. John Ambulance class. . . . What seems to be required is a special kind of ambulance instruction, adapted to the conditions present in the pit after an explosion or any other disaster of the first magnitude."

Mining and Scientific Press, May 9th, 1908.—In celebration of the arrival of the American fleet in the Bay of San Francisco, Mr. T. A. Rickard contributes an article entitled, "From Mine to Battleship" to this issue. His theme is white lead. He traces the story of its manufacture. From the lead mine, the reader is brought to the furnace, the pigment factory and, finally to the navy yard where the battleship is made whitely beautiful.

The Selby smelter, at the northeastern end of the Bay of San Francisco, supplies the white lead used at the Mare Island navy yard. One of the mines, from which ore is sent to the Selby works is the Bunker Hill and Sullivan, the most important single lead producing mine in America.

The Bunker Hill and Sullivan produces 40,000 tons of lead and 1,650,000 ounces of silver annually. The property is situated at Wardner, in the Coeur d'Alene, Idaho. The ore is found in old quartzite, which has been much metamorphosed. The galena has been deposited in the resulting cracks and fissures. Silver is associated with the ore in the rates of one ounce of silver to 44 pounds of lead.

A certain rough alignment of irregular ore bodies marks the continuity of the lode. The quartzite is full of slips and fractures, which serve as local boundaries for the richer bodies of galena. The galena replaces and impregnates the brecciated quartzite along channels created by the fractures extending along the footwall and away from it into the overlying rock. The ore is mined with little waste, and goes to the mill for crushing, classification and concentration. Argentiferous galena is the chief product, but there is also iron pyrites which carries silver. The problem is to save the lead and silver without the zinc.

The ore first falls over 1¼ inch spaced grizzlies, the oversize going to a Comet gyratory crusher, which crushes it to a maximum diameter of 2½ inches, and then spills into a horizontal bucking belt, where a couple of men are stationed to pick out the clean ore (galena) and the mine rubbish by hand. The belt delivers to roughing rolls, and from them, reduced to a size of about 40 millimetres, the ore is discharged onto an incline belt conveyor. Here it is joined by the undersize from the grizzly. The joint product is carried to the top of the mill proper and is fed into two Vezin samplers, one of which extracts as a sample one tenth of the total, and the next a tenth of the sample. One per cent. therefore is the final sample. This is reduced and prepared for assay daily.

The ore now drops into mill bins of 600 tons capacity, equivalent to a 12-hours supply. After passing through trommels a part of the ore (between 18 mm. and 36 mm. diameter) goes to the bull-jigs. The jig concentrate is shipped to the smelter and the middling is reground. The other oversize from the trommel is reground and again passed through the trommel, and thence to the jigs. Huntington mills, Spitzkastens, Callow settlers, Frue vanners and Wilfley tables complete the outfit. The principal features of the mill are the re-crushing by rolls, the passage of the coarse middlings through the rolls, and the grinding of the fine middlings in Huntington mills.

In March of this year, in 28 working days, the mill treated 30,600 tons of ore carrying 12.56 per cent. lead and 5.07 ounces of silver. The ratio of concentration was 4.6 into 1. Of the 7,686,720 pounds of lead and 155,142 ounces of silver contained in the ore, respectively 5,965,096 pounds of lead and 111,598 ounces of silver were recovered, or 79.4 per cent. of the lead and 71.9 per cent. of the silver, 77.6 per cent. total recovery. Fifty-two men are employed in the mill. The total cost of milling in March per ton of crude ore was 35.9 cents. Besides the concentrates saved in the mill, varying amounts of picked ore are shipped direct to the smelters. The total cost of freight and smelting is $19.61 per ton. The grand total for all operating costs is $2.438 per ton.

The Selby Smelting and Lead Company works were founded in 1868. Twenty-five thousand dollars worth of gold and 12 to 15 million ounces of silver are refined here annually. The chief supplies of argentiferous lead ore and of silicious gold-silver ores come from Idaho and Nevada respectively.

From the bins the ore and concentrates are taken to the feed floor where they are shovelled by hand into the blast furnace. This is 36 by 144 inches. The blast is under a pressure of 33 to 34 ounces per square inch. From 130 to 140 tons of charge is treated per day, exclusive of fuel or slag. Of the charge 60 to 70 per cent. is ore. It is the aim to have 15 per cent. of lead on the charge.

The charge of 7,700 pounds is made up of slime briquettes, roasted matte, limestone, ore, refinery by-products (mainly litharge), metallic iron, and coke. To this 20 per cent. of old slag is added.

The roasted matte contains 12 per cent. lead, 12 per cent. copper, 45 per cent. iron, 3 per cent. zinc, and 7 per cent. sulphur.

The scrap iron bought as flux often includes typewriters, frying pans, rifles, stoves, sewing machines and many other miscellaneous items.

When the copper accumulates in the matte beyond 16 per cent., it is re-smelted and brought up to 45 to 55 per cent. The matte and the pyritic ores are roasted in Ropp furnaces, provided with travelling mechanical rabbles.

From the blast furnace the lead flows into moulds and is cast into bars weighing 100 pounds apiece. These are elevated to the upper floor of the refinery. Here the process of liquation is carried on. The metals are separated by the difference in their smelting points. The softening furnace is the next step. The lead is now free from antimony, arsenic, and other impurities and is tapped into desilverizing kettles, made of cast iron and fired by oil. At 840 degrees, F., a slab of zinc, added to collect the silver and gold, melts. The zinc is skimmed off and when pressed carries 3,000 to 3,500 ounces dore. The lead, free from silver and gold, contains now about 0.5 per cent. zinc. This is eliminated in a reverberating furnace. The lead is cast into 100 pound pigs and is taken to the white lead plant.

The refined lead is now "corroded into white lead—a compound of lead carbonate and hydrated lead oxide. From 2,100 tons of refined pig lead the Selby plant manufactures 2,500 tons of white lead per annum. The lead is exposed to the corrosive effects of acetic acid, in specially built temporary stacks. The treatment requires 100 days of undistributed chemical action. The corroded lead is then separated from the uncorroded and ground and screened. After much special treatment it is finally turned out as commercial white lead, ready to be used on the armoured sides of Uncle Sam's noble fleet.

PERSONAL AND GENERAL.

Mr. Frank C. Loring has returned from London, England, where he spent the last two months.

Mr. Jules Labarthe of the Consolidated Mining and Smelting Company, Trail, B. C., has returned from Colorado.

Our thanks are due the Bureau of Mines, Ontario, for copies of the map of Larder lake, compiled by

Messrs. Brock and Bowen. The map is on a large scale and the geological legend is instructively simple.

Mr. A. J. McMillan, general manager of Le Roi mine, met Mr. T. D. G. Drayton, chairman of the Board of Directors, in Chicago.

Mr. B. A. C. Craig has returned from a visit to northern Manitoba. Mr. Craig has taken up some valuable clay properties in that district.

Mr. Francis J. Peck, of the firm Francis J. Peck and Company, Williamson Building, Cleveland, Ohio, has gone to report on a mining property in Southern Mexico for Cleveland capitalists.

Professor Manley B. Baker, of the School of Mining, Kingston, pased through Toronto on his way to Cobalt on May 19. From Cobalt, Mr. Baker will take a geological party to Lake Abitibi for the season.

