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## The Canadian Mining Journal

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#### MINES BRANCH SUMMARY REPORT.

The summary report of the Mines Branch of the Department of Mines, Ottawa, for the calendar year ending December 31st, 1911, has just been received. During that year, according to the statement of the director, Dr. Eugene Haanel, four technical officers have been added to the regular staff, and three clerks to the non-technical staff. There are now nine divisions, each under a chief officer and all fully organized, except that of the explosives division. Mr. J. G. S. Hudson is the only officer assigned to this division, nor will additions be made until the proposed Explosives Bill shall have become law. That there is dire need of a restrictive law is becoming more and more evident every day. It is to be hoped, therefore, that the Mines Branch will very soon be enabled to complete this important part of its organization.

The preliminary reports on field work deal with a large variety of subjects—the building stones of the Maritime Provinces, the nickel industry, copper and pyrites, iron ore, Canadian markets for mineral products, gypsum and salt, feldspar and phosphite, moisture in fuels, explosions, statistics, etc.

It is a matter for congratulation that the Mines Branch is now comfortably and adequately housed in the building formerly occupied by the Geological Survey Branch. This old structure, whose walls are more than ordinarily sound, has been completely reconstructed inside, has been added to, and has, moreover, been most ingeniously adapted to the needs of the Mine Branch. Its convenient situation is a great advantage. Instead of occupying parts of five scattered buildings, the Mines Branch staff is now consolidated under one ample roof.

Reference is made by the director to an arrangement entered into by the branch with the Kingston School of Mining. Under this arrangement the School of Mining has undertaken to carry on for the Mines Branch certain metallurgical investigations "of a directly economic character." Dr. Herbert T. Kalmus, formerly of the Massachusetts Institute of Technology, has been chosen to direct this work. The investigations will cover the uses of cobalt and its alloys, the uses of nickel copper iron alloys, and the electrical smelting of iron ores.

The Mines Branch, judging from the summary report, is making a vigorous attempt to widen its sphere of usefulness and to direct its efforts in channels of economic importance.

#### DREAMS.

The Standard Coal Company of British Columbia, if one may believe Mr. W. F. Alloway, jr, trustee, is a

wonderful concern, and evidently differs in many radical respects from the usual Canadian coal company. The advertisement of the flotation of this remarkable corporation has for some time past been appearing in the financial advertisements of the Montreal Star and occupies a full quarter page. The "trustee" must be a benevolent person to spend so much good money in advertising so unusual an opportunity to make money quickly and easily. The caption of the ad. reads: "Hundreds are Homeless," words that at first sight do not seem germane to the prospectus of a coal mining "corporation." Upon reading further, however, it is learned that many persons are to-day homeless and impecunious who might have been wealthy had they, in their youth, made judicious investments in the first stock offerings of successful Canadian companies. Such investments, for instance, as the Standard Coal Company. The statement is made that any person who had invested ten dollars in the common stock of the Crow's Nest Pass Coal Company would at the present time be worth \$38,000, had he retained his original holding. It would be interesting to have corroboration of this extraordinary appreciation in value from a shareholder of the Crow's Nest Pass Coal Company.

One gem of the advertisement—it is hardly correct to use the word "prospectus"—should be reproduced in full for the encouragement of despondent coal operators. It reads as follows:

"Right in the Province of Quebec to-day are many men who have amassed millions through coal operations. Even the small merchant who sells coal in a retail way attests to the profit he is making from the air of independence attendant upon his business, because coal is mined at a big profit and sold at a fair margin, and the price is controlled by the operator, not the retailer."

Many coal operators will be glad to learn that they control the price of coal, as this particular point has often worried them. They never would have suspected the fact.

The "trustee's" advertisement is as good as an encyclopedia. We learn that British Columbia has the largest mines in Canada, and that her coal deposits are "the greatest in extent in all America." This is certainly great news.

The advertisement further states that the Standard Coal Company's property embraces "thirteen square miles of coal lands under licenses from the Provincial Government at Vancouver, situated as follows:

"No. 1 mine—Six square miles on deep sea, Skidegate Inlet, Graham Island.

"No. 2 mine—Seven square miles on the east coast of Graham Island near Cape Ball, fronting on deep sea."

Nothing is stated regarding the thickness, quality or number of coal seams, of the pitch of the measures, or the conditions expected to be found in the operation of mining, and it is difficult to gather from the foregoing description of the properties whether No. 1 mine or No. 2 mine, are mines or areas. There is quite a difference

between coal lands and a developed "mine," although many of those who subscribe for the stock of the Standard Coal Company will in all probability be incapable of appreciating the distinction.

Reading further one may gather that the directors of the company visited the property, and one of them spoke to the press representatives of Vancouver in "most glowing terms," stating from his own deductions "unconditionally and irretrievably that the property is destined to be one of the greatest coal properties in Canada." The wording of this emphatic opinion is peculiar, but what more could an investor desire than an "irretrievable opinion"?

The "trustee" who is "well and favourably known throughout the west and east, offers for sale shares held by him in the Standard Coal Company (par value of each share \$1) at the present ground floor price of 25 cents per share." It is intimated that the price of shares will shortly advance to 35 or 40 cents in the very near future.

After this, who would be poor? It may be significant that the address of the trustee is in the Orpheum Theatre Building, Montreal. The man who hopes to obtain \$38,000 in seventeen years on a ten dollar investment should expend his money in vaudeville. He will get much better value.

#### FOOLISH CRITICISMS.

A prominent Nova Scotian educationist, speaking in Prince Edward Island, was responsible for the following: "We have depleted our soil partly ruined our fisheries, pawned our coal mines to monopolists, who take heavy toll."

This is typical of the over statements of the uninformed, the glittering generality of the casual observer. We would like to ask that educationist what he has to suggest concerning Nova Scotia's coal mines. Where, for example, will he find more competent mining and more adequate equipment than in Cape Breton? How would he propose to operate these mines if the corporations stepped out? Whom could he induce to take hold of the co-ordinated industries of coal mining and iron smelting? In other words, what possible constructive suggestion has he to make? What possible good can he hope to effect by talk of this kind?

#### THE HOLLINGER STATEMENT.

The interim statement issued late in October by the Hollinger Gold Mines, Limited, shows a highly gratifying condition of affairs. The statement accompanied dividend cheques, the first of what are to be monthly 3 per cent. payments.

President Timmins is responsible for the statement that profits are now being made at the rate of \$40,000 per week. As all expenditure, up to July 1st, 1912, was charged to capital account, this weekly profit looks healthy.

One of the best features of the Hollinger policy is the

fact that information is to be given promptly and regularly to the public. It is a matter of regret that this course is not pursued by all other mining companies. Nothing can be gained by secrecy. In fact, much may be lost. Unauthenticated rumours do harm. The corrective is to take the public into the confidence of the management.

The statements that about 20,000 tons of ore have yielded an average of \$19.70 per ton, that 5,777 tons of stoped ore contained \$37.89 per ton, that the mill is now treating 300 tons per day, and that an extraction of 97 per cent. has been obtained, are remarkably cheer-

ing. They vindicate the general accuracy of Mr. Robbins' first report. Apparently there have been no disappointments in the matter of the gold contents of the ore.

With a surplus of about half a million dollars, earned since July 1st, of this year, the Hollinger is unquestionably in a position to pay dividends, provided, of course, that the ore reserves also warrant the step. This, until Mr. Robbins' next annual report, we may well take for granted.

The Hollinger has given Porcupine standing and dignity in the eyes of the public.