Mr. Arthur Koppel, the founder of the Arthur Koppel Company of 66-68 Broad street, New York, died in Berlin, Germany, on May 13, of heart failure. Mr. Koppel was in his 57th year. He was born in Dresden, Germany, in 1851. At the early age of seventeen years he started in business. In 1876 he established the present firm, taking up the manufacture of all kinds of material for narrow gauge railroads. Through his energy and foresight the portable industrial track was given wide popularity. In 1905 the firm was made a stock company. It now owns fifty-two branch houses, distributed practically all over the world. The American business was established ten years ago. In 1906 Mr. Koppel purchased 700 acres of property in Beaver County, near Pittsburg, Pa., where he founded the township of Koppel and erected a thoroughly modern plant. Mr. Koppel's death will not affect the organization.

BOOK REVIEWS.

A Pocket Handbook of Minerals, by G. Montague Butler, E.M.—16 mo., IX + 298 pages, 89 figures. Morocco, $3.00. John Wiley & Sons, New York, 1908.—The first thing that strikes one about this neat volume is its convenient size. It is easily portable. In one of the capacious pockets of the regulation khaki prospectors' jackets it would be scarcely noticeable.

Another prominent feature is the blank space left throughout the book for field notes and remarks.

Again, the most important characteristics of each mineral are emphasized by means of heavy face type. This serves to impress upon the reader the distinguishing traits of a mineral.

The systematic arrangement by paragraphs is convenient and time-saving. The plan followed is as follows:

Dana Number. Name. Composition. Hardness.
Lustre.
Color.
Streak.
Cleavage or parting.
Tenacity and fracture.
Degree of translucency.
Specific gravity.
Miscellaneous (magnetism, taste, odor, dichroism, etc).
B. B. (before blowpipe). Here are included simple chemical tests.
Methods or habits of occurrence and crystal habit.
Description of varieties.
A list of resemblances for comparison.
A short statement of uses.

The title page informs us that there is little reference to chemical tests. Since the book is intended to be used chiefly as a guide in field work, this omission is wise. Usually the prospector must rely upon the simple physical tests of hardness, color, streak, lustre, fracture and specific gravity to guide him. The blowpipe is not often called into requisition by the prospectors.

There are supplementary chapters upon commercially important ores, retail prices of cut gems, values of metals and minerals. A glossary also is appended, along with useful tables. Numerous clear half-tones and diagrams are interspersed throughout the text.

The binding is strong, the type clear, and the arrangement good.

CORRESPONDENCE.

To the Editor

"Canadian Mining Journal."

Dear sir:—

At the meeting of the Canadian Institute held last month I promised to contribute some comments upon some points raised in the papers presented by Dr. Leith and Mr. Willmott. These remarks would have been incorporated with the discussions in the notes of the proceedings of the Institute, had it not been for the inability on the part of the secretary to furnish me with some of the items from one of these papers, so that it is now too late to have this done.

Both of these papers referred to were extremely interesting, that by Dr. Leith was entitled "The Iron Ore Deposits of Canada," and the other, by Mr. Willmott was on the "Iron Ores of Ontario," and the latter was only presented in part and extempore.

Dr. Leith classified the deposits according to their origin, dividing them into six classes, as follows:—

1st—Magmatic segregation.
2nd—Pegmatite type.
3rd—Lake Superior sedimentary type.
4th—Clinton sedimentary type.
5th—Carbonate type.
6th—Brown ore type.

This mode of classification is very useful, not only to the engineer, who will find himself more at home in making examinations and reports upon the deposits, but also to the experienced miner, who will find it a assistance in laying out his work correctly when endeavoring to win the ore from them.

Now it can readily be understood that, in the enumeration of the iron deposits of a country so vast as Canada, it is hardly possible for any single individual to possess an intimate personal knowledge of them all, and even if he wishes to confine the subject matter of his paper to those which are well known, he must perforce rely to some extent upon the opinions of others, whom he believes to be familiar with the localities in which the deposits occur. It is possible, therefore, owing to this dependence upon the work of others, that the explanation of certain phenomena might be based upon accurate observations, or again, it might be based upon the writings and teachings of persons, whose theories seem to have every appearance of fitting the case in question, or, yet again it might be based upon a

mere guess, in which the particular theory which happens to be the prevailing fashion is followed, whether it be the neptunic or volcanic. In this manner it may occur, quite inadvertently, that we may place statements on record in our writings which we would most assuredly have omitted, had we possessed an intimate personal knowledge of the actual facts of the case.

I might mention one single instance of this, the genetic occurrence of the Atikokan magnetites; these are classed by Dr. Leith under heading No. 2 of his table; this classification is erroneous, and the error can readily be shown, since no deposits afford more simple problems for the observer than these. Had Dr. Leith consulted my paper on "The Atikokan Nickeliferous Pyrrhotite Deposits and their Origin," Vol. IX, of the Proceedings of the Canadian Mining Institute, he would have not been guilty of such a lapsus. But I must excuse him because he told me since that he had forgotten that paper.

Not so easily, however, can I forgive him his statement, or rather I should use the plural and say statements, for I find it repeated several times, in other publications, to the effect that the occurrence and discovery of iron ores on this side of the international boundary in the vicinity of Lake Superior, was disappointing; especially, in speaking of the Animikie iron-bearing rocks, he asserts that, if 200 feet more of this formation had been eroded, the whole of the formation would have totally disappeared. This is a belief that originated with Van Hise, who promulgated this theory, in spite of the fact that he had no direct or personal knowledge of the facts, then Dr. Leith follows in his footsteps, and, last in order comes Mr. Willmott.

Let us consider upon what basis these assertions rest. Merely upon the experience in that portion of the Animikie formation lying in proximity to Loon Lake, on its southern shore, at a distance of about 23 miles from Port Arthur, in a northeasterly direction, and upon the knowledge of the locality adjoining Gunflint Lake to the west, situated about 90 miles southwest of Port Arthur. The former district forms the northerly margin of the iron-bearing rocks, which at that point are only a few feet in thickness, and consequently the hematite found there is in places very shallow. The latter region is the western boundary of our Animikie rocks, which are cut out at that point by the intrusion of a number of different eruptive rocks. Now, what I would ask is, whether a man is justified in judging a formation, such as is found here, over one hundred miles in length, and at many points over twenty miles in width, and making an estimate of its probable value from merely examining the margin, or should he not rather for his opinion on such a large area by considering the formation in toto? The latter is surely the only proper method, and if these gentlemen had taken the occasion to consult my monograph on "The Genesis of the Animikie Iron Range," in the Proceedings of the Canadian Mining Institute, Vol. VI, 1903, pages 243-253, they would have discovered that this formation is much thicker on this side of the boundary line than it is on the other. Dr. Selwyn estimated its thickness to be about 12,000 feet, but we would come nearer to the actual facts if we divide this figure by four, and then it would only be as deep as this in the deeper basins. If this be the case, I fail to see any good reason why we should not find as good iron and as large deposits of hematite ore in our own rocks as are found on the Mesabi or other Lake Superior hematite ranges. Throughout the whole of this series of ranges the rock formation is identically the same, forming, in Pre-Cambrian, or one had preferable call it, Post-Laurentian times, one continuous and uninterrupted rock mass. The fact that the same large deposits of hematite have not been found here as have been opened up on the other side is easily accounted for—we simply have so far neglected to prospect our Animikie rocks: the little, however, that has been done and the results attained thereby should have given any one sufficient encouragement to go down into the deeper basins of this rock, in which it may reasonably be expected that we shall find larger and purer deposits of hematite. I venture to predict that, as soon as much diamond drilling has been done here, as has been done on the Mesabi range alone, both Dr. Leith and Van Hise will doubtless be only too willing to retract the statements they have made about our Animikie range.

Dr. Leith's statements I find more pardonable, because I can easily understand his reluctance to contradict his former mentor, Prof. Van Hise, although I have observed that, as regards the origin of these rocks, their ways are already beginning to diverve, and that Dr. Leith has started travelling upon a road that is somewhat more direct and also more correct. I welcome his company thereon.

Towards Mr. Willmott I hardly think that I can extend so much mercy, because for several years he lived here himself, and for a still longer period had prospecting parties throughout the district. It was, therefore, to be hoped that he would have been too well informed to fall into such glaring errors. I only learned of these erroneous statements upon reading his paper as published in the "Journal," these subjects not having been touched upon in his extempore discourse at the meeting.

What appears to me to be a very grave omission has been made by both these gentlemen, and I cannot rest without alluding to it; for they hardly mention my special big pet, the Mattawin iron range. The reader can well understand my sentiments when I state that this range contains perhaps the largest low grade iron deposits of which we have any knowledge. The figures will speak convincingly enough for themselves. The range commences about twenty miles west of Port Arthur and ends in St. Louis County, Minnesota, thus being nearly 100 miles long. Some of the individual deposits are 500 by 1,000 feet, one 660 by 3,000, and another 1,000 by 10,000 feet, and all of them have a depth of at least 5,000 feet. Many other deposits are found here of a similar size. Now, if my readers will kindly figure out how many million tons of iron ore these three first named deposits alone contain, and how many years they would last the population of Canada, when they were mined and reduced to iron and steel for their use, after having worked out this calculation, they will not consider it so very extraordinary for me to feel somewhat aggrieved at the light-hearted omission made by these two gentlemen who take so much interest in the problems of iron ores.

I can now let Dr. Leith step down from the stand, but I would like, with his kind permission, to devote a little more time to Mr. Willmott.

During almost the whole of last year I was absent from home and in consequence I had perforce to neglect to a great extent the perusal of mining and other journals. A few days ago, however, the November number of "The Canadian Mining Journal" came acci-

dentally into my hands, and upon it my eye was caught by the heading of a paper entitled "The Origin of Deposits of Pyrites," by Mr. A. B. Willmott.

I would ask Mr. Willmott to bear with me while I offer a few corrections as regards the nature and origin of some of the sulphide of iron deposits quoted by him. He attributes the origin of a large number of the pyrite deposits to sedimentation, and refers, for support, to Beck, Kemp and others. Both of these observers, however, classify pyrites deposites according to their different origins, and cite cases of different modes of sedimentation. Mr. Willmott in his paper enumerates a multitude of pyrites deposits, but I fail to find any explanation as to what kind of sedimentation he ascribes their occurrence, although it ought not to have been a task of very great difficulty to deduce some theory as to their origin from the rocks associated with them, from their physical structure and from the often peculiar character of the enclosing rocks.

Mr. Willmott speaks at length of the Michipicoten and surrounding district, he traces the association of the different minerals with the pyrites, he describes also the peculiar shape of the immediate environments, their pond-like shape surrounded by rocks, or the rounded or elongated depressions in which these deposits are found, but in spite of all that he speaks only of sedimentation—what kind of sedimentation, then, does he refer to?

Any person who is acquainted with that country is also well aware that, in both pre and post-Cambrian times there was a period of great volcanic activity, as witness to which we have the vast number of basic rocks, tuffs and granites. With this knowledge to guide us, and from observation of the locations in which these pyrites deposites are found, would it not be reasonable for us to come to the conclusion that some of these pond-like places or rounded depressions are the collars and vents of craters, vents of geysers or fumaroles, such as we can see in several places in this locality, in a beautiful state of preservation. At Steep Rock Lake we find similar pyrites deposits of a high grade limonite and manganese. In the immediate neighborhood we find some of the most beautifully preserved geyser vents that I have ever seen dating from a period so remote. In addition to these geysers, there must also hav been numerous mineral springs carrying various mineral contents in solution, similar to those which we can see occurring to-day in the Yellowstone Park. Now there can be no doubt of the fact that these Steep Rock Lake deposits are produced by mineral springs coming from a subterranean source, and if we connect these deposits with volcanism it would only be a natural inference that the Michipicoten deposits were produced in the same way. But in that district there occur not only iron di-sulphide deposits, but also some very large deposits of pyrrhotite, one of which is especially remarkable for its size and massiveness. The one I refer to is found on locations 223 and 224X, north of Cuthbert Lake, and this deposit no one would surely classify as a sedimentary product—it is as clearly a magmatic segregation product as those in the vicinity of Sudbury, carrying a certain amount of nickel. In addition to this one, there are a number of similar examples that might be quoted.

There is no doubt that the Helen ore is to a large extent an oxidation product, from pyrites and siderite, but these minerals are not of the same age as the Animikie rocks, as has been repeatedly asserted, but date from the time of the greenstone eruptions, which occurred after the Animikie had been laid down.

Mr. Willmott alluded to the 'pyrrhotite" deposits, near the Kaministiquia River, and those near Schreiber, as "pyrites,' and to them he also attributes a sedimentary origin. This opinion is clearly erroneous, for there can be found no truer type of a magmatic differentiation products than these deposits, which are quite numerous in both localities. The pyrites found associated with the Schreiber ore exists only at the surface, consisting, usually, of a shallow layer from about one foot to a foot and a half in thickness, and represents merely a re-arrangement of the molecules from FeS_8 to FeS_2.

Towards the close of his paper he speculates on the origin of this pyrites, arriving, however, at no definite conclusion. He does not know how silica, iron and sulphur were dissolved, now how they were precipitated, but he says that there must have been volcanic activity at that period, but this activity only served to add mechanical sediments to the chemical. Might it not have been expected that the thought would have arisen that these deposits in the Michipicoten district and elsewhere are all the products of volcanism, partly produced by the after action of volcanism and partly as the direct result of the same agency?

Mr. Willmott asks how the silica, iron and sulphur were dissolved and precipitated. Let me ask him, in turn, how the silica, the iron, the copper and other metallic sulphides are carried into the fissures of the rocks, forming veins, or into porous rocks strata, forming impregnations. Do not the geysers and the many hot and cold mineral springs of the Yellowstone Park and of Iceland, and those found throughout Europe and Australia and elsewhere, give us some idea of the manner in which lime, silica, iron and other rock or metallic minerals are dissolved, or are found by us in a state of solution, and are precipitated? And if we picture to our minds the remote periods, with their accompaniment of enormously greater volcanic activity, during which these pyrites and pyrrhotite deposits had their origin, it should be a matter of no great difficulty to realize the manner in which these phenomena occurred.

F. HILLE, M.E.

Port Arthur, April 27, 1908.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.