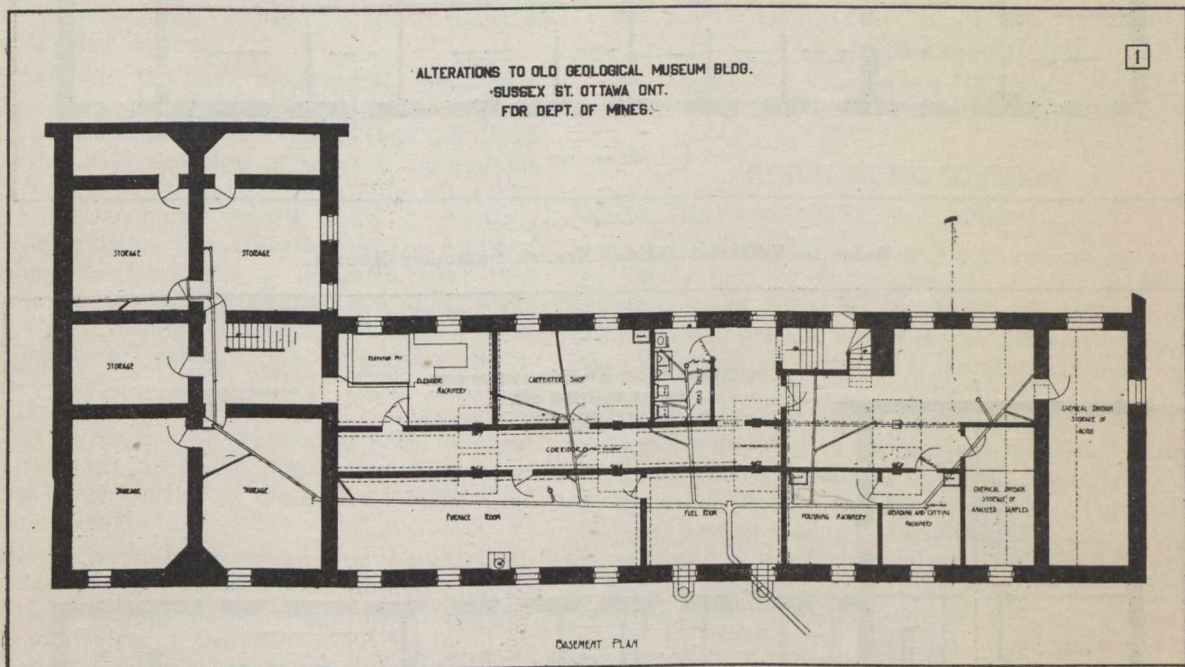


Fig. 1 - New Headquarters of the Mines Branch

Refer to Editorial—Mines Branch Summary Report.

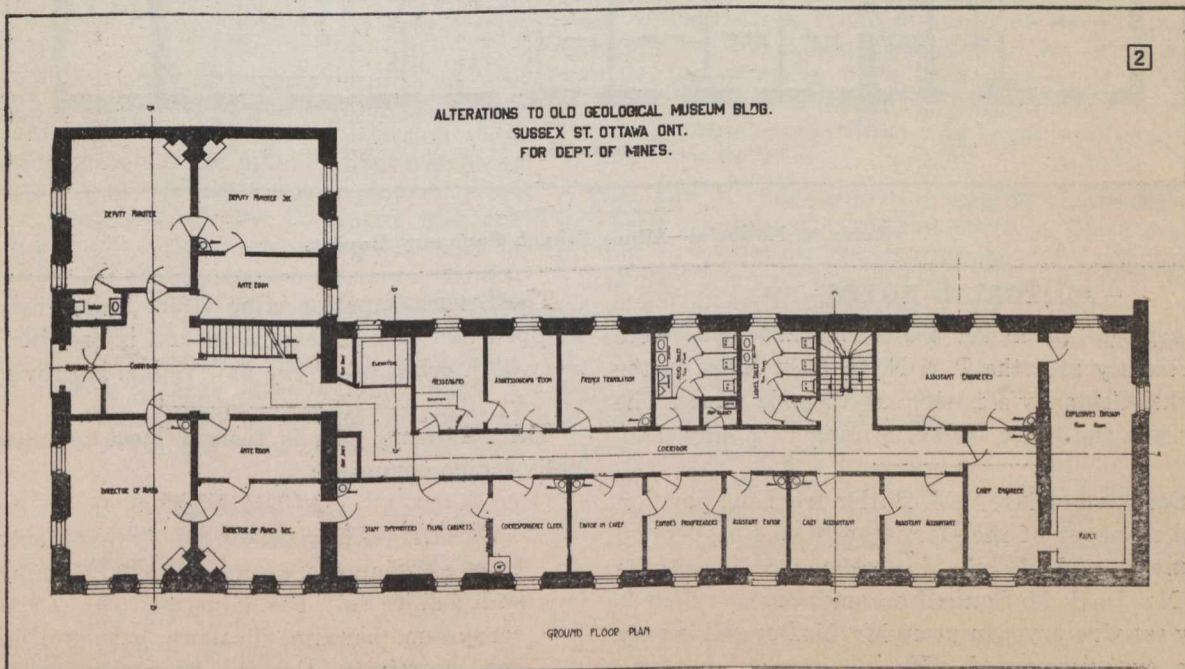


Fig. 2 - New Headquarters of the Mines Branch

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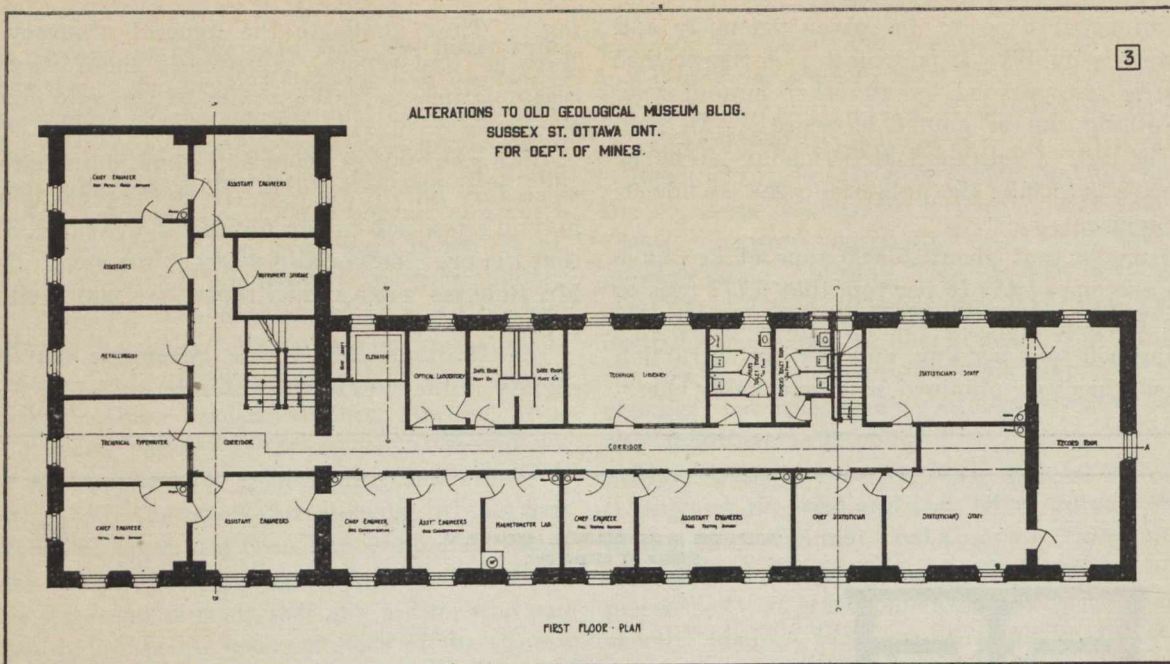