There is very little to chronicle at the collieries at the present time, a sure sign that all is going well. The mines have got into their summer stride, and some remarkably good outputs have been made. As we forecasted some time ago the mines of No. 2 colliery district have made a record. On the 14th of May, No. 2 colliery had an output of 3,221 tons and No. 9, an output of 1,879, making a total output for one day from one shaft of 5,100 tons. The previous record for this shaft was 4,656 tons. It would be interesting to know whether this is not a world's record. No. 6 colliery is also doing well having reached 1,200 tons on one day this fortnight. No. 10 mine, the Emery, has also the highest output that it has ever made to its credit during the same fortnight, namely 718 tons. We think we are safe in saying that this is the largest output

ever produced from a purely longwall mine in Nova Scotia in one shift. With the exception of No. 3, all the Dominion collieries are on single shift. Another record was an output for all collieries of 15,539 tons on single shift. And yet if one enquires for news around the collieries we are told there is "nothing doing."

The Hub Colliery commenced to hoist coal on the 18th, after a six weeks' rest. During this time the mine has been thoroughly cleaned up; the main deep has been straightened and widened and an electrical endless haulage system installed. Two new electrically driven pumps have also been completed, and extra boilers and compressor plant installed. A new man hoisting engine has also been installed. The main deeps are about a miles under sea beyond high water mark, the coal is dipping at about the same pitch as formerly and maintains the same thickness. The mine has been idle rather longer than was anticipated, but from now on it should give a good account of itself.

At No. 6 Colliery a powerful new haulage engine is being put down, the main deep is being double tracked and put into shape for endless haulage, when the output is capable of being materially increased. The fact that this mine is producing somewhat like 20,000 tons a month, all of which is very readily absorbed is a sufficient commentary on the commercial qualities of this coal.

The Brooklyn Daily Eagle prints very complimentary remarks about Nova Scotia's possibilities as a country of mining investments. This paper says: "It may be said, without making use of extravagant language, that there is not a country upon the face of the earth which offers such absolute safe returns upon mining investments as the Province of Nova Scotia." It makes a statement also which we think is a little remarkable, namely, that the Dominion Coal Company has proved that its mines are capable of an output of 3,500,000 tons per year for a thousand years! Not that this need worry any Nova Scotian, for a thousand years is a long time. It should comfort Steel and Coal shareholders a little. The Brooklyn paper refers to Nova Scotia's gypsum exports, and we think that in her stones will be found the greatest wealth of Nova Scotia. There is in this province gypsum, marble, porphry, syenite, fine sandstones, jade, talc, mica, coal and iron. These we think will prove more precious than gold and silver. We hope the Brooklyn Eagle is right in its estimate of Nova Scotia's possibilities, and as to Dominion Coal, well, in a thousand years we shall be where steel will cease from troubling and coal will be at rest.

ONTARIO.

Cobalt.

The shipments from the camp for the week ending May 16, amounted to 447 tons. The shippers were as follows: Cobalt Lake, Cobalt Central, Kerr Lake, La Rose, McKinley-Darragh, Nipissing, Nova Scotia, O'Brien, Right of Way, T. & H. B., Temiskaming, and King Edward.

Nipissing.—A shaft is being sunk on a vein in the northeast corner of the town of Cobalt. A diamond drill is also in operation close by.

At a meeting of the directors of the Nipissing Mines Company (the holding company), E. P. Earle was re-elected president, L. B. Kendall, vice-president and John Josten, treasurer. The office of the company has been moved to 71 Broadway, New York.

Right of Way.—On May 19, thirty tons of high grade ore were shipped to Copper Cliff.

Seventy-five men are now employed in the various workings.

Lawson.—A small force of men are now at work trenching.

Cobalt Central.—The Standard Cobalt Mines Company, one of the subsidiary companies of the Cobalt Central, has leased 40 acres adjoining the Big Pete on the south. The lease, which is from the Bailey Cobalt, is on the basis of 50 per cent. royalty. The period is for two years with an option for three additional years.

Youngstown Cobalt.—A small steam plant has been purchased and will be installed on the property of the company, northwest of Sasagina Lake.

T. & H. B.—No. 2 level east, is showing up some good ore. On driving east on the cobalt vein, the ore is beginning to show native silver. There was no silver at all on the surface, in this vein.

Chambers-Ferland.—Arrangements have been made by this company to obtain air supply to operate drills, from the La Rose Company. Pipe lines are being laid from the La Rose to the No. 1 and No. 2 shafts. A careful sampling of the vein in the bottom of the No. 1 shaft, about 45 feet in depth, gave a value of 5,100 ounces of silver.

Casey Cobalt.—Twenty-five men are at work here. A station is now being cut at the 165 foot level.

Silver Leaf.—In the north face of the shaft, at a depth of 140 feet, a new vein running at right angles to the main vein, has been encountered. The values in the main vein are as high as ever and the outlook is encouraging.

The impression got abroad that this mine was being worked on a lease, but the facts are these: instead of receiving a salary, the manager, Mr. Symmes, receives 10 per cent. of the net proceeds and out of this he pays the mine superintendent's salary.

Shamrock.—Half a twelve drill compressor and a sixty and eighty h. p. boiler will be installed at once and active work begun under Mr. McPherson, who will have charge.

Little Nipissing.—A car of ore will be shipped in a few days from the Peterson Lake lease of this company. Arrangements have been made to secure an air supply for operating drills and a hoist from the Nipissing Company. Active work will be started as soon as the connections are made. The shaft which is now down 45 feet, is being timbered and a water tight concrete cellar is being made. There is every prospect of this mine becoming one of the important shippers in a short time.

O'Brien.—Work has been started cleaning away for the new concentrator to be erected. This will cost $125,000 and will be capable of treating 100 to 150 tons a day.

King Edward.—A ten stamp mill has been ordered from the Allis Chalmers Bullock Company. This is for the concentrating plant.

Crown Reserve.—At a meeting of the directors of this company, Mr. Samuel Cohen was appointed general manager. Mr. Cohen, who had a wide experience in the Cobalt district, has been in charge of the development of the property since October. A extensive system of development has been planned. The working shaft, which is now down 50 feet on a stringer from the main vein, which carries silver and cobalt values, will be sunk to 100 feet. The main vein will be developed by a cross cut run from the working shaft at this level. Mr. Cohen expects to develop the property by a system of exploration tunnels. The main tunnel will be 1,500 feet long, extending east from the shaft and with cross tunnels at intervals of 500 feet.

The ore in the original working is wonderfully rich. Fifty pounds taken from the bottom of the open cut and smelted at the Silver Queen, gave 38½ pounds of silver, 940 fine. A 20 ton car of ore is now being sampled by Ledoux & Company. The refining of the nuggets has not been completed but the ore will run between nine and ten thousand ounces silver to the ton or approximately $90,000 to the car. After being sampled by

Ledoux & Company the ore will be shipped to Delora for treatment.

An interim dividend of 4 per cent. on the capital stock, payable July 1st, has been declared. The stock outstanding is $1,750,000.

Montreal River District.

The Gates property, James township, has been sold to a Detroit syndicate. Mr. Tom Fee of Cobalt is now on the property laying out the plans for development work.

Holden Property.

A promising vein of calcite and copper with small stringers of aplite carrying high silver values, has been encountered in a drift at the 90 foot level. This claim is in Tudhope township.

The righteous indignation of the better class of prospectors and miners in the Montreal River district, has been aroused by the exaggerated and inaccurate statements published in the local paper. Apparently no effort has been made by the editor to confirm the truth or even the probability of a greater part of his "news items."