Fig. 3.—New Headquarters of the Mines Branch

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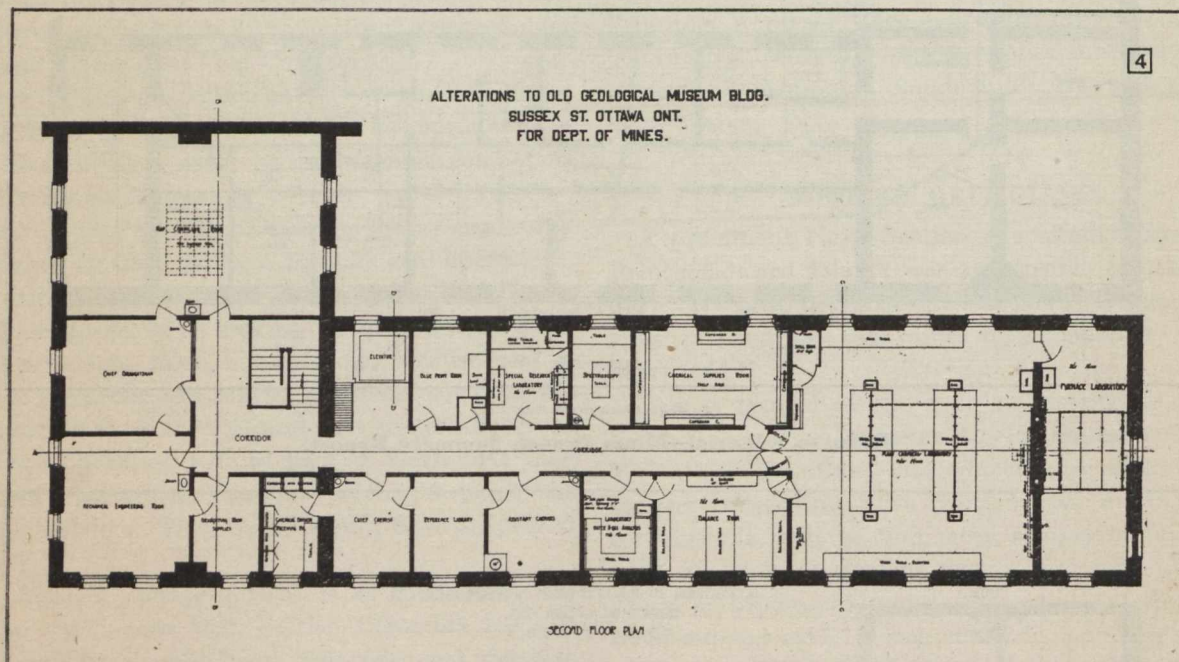


Fig. 4.—New Headquarters of the Mines Branch

Refer to Editorial—Mines Branch Summary Report.

**EDITORIAL NOTES.**

Seven carloads of nickel ore, about 295 tons, were shipped recently over the T. & N. O. from Kelso to the Mono Nickel Company's smelter at Victoria mines. The consigner was the Kelso Nickel Mining Company, Ltd.

The resignation of Mr. M. J. Butler from the position of general manager of the Dominion Steel Corporation was not unexpected. While his absence will be felt, the fact that Mr. D. H. McDougall becomes his successor is extremely satisfactory. In years Mr. McDougall is very young, in experience, old. He has worked his way through many of the departments of the Corporation and has won and held the confidence of his superiors.

The Seneca-Superior mine (Cart Lake) has already shipped two cars of screenings and is bagging a car of very high grade ore. The new vein is improving.

The following gem is from a local newspaper. It calls for no comment:

**ALUMINUM.**

Chemist—Aluminum is chiefly manufactured from aluminum ore. It contains 11 minerals and 3 silicates. The minerals are: Cryolite, corundum, bauxite, diaspore, gibbsite, alunogen, aluminite, alumite, turquoise, wavellite and lazulite. The silicates: Kaolin, feldspar and mica.

## CORRESPONDENCE

### EXPLOSIONS FROM FALLS OF ROOF IN MINES.

Editor The Canadian Mining Journal.

On returning to this city the writer finds your edition of the 15th inst., which contains voluminous extracts from a paper entitled the "Bellevue Explosions, Alberta, Canada; an account of and subsequent investigation concerning Three Explosions produced by sparks from falls of roof." This paper was read at the September meeting of the Institute of Mining Engineers in England. Although the writer has already sent on some notes on it to the Institute named, yet he thinks that a few further remarks may not be out of place in the columns of your Journal.

The authors appear to have been mainly bent on a campaign to refute the "views" of one mining engineer, who had the temerity to suggest that the disaster of Dec. 9th, 1910, was due to what is termed his "percussion theory." It may be pointedly remarked that although the authors, Messrs. John T. Stirling, Chief Inspector of Mines for Alberta, and Dr. Cadman of Birmingham, England, are so cocksure that that theorist was wrong, yet they cannot get along with their own theories without accepting his assumption, that the "originating" cause of all three disasters referred to was due primarily to falls of roof. Why the authors suppress the theorist's name is best known to themselves, but as he is well known to both of them his identity need not be hidden, and therefore he is glad to acknowledge himself as the active "father" of the "percussion theory."

Unfortunately, the plan accompanying the Stirling-Cadman paper is not reproduced in your Journal, but its importance will be readily understood when it is stated that the fatal explosion of Dec. 9th, 1910, is placed as occurring at a point in the mine where an assistant inspector of mines reported in writing the day before the disaster that it was clear from gas. The writer ventures to say that the fall of roof originating the first disaster did not occur where shown on the plan accompanying the paper.

The authors do not seem to have taken into account that there were quantities of explosive and detonators in the mine, and also that on the first occasion there was a missed shot in one of the pillars which was being drawn. Whether or not this shot was exploded by the crushing of the pillar cannot now be stated with certainty, but the fact remains, and the query may be extended further by asking what became of the explosives and detonators which were in the mine on the second and third occasions?

The fatuous man, who wilfully made the dangerous experiment of rolling a large piece of rock down a chute for the fun of seeing the fireworks, forgot that the Act of Parliament scarcely countenances that sort of horse play.

With respect to the Draeger apparatus, Alderson is said to have lost his life through some leak—the fact is that he was not wearing any apparatus, and therefore could not suffer from any leakage. In the paper the Draeger apparatus is credited with being instrumental in saving 14 lives, whereas only two were thus saved.

The greatest value of a paper such as the one now referred to would have been in suggestions for the

future safe working of this and similar mines, but we are not told what remedies are in force, excepting as temporary expedients, and the authors decline to discuss the subject of filling the goaf spaces from the surface. The paper, in the writer's opinion, fails entirely to throw any fresh light on the Bellevue disasters.

In conclusion, although the theory of "percussion," or, as some prefer to call it, "compression," is practically sneered at, yet the authors have carefully avoided any consideration of the force which blew out a wall of rock six feet in thickness in No. 4 cross pitch.

Your etc.,

JAMES ASHWORTH,

930 Drake St., Vancouver, B.C., Oct. 28th, 1912.

### STILL MORE HISTORY.

Editor The Canadian Mining Journal.

Sir,—Dr. Barlow has avoided the issue by omitting the latter half of the statement I quoted from the article entitled "The Special Research, etc., etc." The complete sentence is, "McGill was the first of the Canadian universities to give instruction in mining and metallurgy as a regular course in 1871, and again the first to create and equip an independent department exclusively devoted to the subject in 1896." Dr. Barlow omits the part printed in black, the only part definitely called in question by my letter. The emphasis on "practical provision" is sufficiently clear. The facts are as stated in my former letter. The Kingston School of Mining was "the first to create and equip an independent department exclusively devoted to the subject." In 1893-4, it was in the hands of Colonel William Hamilton Merritt, a graduate of the Royal School of Mines, London. He was succeeded by Prof. Courtenay DeKalb, and both of these men confined themselves strictly to mining and metallurgy as subjects of instruction. The building of the Mining Laboratory in 1894 made possible for the first time in Canada, the carrying on of such large-scale investigations as the concentration of the Ontario corundum rock, a piece of work which was begun and completed in this laboratory.

That McGill had a course in mining before 1893 has not been questioned; and that some of the graduates of that early period are distinguished in mining and metallurgy is a well-known fact. How would it do for Queen's University to set up a claim to early educational work in mining and metallurgy on the ground that she graduated in 1858 Dr. James Douglas, President of the Phelps Dodge Co., and an acknowledged leader in mining and metallurgy?

If Dr. Barlow really wishes to give "honour to whom it is due" he will write in reply to this a nice letter acknowledging that it was the rather surprising progress of the School of Mining which moved the McGill authorities to improve their facilities for the study of mining and metallurgy. I am,

Yours sincerely,

W. L. GOODWIN,

School of Mining.

Kingston, Ont., Nov 6, 1912.

### THE EIGHT-HOUR DAY IN MINING.

Editor The Canadian Mining Journal.