The development of this district will largely depend on the result of this season's prospecting and development and while outside capital is badly needed there is no room for a wild-cat boom or wild-cat methods of advertising. The owners of properties and the prospectors now in the field are beginning the summer's work with quiet confidence that legitimate development of the rich prospects will make a producing camp of the district. Outside capital undoubtedly is needed and should be secured; but it is far more important that legitimate mining men be attracted and induced to undertake the intelligent development of the district in a practical way, and such men are interested and attracted by sane, attractive, and conservative statements. There is plenty of real news. Interesting stories and news items may be had from almost anyone of the hundreds of men who know the country and are working for its best interests.

Temagami.

Active prospecting and development has been started on the Old Abe property situated one mile north of Temagami station. The three forty-acre claims which constitute the holdings of this company, were prospected last summer with very promising results.

ALBERTA.

Coleman.

The miners in the collieries of the International Coal and Coke Company's mines, struck owing to a dispute about pillar drawing. The men have a contract rate for this work, but the company wished to introduce day labor. The men were only idle for two days and resumed work pending the sitting of the District Grievance Committee, when the whole matter will be investigated, and it is thought that it will be finally settled without an arbitration board being asked for.

Frank.

An examination of candidates for Fireboss' certificates was held in this town last week. Six candidates presented themselves for examination. The examination board consisted of the two mine inspectors for the province and one member representing the mine owners and a fourth member representing the miners.

Although practically no work has been done at the mine since Christmas, the outlook for the future is much brighter. The company has been reorganized and Mr. H. Gebo has undertaken the general management of the concern, with Mr. S. McVicar as mine manager, and C. Chesnut as pit boss.

Mr. G. C. Rochfort, book-keeper with the old company, has been elected as secretary-treasurer, with Mr. G. S. Silverman as travelling sales agent.

The old slope east of the town has to be pumped out. This slope has not been worked for a number of years, but it is now intended to reopen it.

A force of men are at work repairing the main tunnel and doing other preliminary work with a view to an immediate resumption of work.

Mr. Gebo has taken a large contract to supply coal to a Spokane firm and at present extensive alterations are being made on the screening plant so that the requirements of the contract can be fulfilled.

Strathcona.

The case of 21 miners versus the Strathcona Coal Company came up in the District Court before his honor, Judge Taylor. Some time ago the company made an agreement with the men after an Arbitration Board under the Lemieux Act had investigated a dispute between the said parties. Since then the company entered into a new agreement for a smaller wage with three of the men on behalf of their fellow-workers without complying with the requirements of the Lemieux Act.

The judge held that the three men who made this new agreement must abide by it, but the agreement was not binding on the other workmen.

The United Mine Workers of America has taken up the question and will appeal from the decision of the judge with respect to the three men. It is also understood that they will enter an action in the Supreme Court against the Strathcona Coal Company for $20,000 damages for violation of their agreement.

Lethbridge.

No. 3 shaft of the Alberta Railway & Irrigation Company does not average more than three days per week. There is very little improvement to be looked for until dealers begin stocking up coal for the fall again.

The new shaft situated a short distance from the town is being rapidly pushed ahead. Mr. Robert Livingstone who has charge of the construction work at this shaft, resigns his position with the company at the end of the current month. Mr. Livingstone has been appointed by the Provincial Government to the position of mine inspector for the Lethbridge and the surrounding districts. Mr. Livingstone, though a comparatively young man, has had a long experience in mining and has worked himself up from the ranks. He has had considerable experience in the States and has been with the Alberta Railway and Irrigation Company here for over seven years. He has also had considerable experience in the Edmonton coal field where he was manager for the Edmonton Standard Coal Company.

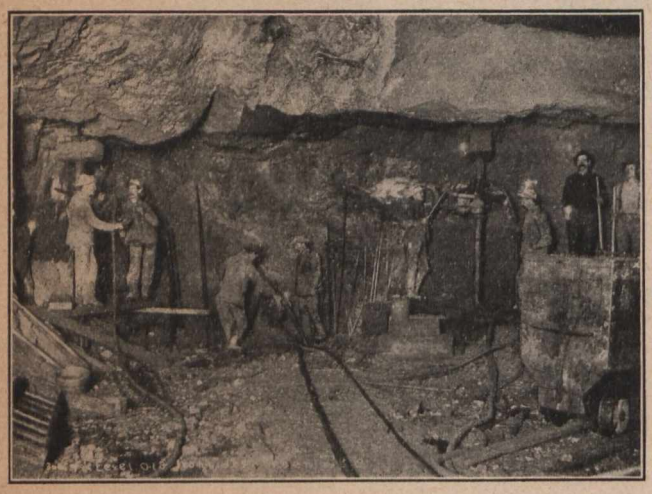
BRITISH COLUMBIA.

Phoenix.

The business interests of the Boundary district are in good spirits just now over the resumption of work by the British Columbia Copper Company after their long shut-down. Owing to the fact that the fixed charges in connection with the Copper Company's plant were quite heavy and also owing to the favorable factor, the low cost of production in the Boundary, due to a spirit of friendly rivalry for low costs that has existed among the managers of the big copper producers of the Boundary, the British Columbia Copper Company has found that it is more

economical for them to operate even with copper at its present low price than to remain in idleness. While the British Columbia Copper Company cannot make copper as cheaply as the Granby, yet, they are a close second to that company in cost of production. The Granby can make copper for about 10 cents per pound and with good management the Copper Company should be able to make it for 11 or 11½ cents per pound, this to include cost of selling, etc. The plant of the Copper Company and work at the mines are being got into form as rapidly as good practice warrants and within 25 or 30 days they will be able to ship 2,000 tons of ore per day from the mine and turn out 1,500,000 pounds of blister copper from the smelter. They will then be employing between 400 and 500 men at the mines and 200 men at the smelter. The new 35-drill Rand compressor is receiving the finishing touches and will soon be available for addition to the air supply.

As the British Columbia Copper Company is in a position to treat ore from the Snowshoe mine to advantage and was doing so at the time they closed down last fall, it is stated that the Snowshoe will shortly be opened up by the Consolidated Company and shipments made on a large scale to the British Columbia Copper Company smelter. Should this come about at an early moment, and with the likelihood of the Dominion Copper Company finding it more economical to work than to lie idle, the Boundary district will exhibit some of its old time liveliness. The plant of the Dominion Copper Company is being kept in readiness for immediate resumption of work but no word has been received by the management from headquarters as to going back to work, so far.



300 ft. level Old Ironsides, Phœnix, B.C.

Shipments from the Granby mines for the week ending May 16th amounted to 24,309 tons and their total for the year to date is 402,354 tons. With seven furnaces working at the smelter they treated 22,402 tons of ore which makes the amounted smelted up to date 392,494 tons. Diamond drill prospecting is being continued on the property. During the last four years the Granby Company has drilled 29,117 feet of diamond drill holes in the hill, or over six miles of work. Diamond drilling has been found economical development in the Granby mines and has given good results.

The Crescent mine at Skylark camp shipped a thirty-ton car of ore to the Trail smelter during the week.

The Greenwood prospecting tunnel proposition keeps bobbing up every now and then and it looks as though work might be started. The company has been, or is to be, capitalized for $5,000,000 in $1 shares, which looks a little damp to the cursory observer. The promoters may be able to see their way clear to make a paying proposition out of their tunnel but from the information one can gather it will be more of a speculation as to the encountering of the high grade lodes that may be on its line rather than an industrial enterprise for the economical handling of Phoenix ore.

In the Boundary and all through the Kootenays there are mining propositions that are used as a basis for the sale of stock and intending investors in legitimate mining propositions must make strict inquiry as to the merits of any company they are going to put money into, for the risks with which the best mining ventures are fraught, are hazard enough without banking on luminous but hazy reports from wild-cats and knife-blade ledges of ore, probably of high grade, that cannot be mined at anywhere near a profit, although it may assay into the hundreds.

Rossland.

Prospecting in the South Belt and work on the good showings they have in that district are being executed with some of the zeal and hope of the earlier days of the camp. Mining men are keeping in close touch with work in that part of the camp and if results obtained during the next few months warrant it considerable development, on a larger scale than at present, will be undertaken. The Monday claim has been leased by John Brokenshire and associates, Mr. Brokenshire having sold out his interest in the Blue Bird lease at a good profit. The Monday is near the Blue Bird and a little work on the property may uncover the continuation of the Blue Bird ledge. The Spitzee, which the Le Roi Company had under lease for a while has again been leased and work will be started right away. The Spitzee is having a lot of ups and downs but may surprise even those who think it will prove a good property some of these days.

The shaft of the Centre Star is now down to the fifteenth level, 2,100 feet from the collar. In consequence of the encouraging showings that have been met with at depth in the Star the shaft will be sunk still deeper in the near future. The rich gold ore still continues to be found and mined in the lower levels of the War Eagle and work on the Iron Mask and Idaho portions of the Consolidated Company's property is giving satisfactory results.

The Le Roi, Josie and Giant-California mines are prosecuting work with their usual vigor and good results are being obtained for every foot of work done.

The Blue Bird has shipped another 20-ton car of good grade ore to the Trail smelter. The combined output of the camp continues to average 5,000 tons per week and the receipts of ore at Trail smelter run about 6,500 tons per week, including ore from the Snowstorm (Idaho), First Thought (Wash.), North Star, Richmond, Rambler-Cariboo, Vancouver and Reco.

One of the flumes bringing water to the city burst recently and the escaping water carried away the wash and laid bare a hitherto unknown ledge of mineralized matter. One of the miners who appeared on the scene recognized that it might prove of value and staked a claim upon it.

M. R. Galush, managing director of the Jumbo mine, Spokane, states that they will put a small force of men to work on the Jumbo at an early moment, which will be augmented as the showing made warrants. Mr. E. L. Tate, one of the large stockholders in the Cliff mine, which is one of the most promising properties in the camp, is in Rossland from Spokane and says that if the interests in the Cliff can be got into harmony something will be done with that property this season.

Nelson.

The Canada Zinc Smelting Company of Nelson will begin operation June 1st. The capacity of the plant for the present time will be twenty tons per day. The machinery will be elec-

trically operated and will require about 1,00 horse power which will be developed from power derived from the high voltage lines of the West Kootenay Power & Light Company.

It is reported that the ore body they have been prospecting for in the Ymir mine has been located, but the management is very quiet about the strike. Spokane men are expected up to examine the Yukon in a few days.

At the Giant mine, near Golden, an up-to-date Elmore oil process of concentration has been installed. It is expected that this improved process will be far ahead of the first plants installed.

The old ledge has been encountered on the Granite Poorman near here. The lessees have been making a good profit from ore taken from a new ledge and the strike now made will prove a good one. The car of ore shipped from the Slocan Sovereign, March 23rd, returned 90 ounces silver and 60 per cent. lead.

It is the general opinion here that the lead bounty will be extended all right, although nothing has been heard as yet regarding the matter. One reason advanced, and a good one, is that there is yet enough of the grant unused to run for a further period of six years, at the rate it was used during the last couple of years.

GENERAL MINING NEWS

NOVA SCOTIA.

Halifax.—The Lake View gold mine, at Waverly, has been sold by Mr. A. A. Hayward, to Mr. J. B. Woodworth, the discoverer of the Nova Scotia Cobalt mine. Mr. Woodworth represents a small syndicate of which Mr. O'Brien of the O'Brien Cobalt mine, is a member. The Lake View is a well-equipped mine. A considerable quantity of high grade gold ore is blocked out and some thousands of feet of development have been finished. It has lain idle for some years.

Mr. W. J. Prisk, formerly manager of the Dominion Antimony mine, West Gore, is now in charge of the Eagle Mining Company's property at Renfrew.

There are rumors of an English syndicate being formed to operate a group of Nova Scotia's gold mines. Definite news has not yet been received, but the concern is reported to be a responsible and large one.

Sydney.—Fire broke out on the evening of May 19th in the pipe shop of the Dominion Iron and Steel plant. The building was destroyed. The estimate loss is small and is covered by insurance.

ONTARIO.

Madoc.—Talc shipments from the Henderson talc mine are to be made within a few days. It is announced that the output of the mine will be largely increased.

Cobalt.—The main shaft of the Nova Scotia mine is down 160. The drifts are in good ore. About 60 men are employed.

The Foster mine has removed a part of its underground force with the intention of devoting more time and energy to prospecting the remainder of its territory. Only a small proportion of the Foster lot has been worked.

The Cobalt Central has leased the Bailey property. An arrangement has been made whereby the Bailey Company will receive 50 per cent. of the net production.

Sault Ste. Marie.—The power house of the Lake Superior Power Company was destroyed by fire on the morning of May 18. The estimated loss is $300,000, fully covered by insurance.

BRITISH COLUMBIA.

Fernie.—John Cattell, a machinist in the employ of the Crow's Nest Pass Coal Company at Coal Creek, was killed on May 6. In some manner he was caught and dragged underneath a mine locomotive. The engine and eight cars passed over him, mangling the body fearfully.

Nelson.—The Queen mine at Salino was sold on May 4th to an American syndicate. The purchasers are residents of the state of Wisconsin. The mine is to be worked at once. The price paid is reported to be $175,000. Of this $50,000 is to be paid cash down, the remainder in 30 months. The terms of purchase stipulate that work shall be continuous.

Rossland.—The second general meeting of the western branch of the Canadian Mining Institute was held in Rossland on May 14. The morning and afternoon sessions were attended by about fifty members. In the evening a smoker was held at the Rossland Club. Trail, Nelson, Grand Forks, Phoenix, Vancouver, Victoria and Northport were represented. Professors Dresser and Porter of McGill University were present. Mr. A. B. W. Hodges occupied the chair. The local council was increased. A resolution was passed requesting the Provincial Government to make a grant of money towards defraying the expenses of the British delegates who are to visit British Columbia next fall.

On May 15, the visitors were shown through the principal Rossland mines.

Phoenix.—There is rejoicing in Phoenix. The British Columbia Copper Company's mines and smelter are operating again. On May 6, work was started at the Mother Lode mine, Deadwood camp, and at the Emma and Oro Denoro mines, Summit camp. The smelter also is being got ready. The three furnaces will be blown in as soon as the ore bins are full. There is a large supply of coke on hand. The company has a contract for treating the ore from the Consolidated Company's Snowshoe mine. This will mean an addition to the payroll. It is hoped that the smelter will be able to handle about 2,000 tons of ore per day. During the first ten months of 1907, the British Columbia Copper mines shipped 242,788 tons of ore. The individual mines contributed to this total thus:—Mother Lode, 208,321 tons; Emma, 18,274 tons; Oro Denoro, 14,481 tons; B. C. mine, 1,712 tons.