Sir,—In your issues of 1st and 15th inst., you deal with the eight-hour day applied to mining.

In considering this question it is important to understand thoroughly that metal mining is the business of extracting metals from their ores and making them marketable at a profit. In accomplishing this, we must also bear in mind the professional and trade relationship that must necessarily exist between the human factor and the economic factor.

We have not only to extract metals from their ores at a profit and make them ready for market, but we must also conduct the various operations of exploration, mining, ore treatment, etc., in a thoroughly safe and workmanlike manner. We have, therefore, to consider the economic feature on the one hand, and the quality of work and the ease and comfort with which it is performed by the individuals in the industry, on the other.

You observe that "if the eight-hour day entails loss upon mine owners, and if the change brings a diminution of output the mine-owners are amply justified in demanding full consideration of their rights" (namely, the retention of a longer day than an eight-hour day). This contention is not sound.

Mining is (barring the discovery of an orebody) practically an uncompetitive business. The forces and the agencies of nature place orebodies in certain places for our exploitation. If an orebody is a profitable mining venture it usually has sufficient metal content within a given area to warrant its extraction regardless of an eight or ten-hour day and regardless of twenty-five cents per hour or thirty cents per hour paid to workmen. There is an irreducible minimum metal content in a commercial orebody which it will pay the industry to recognize. This metal content is such that neither an eight, nine or ten-hour day, or twenty-five or thirty-two and a half cent per hour wage will substantially alter the profit resulting therefrom.

Any vein or formation indicating ore which does not contain this minimum volume of metal, which makes it a mineable venture, is not worth bothering about under a day of any number of hours or a wage of any number of cents—within certain fixed limits. It is, therefore, not worth mining at all, and only worth a certain amount of exploration to prove its unprofitableness. The fact that many companies or individuals will mine any old orebody is no valid argument that the trained employees of an industry should be compelled to work ten hours per day or nine hours per day, or even eight hours per day, to justify the misjudgment of an operator.

Your first editorial deals largely with a letter written by the Cobalt mine managers to Mr. Price, Mining Commissioner. Before discussing this editorial more closely let us look for a moment at the eight-hour principle as applied to metal mining. This eight-hour day has been universally adopted in the Australian States. It has been adopted in many States of Western America, and in other places, and, where adopted, this statement is axiomatic: "That where the tradesmen engaged in mining are properly and systematically trained to their business and working under a systematized eight-hour day the costs of production on given orebodies are lower and the metal content recovered higher than under any other circumstance, always understanding that the human units and the mechanical units of the trade must be given certain irreducible minimum considerations in the form of fixed wages,

fixed hours of work, and fixed compensation for injury." When we have appreciated this we are forced to agree with the editor of The Canadian Mining Journal when he says that in "principle the eight-hour day is sound."

In your editorial of Oct. 1st you note that the mine managers of Cobalt claim that the Cobalt miners are well paid, better, indeed, than any other mining region of Canada. This may be true, or it may not be true. Relatively, it is a matter of little importance, because mining is not concerned, primarily, with the rate of pay that miners receive, but the volume of profit that results from industrial mining. It is hard to follow the statement that miners would lose from fifty to sixty-five cents per day if the work-day be reduced to eight hours. It is not manifestly unfair for a man to demand the same remuneration for eight hours as he receives for ten. The remuneration should depend entirely upon the production per man employed.

The statement that the cost of prospecting and working unproductive claims renders the final cost of silver generally above the market value has nothing whatever to do with the exploitation of the orebody and, therefore, cannot enter into the merits or demerits of an eight-hour day. If individuals will explore ground (the result of which are doomed to failure from the outset) they cannot demand recognition from a systematized industry. Territory which has been explored and has failed to disclose profitable orebodies will, however, have to be considered, and will be a properly borne charge upon the existing profitable industry. But it cannot be accorded other labor considerations than those given to profitable territory.

Severe climatic conditions are the very best reason for considering to a great extent the human element in the industry.

The sixth point taken up by the mine managers, that underground work is not injurious to miners' health is not in accordance with established facts anywhere. Mining is not the most healthful of occupations. The powder gases, dust from machine drilling, and the other disabilities, such as water, etc., which miners are compelled constantly to work in contact with, are reasons why they should be well paid and not worked too long at any one period. Their occupation (statistics to the contrary notwithstanding) is always dangerous, hence the recognized higher rates of pay than many other callings.

The seventh reason taken up in your editorial is the real reason for an eight-hour day. Mining labor in Northern Ontario is probably not so well organized as in the Western States, and, therefore, mining is conducted not so economically as in the Western States, and, therefore, miners of Ontario are compelled to work longer hours through lack of experience in their trade and through lack of systematization in their work.

For an eight-hour day to be successful every man employed upon a mine must be thoroughly trained and thoroughly systematized as to his work. Mine managers themselves, their deputies or foremen, are those who are responsible for the proper training and selection of their workmen; the manager and engineer are the men responsible for the proper systematization of their effort. Given skill and given systematization, the eight-hour day, wherever applied in metal mining, is a more profitable day to the owner and a more humane day to the employee than any longer day still used. Generally speaking, where metal mining is conducted by a nine or ten-hour day, there is the clearest

kind of evidence that the workmen and the system under which they work are not the best obtainable. Where the eight-hour day is in existence on this continent there you will find the best-trained men of the industry, and under similar conditions you will find the cost of production and operation as low, if not lower, than elsewhere. Incompetent labour and unduly long hours produce inefficient work, with resulting loss of ore and unsafe working conditions. This is the real argument for an eight-hour day. It is easy on the manager, easier on the men, and easiest on the mine.

What possible justification is there for a man going to work when daylight is breaking and quitting work when daylight is ceasing in order to do a certain given amount of work, which can be done under proper organization in much less time? Why fiddle with the function of the astronomer and throw the hands of the clock back a certain amount each week during the winter season so that you may collect all the daylight that nature furnishes into the miners' workday? This is an admission of weakness and lack of system, and should be promptly and thoroughly abolished by all mine-owners of the province.

You fail to state, Mr. Editor, where the eight-hour day applied to metal mining has been applied unsuccessfully. Special conditions, of course, limit its profitable application. These special conditions are usually lack of orebodies. It is hard even yet to convince most operators that it is no use operating without a condition that gives hope of real orebodies. You are not only wasting your own time, but that of the workmen also.

In your editorial of Oct. 15th, I must take issue with you when you say the interests of the owners and employees are identical. The interests of the owner and employees are friendly, yet opposed. The interest of the owner is to mine profitably, and that is usually the only interest he has in the business of mining. The interest of the employee, on the other hand, is to obtain employment at this trade in order to secure a living and to obtain the highest remuneration for the shortest possible number of hours of work. Their interests, therefore, are antagonistic, except that probably the interests of the owners and employees are identical in so far that both are desirous of seeing the work well done. We are, therefore, justified in saying that the trade and professional interests of owners and employees are identical, but that their economic interests

are distinctly opposed. The question then resolves itself into this: As the interests of the owners and employees are antagonistic, is it desirable (from an economic standpoint) to introduce the eight-hour day into the metal mines of Ontario? My contention is that the eight-hour day, established with well-trained men and system, will give greater output per man than a nine or ten-hour day. It is, therefore, expedient to adopt it. It will also tend to more pronounced organization, and, where organization becomes more perfect, the quality of work becomes still better. This is a second reason for its adoption.

Work has been expensive in Ontario in the past through mistakes made by operators and by ill-trained employees. None of these faults can be attributed to the eight-hour day. As you stated, Mr. Editor, that the eight-hour day is sound in principle, why not adopt it? If this proposition is sound in principle that is the greatest argument for its adoption.

You say that a fact generally overlooked is that a considerable portion of the miners do not want an eight-hour day. If you will poll the miners that are trained, intelligent tradesmen it will be found they will to a man favour the eight-hour day. Whether any other trade or industry be not as fortunately situated as mining, as to hours and rates of pay, is not the question. We are not dealing with the farmer or the shoemaker, or the tailor, but with the mining industry, and if the eight-hour day will benefit this industry and render its operations less crude, less expensive, and its profits and productions greater, then nothing should stand in the way of its adoption.