Greenwood.—The plans for the long Greenwood-Phoenix tunnel are maturing. Work will be commenced before the first of June. When driven a mile, starting from Greenwood, it will tap seven mining properties, giving natural drainage and doing away with haulage and hoisting.

Victoria.—Mr. W. W. Leach of the Geological Survey, left Victoria for the Bulkley Valley in the Skeena river district. Mr. Leach will be accompanied by a party of six. He will return in October.

Atlin.—The Otter Creek Hydraulic Company will begin washing as early as weather permits. Messrs. Jamieson and Maluin are in charge.

YUKON.

Dawson.—Reports indicate that eighteen dredges will be operated in the Klondike,, Forty-Mile and Stewart River districts this season. The first electrical conveyor ever installed is to be used by the Goggenheims.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The South Wales and Monmouthshire coal owners have adopted the recommendation of the Royal Commissioners on Mines with respect to establishing rescue stations and definite steps have now been taken to proceed with the necessary building. The first station will be constructed at Aberaman, in the Aberdare valley, where officials and others will be trained in rescue work. The building will be equipped with Fleuss' apparatus and other appliances.

Mr. Richard A. S. Redmayne, M.Sc. F.G.S. has been appointed Chief Inspector of Mines. Mr. Redmayne, after a lengthy practical experience in responsible positions, has been professor of mining at Birmingham University since 1902, and is the author of several books on mining.

Lord Ardwell has given his decision in regard to miners' wages in Scotland to the effect that a reduction of 6¼ per cent. be made on the 1888 basis, which reduces present wages to 81¼ per cent.

FRANCE.

The zinc works of Mortagne are developing rapidly. After working for about two years and a half the production attained 8,500 tonnes in 1907, with six furnaces and 240 large retorts per furnace. The total zinc productions for last year was 49,000 tonnes and an increase of a few more thousand tonnes will supply the home demand for metallic zinc.

AUSTRIA-HUNGARY.

The Hungarian coal industry is very active owing to the growing demand and the scarcity of labor has resulted in increased wages and improved housing conditions. New shafts are being put down in several districts and prospecting is being energetically carried on.

RUSSIA.

American capitalists are endeavoring to secure control of the platinum industry of the Urals. Negotiations are on foot for the purchase by American interests of the Tagil factories, the Nizhe Pavdinsk properties of Vorobieff and others.

SOUTH AFRICA.

A Department of Mines and Works has been established in Southern Rhodesia, with Mr. E. W. S. Montague as secretary.

There are now 70 tube-mills in operation in the Transvaal which have largely increased the output. At the Luipaards Vlei Estate mine the duty per stamp per 24 hours is now 9.12 tons.

JAPAN.

The abundance of gold to be found in Satsuma has of late attracted the attention of capitalists. There are altogether 197 gold mines, or gold producing districts, many of which have been worked for a long time by hand digging on a small scale. The yield is roughly estimated at 3,000,000 yen a year. Modern methods are now being introduced including water power electricity for the operation of machinery.

AUSTRALASIA.

An important discovery of nitrate of soda has been made on the Grampas station in the Northern region of South Australia. This mineral is found as in Pern beneath a cap of guano. Samples show 24 to 29 per cent. of nitrate of ammonia.

A Geological Survey bulletin on the Great Fitzroy mine, Queensland, places the quantity of ore yielding gold, copper and silver in sight as over 600,000 tons.

A Sydney capitalist has determined to test the Gulgong district, New South Wales, where there were formerly rich alluvial diggings, for deep mining. He purchased several leases and is installing a plant.

Miners are prospecting the ridges northwest of Puranga station, New South Wales, for opal. Twelve years since opal was extracted in this neighborhood, but operations were not continued.

UNITED STATES.

Shipments of anthracite coal from Pennsylvania during April amounted to 5,987,221 tons, making a total of 20,875,474 tons since January 1st, as against 20,966,063 tons for the corresponding period last year.

The iron ore industry of the Lake Superior iron region continues depressed, and production is much restricted. Both the Chapin and Arragow mines of the United States Steel Sorporation, the two largest producers on the Menominee range, are being worked on half-time. There are scarcely a thousand men on the pay rolls, the normal force being about 1,600.

The large mines of Butte district, Montana, are gradually resuming the usual production, and there are few evidences of depression. Much attention is being given by operators to the reduction of the cost of production, and it is expected that several of the amalgamated properties will this year produce copper at a record low cost. The copper production of Butte for April was 21,530,250 pounds, being the largest since July last, when the output was 27,157,300 pounds.

The Copper River & Northwestern Railroad in Alaska is being pushed to completion. About 1,500 men are working on construction. The road is expected to reach the Catalla coal fields this year, and the Alaska Central, also under construction, will probably tap the Matanuska coal fields next season.

MEXICO.

The American Smelting & Refining Company will shortly blow in their smelter near Chihuahua. They expect to get about 15,000 tons of ore monthly from the Santa Sulalia district.

A strike of rich silver ore in the Bien Venido mine at Boruquillas in the Roncesvalles district, Chihuahua, has arroused great interest. Four tons of the ore netted $4,000. Many locations in the neighborhood have been taken up.

COMPANY REPORTS.

The Report of the Tilt Cove Copper Company, Limited, for the year ended December 31st, 1907:—The report of the Committee of Management, presented to the shareholders at the twentieth ordinary general meeting, held on May 14, at No. 9 Queen street place, London, shows, in the Profit and Loss account, a credit balance of £23,587 13s. 9d.

Copies of the reports and accounts presented by the Cape Copper Company at their last general meeting, embracing a description of the progress and result of their operations on this company's property for the twelve months ending August 31st, 1907, were sent out to each shareholder on the 28th of November, 1907. The Cape Copper Company's Tilt Cove establishment audited accounts for the year ending December 31st, 1907, are appended. They show that the mines made a gross profit of £58,609 11s. 5d., leaving, after charging the account with the rent (representing the interest on the debentures), prospecting

costs, management, etc., a net profit of £51,034 14s. 11d. The balance of profit thus remaining has been dealt with as follows: £25,517 7s. 5d., has been retained by the Cape Copper Company, and £25,517 7s. 6d. has been received by this company as its moiety of profit, as provided for in the agreement with the Cape Copper Company.

Although a profit of £51,034 14s. 11d. is shown on the Establishment account, that result is arrived at after the absorption of £38 2s. 4d., an increase in the amount retained for working capital, and this amount has been added to the capital expenditure on the one side of the account, and to the reserve for depreciation on the other, as heretofore.

Out of the available profit of £27,098 3s. 8d., £1,374 5s. 9d. has been paid in income tax, and interim dividend of 2s. 9d. per share was paid on December 3rd, 1907, and the committee now recommend a final dividend of 2s. 3d. per share, making a total distribution of 5s. per share, or 12½ per cent. for the year, leaving the sum of £3,473 17s. 11d. to be carried forward to the next account.

COMPANY NOTES.

The dividend of the International Coal and Coke Company has been reduced from the annual rate of eight per cent. to five per cent. Dividends were begun on the first day of February, 1907. The directors had hoped to wipe out the outstanding obligation of $200,000 by disposing of treasury stock. The uncertain and disturbed condition of the market made it impossible to do this. Hence the reduction in the dividend rate. The difference is to be applied to the liquidation of the indebtedness. The next quarterly dividend will be at the rate of one and one-quarter per cent.

The annual meeting of the Silver Leaf Mining Company, Limited, will be held at McConkey's, at 10 a.m. on June 2nd.

STATISTICS AND RETURNS.

The output of the Crow's Nest Pass collieries for the week ending May 22 was 10,950 tons, or a daily average of 1,825 tons.

The Crow's Nest Pass Coal Company, Limited, report the output of the collieries for the week ending May 15th, as 19,385 tons, a daily average of 3,231 tons.

COBALT ORE SHIPMENTS.

Following are the weekly shipments from Cobalt camp, and those from January 1st to date:

	Week end. May 16.	Since Jan. 1.
Buffalo	.....	563,810
Coniagas	.....	830,910
Cobalt Lake	65,845	246,455
Crown Reserve	.....	40,000
Cobalt Central	49,200	156,380
City of Cobalt	.....	338,600
Drummond	.....	92,340
Foster	.....	238,400
Kerr Lake	61,960	392,270
King Edward	.....	127,240
La Rose	80,000	1,981,652
McKinley	60,000	1,243,900
Nipissing	133,020	1,316,920
Nova Scotia	106,765	227,555
Nancy Helen	.....	140,420
O'Brien	63,800	1,826,370
Right of Way	60,500	181,180
Provincial	.....	143,210
Standard	.....	39,730
Silver Queen	.....	524,200
Silver Cliff	.....	52,000
Silver Leaf	.....	132,800
Townsite	.....	85,100
Temiskaming & H. B.	60,000	599,000
Temiskaming	88,140	325,390
Trethewey	.....	679,916
Watts	66,000	180,430

The total shipments for the week were 895,230 pounds, or 447 tons. The total shipments from January 1st to date are 12,304,448 pounds, or 6,152 tons.

Following are the weekly shipments from Cobalt camp, and those from January 1st, to date:

	Week end. May 9.	Since Jan. 1.
Buffalo	46,290	563,810
Foster	69,800	238,400
La Rose	40,000	1,901,652
McKinley	60,000	1,183,900
Nipissing	122,240	1,230,870
O'Brien	127,500	1,763,070
Right of Way	60,470	120,680

The total shipments for the week were 526,300 pounds, or 263 tons.

The coal shipments of the Nova Scotia Steel and Coal Company for the four months are as follows:

Shipments, April, 1908	38,000
Shipments, April, 1907	33,450
Increase, April, 1908.	4,550
Shipments, 4 months, 1908	155,737
Shipments, 4 months, 1907	120,279
Increase, 4 months, 1908	35,458

BRITISH COLUMBIA SHIPMENTS.

Following are the shipments for the week ended May 2nd, and year to date:

Boundary shipments—

	Week	Year
Granby	19,942	354,472
Other mines	.....	462
Total	19,942	354,934
Rossland shipments—		
Total	6,076	96,847
Slocan-Kootenay shipments—		
Total	1,086	37,834

The total shipments for the past week were 27,104 and for the year to date 489,615 tons.

Granby Smelter receipts—		
Granby	19,942	354,472
Consolidated Company's receipts—		
Total	5,006	93,008

Le Roi Smelter receipts—

Total	2,359	28,776

The total receipts at the various smelters for the past week were 27,307 tons and for the year to date 381,986 tons.

Following are the shipments for the week ended May 9th, and the year to date:

	Week	Year
Boundary shipments—		
Total	23,203	278,137
Rosland shipments—		
Total	5,589	102,436
Slocan-Kootenay shipments—		
Total	1,110	38,944

The total shipments for the past week were 29,902 and for the year to date 519,517 tons.

Granby Smelter receipts—		
Granby	23,173	377,645
Consolidated Company's receipts—		
Total	6,308	99,316
Le Roi Smelter receipts—		
Total	1,346	30,122

The total receipts at the various smelters for the past week were 30,827 tons and for the year to date 512,813 tons.

Following are the shipments for the week ending May 16th and the year to date:

Mine	Week	Year
Boundary shipments—		
Granby	24,309	401,954
Other mines		492
Total	24,309	402,446
Rossland shipments—		
Centre Star	3,744	65,733
Le Roi	1,518	29,949
Le Roi No. 2	508	12,024
Bluebird	53	53
Other mines		500
Total	5,823	108,259
Slocan-Kootenay shipments—		
St. Eugene	251	8,649
Whitewater, milled	280	5,460
Poorman, milled	250	4,100
Queen, milled	185	3,505
Second Relief, milled	145	1,955
North Star	30	1,162
Richmond Eureka	86	635
Rambler Cariboo	43	545
Vancouver	47	501
Ruby	40	181
Slocan Star	65	128
Granite	31	100
Other mines		13,476
Total	1,453	40,397

The total shipments for the past week were 31,585 and for the year to date 551,102 tons.

Granby smelter receipts—		
Granby	24,309	401,954
Consolidated Company's receipts—		
Total	5,801	105,117
Le Roi Smelter receipts—		
Le Roi	1,518	29,929
First Thought	313	1,709
Other mines		235
Total	1,841	31,953

The total receipts at the various smelters for the past week were 31,951 tons and for the year to date 544,754 tons.

Messrs. L. Vogelstein and Company of New York, report the following figures of German consumption of foreign copper for the period January to March, 1908:—

	Tons.
Imports of copper	44,914
Exports of copper	2,084
Consumption of copper	42,830

Of the above quantity 41,999 tons were imported from the United States. The consumption for the same period in 1907 was 24,393 tons.

MARKET REPORTS.

Coke.

May 22—Connellsville coke, f.o.b. ovens—
Furnace coke, prompt, $1.55 to $1.65.
Foundry coke, prompt, $2.10 to $2.25.

Pig Iron.

May 22, Pittsburg—
No. 2 foundry, $15.40 to $15.65.
Bessemer, $16.90 to $17.15.
Basic, $15.90 to $16.15.
Malleable, $15.90 to $16.40.
Southern No. 2, $16.40 to $16.90.

Other Metals.

May 22—
Tin, Straits, 29.55 cents.
Copper, prime lake, 13 cents.
Lake, arsenical brands, 12.85 to 12.95 cents.
Electrolytic copper, 12.85 to 12.90 cents.
Sheet copper, 17 cents.
Copper wire, 14.75 cents.
Lead, 4.35 cents.
Spelter, 4.65 cents.
Sheet zinc, 7.50 cents.
Antimony, Cookson's, 8.75 cents.
Aluminium, 33 to 35 cents.
Nickel, 45 to 47 cents.
Platinum, $23 to $25.50 per ounce.
Bismuth, $1.75 per pound.
Quicksilver, $45 per 75 pound flask.

Silver Prices.

	New York. Cents.	London. Pence.
May 11	52½	24 3-16
May 12	52¼	24 1-16
May 13	52⅜	24⅛
May 14	52⅝	24¼
May 15	52½	24 3-16
May 16	52⅝	24¼
May 18	52⅞	24⅜
May 19	52⅞	24⅜
May 20	53⅛	24½
May 21	53½	24 11-16
May 22	53⅞	24 13-16
May 23	53	24 7-16

MARKET NOTES.

Steel prices are not to be reduced. The manufacturers have agreed to sustain the prices now current.

Of late the copper market has strengthened materially. American buying has induced renewed activity in Europe. Apparently there is little doubt that the tide has turned. Orders are being placed rapidly and the whole situation has brightened.