In speaking of the miner, I am also speaking of the mill-men, smelter-men and of all other persons employed in or about mines.

It is well-known to those of us who are amalgamators that no man is efficient as an amalgamator if he has to work for twelve hours per day. Companies that insist upon their employees working twelve hours per day in mills do so to their own economic disadvantage. It is useless in a letter of this kind to go into a discussion as to why this is so. This Journal is read by men trained to the industry of mining and metallurgy, and this fact must be patent to them without further discussion.

Your, etc.,

MINER.

Toronto, Oct. 24th, 1912.

## THE SEMI-ANNUAL MEETING OF THE CANADIAN MINING INSTITUTE.

(Continued from last issue.)

### THE PRESIDENT'S ADDRESS.

The President, Dr. Barlow, then delivered the following address:—

"I find by the agenda which our Secretary has placed before me that I am expected to make a few remarks. Canada is a country of such enormous extent, and its interests are so varied and so widely separated that it is of vital importance that we should come together at times to discuss our common problems, if the Canadian Mining Institute is to remain as thoroughly representative and national as it is at present.

"It was mainly with this view in mind, but coupled with the cordial invitation of the British Columbia members, that we decided to hold our first semi-annual meeting in Victoria. Moreover, we realized that although the present time of year, although it has certain disadvantages, was really the best at which to call such a gathering. Among the several matters of Institute business which should be discussed at this meeting are the proposed amendments to the by-laws, which, on the ruling of the President at the last annual meeting, were declared out of order, owing to insufficient notice.

At the same meeting we were rather startled by the statement of the Secretary of the Western Branch that the Western members had not heard of these amendments until after their arrival in Toronto. In the circumstances, therefore, it is important that these amendments to the by-laws, which are to be presented to the next annual meeting by a representative committee, should receive careful consideration by all the members present at this gathering.

"I would like to remark on the continued prosperous condition of the mineral industry of Canada. The annual production shows a steady and very healthy increase. Although the production in certain sections in any year may be curtailed, such decrease is more than compensated by a corresponding increase in other portions of the country.

"In Nova Scotia, I regret to say that, in spite of repeated attempts to rehabilitate gold mining, the industry continues to decline, and I very much doubt if we can hope in the near future for any large revenue from this source to swell the annual production. The decrease in gold mining, however, serves in a measure to direct attention to the large increase in the production of coal, which this year will be the largest in the history of the province.

"New Brunswick has not yet attained to an important position as a mineral-producing province, although there is promise of the establishment of an iron industry of substantial proportions in the Bathurst District. The oil and gas found near Moncton will soon be utilized to build up a large industrial centre at that place.

"The Province of Quebec shows a steady and substantial increase in mineral products. In 1899 the value of these amounted to \$2,585,635, while in 1911 this value has increased to \$9,087,698, or 251.5 per cent., a proportional progress only exceeded by that of Ontario in a similar period (334.5 per cent.). The recent very large addition to the territory of Quebec, most of which is underlain by rocks of pre-Canadian age, gives promise of much larger proportional increase. Until lately Quebec comprised an area of 352,000 square miles. This area, in May, 1912, was more than 706,834 square miles by the addition of Ungava. Only a very small proportion of this territory has been explored by prospectors. In spite of over-capitalization and over-production in the asbestos industry of Quebec, the shipments in 1911 were higher than in 1910, although the quantity of rock mined was 13.10 per cent. less in 1911 than in 1910. A proportion of the shipments was drawn from stocks in hand. In 1910, 80,605 tons were shipped, valued at \$2,667,829, while in 1911 this amount had increased to 102,224 tons, valued at \$3,026,306. The balance between output and shipment is slowly readjusting itself, so that there is a notable improvement in the asbestos situation. Quebec now contributes more than 75 per cent. of the world's total production of asbestos. Quebec has also the unique distinction of having the deepest copper mine in Canada, the Eustis Mine being now down nearly 3,000 feet on the slope. The copper situation is improved, too, by the addition of the McDonald Mine at Weedon to the list of shippers. This mine is now producing at the rate of over 2,000 tons per month of ore, which averages over 42 per cent. of sulphur and 5 per cent. of copper, with negligible quantities of gold and silver.

"Ontario has now taken her place as premier province in mining of the Dominion, having passed British Columbia about three years ago. The production,

which, in 1909, amounted to \$32,981,375, grew to \$39,313,895 in 1910, and \$42,672,904 in 1911. If this same rate of growth is maintained the value of the mineral production for 1912 will be over \$45,000,000. For the twelve years, ending in 1911, the proportional increase has been 334.5 per cent., while in the same period British Columbia shows an increase of 67.9 per cent., and the whole Dominion of Canada 107.7 per cent. With the recent addition of the District of Patricia, containing 157,400 square miles, Ontario now has an area of 407,262 square miles. The geology of the District of Patricia presents about the same features as does that of the region hitherto known as Northern Ontario, being underlain mainly with rocks of the pre-Cambrian age. Public attention has been directed to Ontario as a mining province for many years past, and ample capital has been provided, mainly by private effort, for its intelligent exploration and prospecting. Nowhere in Canada are there so many or more intelligent and resourceful prospectors, so that the great area of hitherto unprospected country is receiving capable examination. It seems certain, therefore, that Ontario must, in these circumstances, hold her position as the foremost mining province for many years to come.

"In Alberta the development of the coal industry in recent years has been astonishingly rapid. The progress this year is being more than maintained. The future may perhaps be better appreciated when we learn that Mr. D. B. Dowling of the Geological Survey estimates that the mineable coal of the Central Plains and the Eastern Rocky Mountains, explored with some accuracy, amounts to 130,400,000,000 tons.

"In British Columbia the extension of the railway systems and the building of new lines has rendered a large additional territory accessible to the prospector. This extension of readily explorable country is sure to have a stimulating effect on the mineral industry of the province. The discovery and preliminary development of the Groundhog Coal Basin already presages a large and valuable new anthracite field, while the opening up of the Granby Copper Company's property on Observatory Inlet will be followed shortly by the erection of a smelter at that place in the near future.

"In connection with the progress of our industry, may I add before closing, a few words of appreciation of the work the Geological Survey of Canada. At our last annual meeting in Toronto there was a rather regrettable occurrence when a mining engineer of repute questioned the value of much of the geological work carried on in Canada. The incident, only tended to accentuate, if there was need, the close interdependence of geology and mining. Some universities, notably Wisconsin, with a full cognizance of such a close relationship, have so fashioned a course that they train mining engineers, who are at the same time very capable geologists. I am happy to be able to say that the Canadian Mining Institute of late years has recognized the disinterestedness of geologists, for I am the third geologist in succession to be elected to the Presidency by the mining men of Canada. The Geological Survey is doing, and has done, a vast amount of work, which has been of the greatest assistance to mining. Its present director, Mr. R. W. Brock, is a man who has devoted many years of his life to the study and practice of geology in its relation to mining. His presence here with a number of the staff of the Geological Survey is evidence of the continued and great interest of geologists in mining. In British Columbia, the Geological



Survey are spending more money and doing more work than in all the rest of Canada. Mr. Brock will doubtless explain to you that British Columbia is the best training ground in the Dominion, since geology is here seen in its three dimensions. The principles and examples of structure, so well illustrated in the developments of the majestic mountains, are thus more readily discernible and more easily understood in British Columbia and Western Alberta than, perhaps, elsewhere in Canada. All credit, therefore, to the Geological Survey, which for many years has done such zealous, disinterested and capable work in assisting the mining industry of Canada. It has sometimes been misunderstood or misrepresented, but withal it is held in high esteem by the mining community.

"I may also appropriately refer here to the International Geological Congress, which meets in Canada in August of next year (1913). Part of the duty that brought me to the West this year was that I might assist in the arrangement of a Western excursion on the main line of the Canadian Pacific Railway. The visiting geologists will come from all parts of the world where geology is taught and practiced. It will perhaps be the greatest opportunity for legitimate advertising of the natural resources of Canada that has ever been afforded. We are using every endeavour to make the sessions in Toronto, as well as the excursions before and after the sessions, unqualifiedly successful. Later on I will ask Mr. Brock, who is the General Secretary, to go more fully into the details, as we wish to enlist the sympathy and co-operation of all the mining men as well as of the geologists throughout Canada, in the arrangements.

"In conclusion, our presence at this meeting, at the busiest season of the year, is a sufficient evidence of our conviction of the value of the Institute to the mining profession. The Canadian Mining Institute is a thoroughly national and representative body. In the West the progress of the Institute is very gratifying, while in Ontario, Quebec and Nova Scotia we have a very large and enthusiastic membership. The discussions at the meetings of the various branches are very instructive, at the same time affording an opportunity for the interchange of friendly greetings and courtesies. I would again express myself as being much gratified that I have the honour of presiding at this, the first semi-annual meeting in British Columbia. I had hoped for a larger gathering, but what it has lacked in numbers has been more than compensated by the evident interest of those present in the proceedings."

#### General Business.

Among matters brought forward for discussion were the proposed amendments to Sections 33, 34 and 35 of the By-laws. These amendments, originally introduced by Mr. W. F. Ferrier at the last annual meeting in Toronto, were there submitted for consideration to a thoroughly representative committee and with minor changes endorsed by them, final action by the Institute being, however, deferred for another year. The Secretary explained the reasons, which, in the opinion of many members, rendered the proposed changes desirable, adding that advantage had been taken of the present occasion to afford Western members the opportunity to express themselves on the subject should they desire to do so.

#### Federal Department of Mines.

In calling attention to the fact that under present arrangements the mining industry was not adequately represented in the Federal Cabinet, the Secretary

briefly surveyed the conditions that led to the creation of a Department of Mines at Ottawa. The establishment of this department was almost entirely due to the representations of the Institute, whose efforts, however, were only partially successful until some five years ago, when an Act was finally passed establishing a Department of Mines. It was placed under the ministerial direction of Mr. Templeman, a gentleman whose long residence in the West had after given him a considerable knowledge of the requirements of the mining industry. Unfortunately, as it has turned out (for it has created a precedent), Mr. Templeman held the dual office of Minister of Mines and Minister of Inland Revenue. The administrative duties appertaining to the latter department are relatively light, and Mr. Templeman, during the time he was in office was occupied mainly in directing and administering the affairs of the Mines Department. With the change of Government, a gentleman not possessing Mr. Templeman's special qualifications, received the portfolios of Inland Revenue and of Mines. Later a change was made, the Mines' Department being transferred to the Department of the Interior, whose Minister is already overburdened and whose duties are multifarious. There is no branch of the Government service in greater need of organization and ministerial control than the Department of Mines, while under the guidance of a responsible Minister the efficiency of the department could unquestionably be greatly increased. In reference to Mr. Templeman's remark that the Government may not consider it politic or expedient to make any further additions to the Cabinet, the suggestion has been offered that it would not only be possible, but advantageous, to combine certain of the ministerial offices. For example, Inland Revenue could properly be included with Trade and Commerce, while a Department of Natural Resources, embracing mining, forestry, water powers, etc., would serve a most excellent purpose.

Mr. Jacobs considered that every effort should be made to secure for the mining industry that representation and consideration its importance warranted.

Mr. L. O. Armstrong remarked that he was greatly interested in the suggestion that there should be a Dominion Department of Natural Resources. The Canadian Pacific Railway Company had established such a department with the best possible results.

After some further discussion, in which the President and Mr. W. J. Sutton participated, a resolution, moved by the latter gentleman and seconded by Mr. Charles Graham, was carried unanimously, expressing the sense of the meeting that in the interests of the mining industry of the Dominion it was eminently desirable the Federal Department of Mines should be administered by a Minister of the Crown, whose attention would be mainly directed to the performance of the duties appertaining to this office.

#### Afternoon Session.

In the afternoon, Dr. Barlow delivered an interesting lecture, illustrated with lantern slides, on the geology and mineral resources of Northern Quebec and Ontario. The discussion that followed covered a wide range, and occupied the greater part of the session. In reply to one enquiry, Dr. Barlow stated that during 1911 the Cobalt District produced 14 per cent. of the world's supply of silver, and thus was responsible for placing Canada in the third position among the silver-production countries of the globe. The total output of silver from the camp to the close of 1911 represented \$64,918,752, of which nearly one half had been distributed in

the form of dividends. Of the thirty mines regularly productive in 1911, eighteen had paid dividends. In respect of Porcupine, he was given to understand that the year's production, dating from the commencement of crushing operations, would not fall short of a valuation of two million dollars.

The afternoon's programme concluded with an account given by Mr. R. W. Brock of the arrangements that had been made in connection with the visit to Canada next year of geologists attending the International Congress, of which Mr. Brock is the General Secretary. He also invited the co-operation of Western members to ensure the success of excursions to Western Canada.

#### Evening Session.

At this session a paper was presented by Mr. E. Jacobs, dealing generally with the copper mining industry of British Columbia. Some excellent slides were thrown on the screen, illustrating methods of mining in the several districts, and of the principal metallurgical works. The industry is in a more flourishing condition than at any previous time, and the author directed attention in particular to the important new developments at Granby Bay, Observatory Inlet, and remarked on the satisfactory progress now being made in the development of the Britannia Mine, at Howe Sound.

#### Thursday Morning Session.

The first paper presented was one by Mr. F. Napier Denison, dealing with the subject of the relation of earthquakes to colliery explosions. In the course of his remarks he stated he was firmly convinced that a direct connection could be established between slow earth records that had been kept this connection appeared to have been established. In the case of colliery disasters in Great Britain, covering a definite period, it was demonstrated that 67 per cent. of the disasters occurred within twenty-four hours of the occurrence of earthquakes. In the United States the percentage was found to represent 46 per cent.

Mr. Denison then exhibited the seismograph, designed by himself, for recording earth movements in mines, and demonstrated its operation. One such instrument has been placed underground, at a depth of 979 feet, and another at the surface in one of the mines of the Western Fuel Company at Nanaimo.

Mr. Shallcross remarked that Mr. Denison's investigations had created much attentions, and the Victoria Board of Trade considered the matter to be of sufficient importance to justify them in urging the Dominion Government to provide the funds necessary to further the work in question.

Mr. Sutton stated that from a practical mining standpoint the investigations were of value. Vancouver Island is in the seismic zone of the Pacific Coast, and it is well known that earth movements have been frequent here in recent geologic times. Hence the opportunities were particularly favourable for the conduct of investigations of this character. "We have," he added, "extensive coal mines on the island, and it certainly appears that there is a sympathetic relationship between earth strains and the outbursts of large volumes of gas. For this reason I consider it highly important that the Government should establish a well-equipped seismological station on this coast."

Mr. Mortimer-Lamb expressed the opinion that Mr. Denison might advantageously seek the co-operation of the Department of Mines at Ottawa in establishing the correctness of his theory. If, he said, Mr. Denison

was able to conclusively demonstrate that there was a definite relationship between earth movements and explosions, and if, as has been advanced, there are certain periods or cycles when earth movements are known to be more frequent than at others, it would appear that these investigations might be turned to very practical account.

Mr. Denison stated that he welcomed the proposal, and a resolution was accordingly adopted by which the Secretary was requested to bring the matter to the attention of the Director of Mines, with the suggestion that, if practicable, seismographs be placed in coal mines throughout Canada, and that the department ascertain and determine in what further directions research may be carried, having particular regard to the practical application of Mr. Denison's theory.

Mr. D. B. Dowling then read a paper, "Fuel Problems of the Pacific," originally presented by Mr. H. Foster Bain at the annual meeting of the Institute. This was productive of an interesting discussion. Mr. Dowling remarked that the trade of the Pacific slope was at present in its infancy, and it was difficult to estimate the direction in which it might be expected to develop. Although, as Mr. Bain had suggested, the great liners would doubtless burn oil as fuel in future, the majority of the freight-carrying steamers would continue to burn coal, for the reason that oil was not readily obtainable at ports other than those on this coast.

Mr. Lamb remarked that it was possible to conceive of great industrial developments in Western Canada in the next few years. Mr. Bain's paper should be read in conjunction with a paper contributed to the Institute by Mr. Allan Greenwell, in which the author shows that manufacturing invariably goes to fuel rather than coal to manufacturing. The opening of the Panama Canal would undoubtedly affect the industrial conditions of the world. It would open new trade routes, and perhaps divert trade into altogether new channels. Mr. Bain emphasized more particularly possible developments in connection with fuel supply for ships; but the chief hope for Western Canada was the utilization of her immense coal resources in establishing manufacturing industries and in bringing in raw material from outside to be manufactured in this country. Of course, before this could be accomplished many difficulties would have to be surmounted. The high cost of labour, as at present obtaining, would be a very serious handicap; but, it must be remembered that existing conditions in this respect in the West are abnormal, and their adjustment is only a matter of time. Mr. Lamb also referred to the industrial awakening of China, and of the effect it might presently have on the trade of the world.

Mr. Shallcross, referring to the probable influence of the opening of the Panama Canal on freight rates on the Pacific Coast, remarked that the present distance to Europe is about fifteen thousand miles. With the opening of the canal the distance will be reduced to about seven thousand miles. This must necessarily have its effect in the saving of time alone, for, whereas, by the Suez route, it requires ninety days to draw supplies from Europe, the time occupied by way of Panama will be about forty days. More important, however, is the probable effect on transportation between the Pacific and Atlantic coasts. The average rate on Canada will also be affected. At present the cost of the journey, via Montreal, is very high. The journey by way of Panama will not only be much less costly, but more convenient. This then should influence greatly

freight, which is now 90c. per 100 pounds. This will be cut in two. Immigration from Europe to Western Canada the movement of Europeans to the Western coast of this continent. Mr. Shallcross also spoke on the importance of developing an oil industry in Western Canada. He remarked that there were undoubtedly important indications of oil in certain districts of both British Columbia and Alberta, and urged that special steps be taken by the Government to prove the existence of oil in quantity.

Mr. Dowling called attention to experiments conducted by the Department of Mines, at Ottawa, having regard to the economical production of power from low-grade coal, and stated it had been demonstrated that power produced from lignite in a gas producer was at least as cheap as power produced from the burning of oil.

Mr. Sutton pointed out that in addition to immense coal resources, potential and developed, the water powers of the West were of great economic value. He added that at the Cumberland mines, ten per cent of the coal had, to the present, been consumed at the works for power purposes. It was now proposed to save this percentage of the output by utilizing a water power in the vicinity.

At the suggestion of Mr. Jacobs, Mr. Chas. Camsell gave some information concerning the oil-bearing rocks of the MacKenzie Basin. The exposures here cover an area of more than three hundred square miles. In the lower part of the basin, where the rocks are exposed, oil comes to the surface in numerous localities, especially on the north shore of Great Slave Lake, and again down the MacKenzie Valley towards the Arctic circle. In the delta of the MacKenzie River, oil-bearing rocks are exposed with bituminous matter exuding. In reply to Mr. Lamb, Mr. Camsell stated that no areas had been acquired by capital in this field, although boring was undertaken some years ago, and natural gas encountered, but so far as he knew, no oil.

Speaking of the competition of California oil with British Columbia coal, Mr. Thos. Graham, Chief Inspector of Mines, remarked that properly there should, under the tariff requirements, be a duty on this oil upon its entering Canada, since its flash test was above the standard required for free entry.

#### The Duty on Rescue Apparatus.

Mr. Thomas Graham suggested that the Institute should apply to the Dominion Government for the removal of the duty on rescue apparatus for use in mines. The Western Branch some time ago had made an application to the authorities in this respect, and had been assured that action would be taken accordingly; but nothing had been done. Meanwhile coal mining companies are importing apparatus, and, although the duty is evidently refunded on application, the companies are subjected to annoyance and trouble of an official correspondence, to an extent often not commensurate with the amount of money involved.

The Secretary stated that during the past two years the Council had made repeated representations to the Government to this effect. An application was made to the Minister of Customs last spring, and resulted in a lengthy correspondence. The Minister was informed that life-saving apparatus for use other than in mines was admitted duty free; that mining machinery not manufactured in Canada was also on the free list, and a ruling was asked that mine rescue apparatus be placed in one of these categories. The department had replied that in order to comply with the request it

would be necessary to pass special legislation, but advised that the attention of the Tariff Commission be directed to the anomaly. The Commission has not yet been appointed, but the Council had no intention of allowing the matter to drop. On motion of Mr. Jacobs, votes of thanks were then tendered to the Victoria Board of Trade, for having placed their rooms at the disposal of the Institute, and to the local press for courtesies and attention. The secretary also took the opportunity of speaking appreciatively of Mr. Jacobs' services to the Institute, and remarked that he was greatly indebted to Mr. Jacobs for his assistance in connection with the present meeting.

The traditions of the Institute were worthily upheld at the dinner in the evening.

### FRANK MEETING

The adjourned meeting was held in the Sanitarium Hotel, at Frank, on September 30th. In addition to the officers of the Institute there were present: Messrs. Lewis Stockett, Calgary; D. G. Wilson, Hosmer; John Shanks, Coal Creek, B.C.; Leonard C. Stevens, Burmis; Andrew A. Millar, Blairmore; R. W. Coulthard, Calgary. Evan Evans, Fernie, B.C.; E. Gheur, Toronto; J. Menard, Blairmore; S. A. Jones, Lethbridge; S. Shone, Bellevue; Robt. Hamilton, Redcliff; A. N. Scott, Calgary; O. E. S. Whiteside, Coleman; W. F. McNeill, Calgary; A. Rotteleur, Frank; J. Bilteryst, Blairmore; W. A. Davidson, Coleman; R. H. Morris, Pochontas; W. R. Wilson, Fernie; R. Livingstone, Lethbridge. John Brown, Hillcrest; J. D. Thomas, Passburg; W. L. Hamilton, Medicine Hat; W. Hutchinson, Hillcrest; D. A. McAulay, Coleman; Raoul Greene, Blairmore; L. P. Robert, Blairmore; and John T. Stirling, Edmonton.

The morning session was devoted almost exclusively to general business. As in Victoria, the proposed amendments to the by-laws were explained and discussed, and resolutions were adopted similarly worded to those passed at the Victoria meeting, urging the Dominion Government to appoint a Minister of Mines for Canada and provide for the free entry of mine rescue apparatus. The organization of a local branch of the Institute for Southern Alberta was also considered, the consensus of opinion being, however, that the branch should be representative of the coal mining industry of both Southern Alberta and Southeastern British Columbia. It was consequently decided to organize with this intention, and the branch will be known as the Rocky Mountain Branch of the Institute. Mr. W. R. Wilson, general manager of the Crow's Nest Pass Coal Company, by a unanimous vote, was elected Chairman; Mr. J. T. Sterling, Provincial Inspector of Mines of Edmonton, Secretary; while Mr. O. E. S. Whiteside, of Coleman; Mr. W. F. McNeill, Mr. R. W. Coulthard, and Mr. Lewis Stockett, of Calgary, and Mr. Robert Livingstone, of Lethbridge, were elected to serve with the Chairman and Secretary as an Executive Committee. In the course of the morning Mr. Mortimer Lamb gave a brief history of the Institute, and referred to its activities and aims.

### AFTERNOON SESSION.

Four papers were presented and discussed at the afternoon session, the first by Mr. W. D. L. Hardie (read by Mr. Coulthard) on the subject of "Engineers' Reports on Mines," created much interest. The author emphasized the point that the value of any report was entirely dependent on the application of scientific methods of valuation. He advocated that in making valuations, both "remunerative and accumulative in-

terest on the investment should be taken into consideration," and quoted freely from King's Theory of Finance in support of his contention. In the discussion that followed it was urged that engineers should make a practice of publicly protesting on each and every occasion when their views were misrepresented in consequence of the very common plan adopted by promoters of merely publishing extracts, without the context, of a report. A case was cited where an actually adverse report had been successfully employed by this means to extract money from the public.

Another interesting paper, productive of much discussion, was that by Mr. W. F. McNeill on "Provincial Mining Legislation," in which such matters as Workmen's Compensation and the Eight-Hour Law were considered. The present law in Alberta in respect to the former was criticized, but it was decided to discuss the issues raised at greater length at the meeting of the branch to be held in Lethbridge in November.

Mr. R. H. Morris, general manager of the Jasper Park Collieries, gave an interesting account of the development and equipment of these mines. As Mr. Whiteside remarked, operators in the southern fields of the province are quite ignorant of the progress of coal mining in northern country, and he and others expressed astonishment at learning that so much had been accomplished in the very limited time stated. Mr. R. W. Wilson, who had visited this field, remarked that the geological features at Jasper Park and its vicinity were somewhat unusual, and he thought might well be made the subject of a supplementary paper to the Institute. Mr. Morris thereupon undertook to prepare some notes and drawings for presentation at a subsequent meeting. Another paper dealing with an important engineering undertaking in the northern field was also read, but as

the information was supplied without the authorization of the general manager, substance cannot at present be given.

Before the close of the proceedings, a vote of thanks, on motion of Mr. Whiteside, was tendered the President and the Secretary, "who had travelled so great a distance and had gone to so much pains to provide for a meeting of the Institute in Alberta; and which had resulted in the organization of a branch which it was hoped and believed would serve a most useful purpose."

The Secretary in reply said that as a paid official he was in no sense deserving of or entitled to special thanks, but in the case of men such as the President, who ungrudgingly sacrificed time and money to the service of the Institute, it was right and fitting they should be accorded full recognition and gratitude. The high standing and usefulness of the Institute was entirely due to the disinterested zeal and the unselfish devotion of individual members, not exclusively restricted to those who had or were holding office. The success of the present meeting was in a very large measure attributable to the efforts of the convener, Mr. Stirling, and to the co-operation of the members of the local committee, and he begged to move a vote of thanks to these gentlemen. Mr. Barlow said, that although chairman of the meeting, he would be glad to be permitted to second this motion.

This concluded the first meeting of the Institute in Alberta. There will be many in future, no doubt, no less enthusiastic and representative; and with the rapid growth of the coal mining industry in that province, there is reason to believe that before long the Institute's membership here will at least equal that of any of the older centres.

## THE SULPHURIC ACID INDUSTRY IN THE UNITED STATES\*

By Utley Wedge.

To arrive at a broad understanding of the sulphuric acid industry in the United States, it is necessary to consider it in its relation to the great industries which require the production of sulphuric acid.

The greatest of these lines of manufacture which require sulphuric acid, are as follows, and opposite each is noted an approximation of the quantity of sulphuric acid consumed in that industry. Figures given are in terms of tons of 50 deg. Bé sulphuric acid per annum:

	Tons.
Manufacture of fertilizer .....	2,400,000
Refining in petroleum products .....	300,000
Used in iron and steel and coke industry.....	200,000
Manufacture of nitrocellulose, nitro-glycerine, celluloid, etc. ....	150,000

Manufacture of aluminum sulphate and the different alums, sulphates of magnesium and similar salts, carbon dioxide and hydrogen, sulphide gas, aniline and other organic dyes and colors, hydrochloric, nitric, hydrofluoric, chromic boracic, acetic, picric and other acids, ether, glucose, blue vitriol, zinc sul-

phates, and in the metallurgy of copper, gold and silver and general chemical practice... 200,000

Total .....\$3,250,000

In the manufacture of phosphatic fertilizer, phosphate rock is treated with sulphuric acid to render the phosphoric acid soluble. One ton of rock phosphate requires treatment with about one ton of 50 deg. Bé sulphuric acid.

In refining petroleum products, sulphuric acid 66 deg. Bé and sometimes fuming acid is used for the removal of tarry matter and to some extent sulphur compounds. For example, one thousand barrels of illuminating oil requires for its refining about two tons of oil of vitriol.

In the iron and steel industry, very dilute sulphuric acid, free from arsenic, is used for cleansing steel plates or wire preliminary to galvanizing, making copperas as a by-product; also the steel companies have gone extensively into the production of coke with by-product coke ovens, one of the products of which is sulphate of ammonia, which requires a little over a long ton of 50 deg. Bé sulphuric acid for each net ton of sulphate of ammonia produced.

\*Paper presented at the Eighth International Congress of Applied Chemistry, New York, September, 1912.

In the manufacture of nitrocellulose, nitro-glycerine, etc., highly concentrated or contact sulphuric acid is used in connection with strong nitric acid to absorb water formed during nitration which would otherwise interfere with the chemical action desired.

In the manufacture of alum, either bauxite or white alumina, are treated with 50 deg. Bé sulphuric acid, free from arsenic, to form aluminum sulphate.

In the manufacture of sulphate of ammonia, ammonia gas is absorbed in scrubbing towers by dilute sulphuric acid or solutions of ammonia are treated direct with sulphuric acid.

In the manufacture of blue vitriol, metallic copper is dissolved by hot sulphuric acid, very dilute. Dilute sulphuric acid is also used to some extent in leaching copper ores, concentrates or slimes for the recovery of copper values.

No attempt is made to give a complete category of the uses of sulphuric acid, but enough has been specified to show the distribution of line of manufacture which require sulphuric acid.

Phosphate rock deposits are in Florida, Tennessee, and South Carolina. There are also deposits of phosphate rock in Utah and elsewhere in the Western States, which will have great industrial importance as soon as the demand for phosphatic fertilizer in the West has grown to a point to justify the erection of fertilizer plants.

The location of fertilizer plants is decided by the following facts:

The phosphate rock has, in any event, either acidulated or not acidulated, to be transported from phosphate deposit to agricultural district where it will be consumed. The complete fertilizers can be manufactured near the point where the fertilizer will be used. Therefore, a determining factor in the location of phosphatic fertilizer works is the freight on sulphuric acid or crude material from which it is manufactured.

One ton of pyrites containing 50 per cent. sulphur will produce 2.35 tons of 50 deg. Bé sulphuric acid, so that it is cheaper to transport iron pyrites than to transport the quantity of 50 deg. Bé sulphuric acid which a given amount of iron pyrites would produce.

Sulphuric acid plants in connection with fertilizer plants are therefore generally located adjacent to the agricultural district where the fertilizer will be consumed and not near the deposit of phosphate rock, and combined sulphuric acid and fertilizer plants located near phosphate rock deposits are there merely to supply agricultural requirements in that vicinity. Combined sulphuric acid and fertilizer works are therefore located in parts of the United States where phosphatic fertilizer is required.

Fertilizer is extensively used in connection with the growing of cotton, and the Southern States, denoted as cotton growing States, contain very numerous sulphuric acid plants.

In the Northern and Eastern States, the use of phosphatic fertilizer is not so extensive and a less number of combined sulphuric acid and fertilizer plants supply the demand.

The consumption of fertilizer, other than in the Western States, is growing so enormously that a most unusual business situation is developing, and even in Utah combined sulphuric acid and fertilizer plants are now contemplated.

Much the greater portion of sulphuric acid produced in the United States is made from iron pyrites.

During 1911, pyrites was supplied from the following countries:

	Net tons.
Spain . . . . .	815,000
Portugal . . . . .	133,000
United States, Canada, about . . . . .	350,000
Total . . . . .	1,208,000

Of this amount 584,000 net tons were delivered to plants in the South manufacturing sulphuric acid exclusively for the production of fertilizer, and 236,000 net tons were delivered to plants in the North manufacturing sulphuric acid exclusively for the production of fertilizer.

These quantities of pyrites would represent a production of sulphuric acid in the fertilizer plants in the Southern States of about 1,300,000 tons of 50 deg. Bé sulphuric acid, to which should be added 275,000 tons of 50 deg. Bé sulphuric acid produced as a by-product by the copper smelters in Tennessee, practically all of which is consumed in the manufacture of fertilizer in the Southern States.

The 236,000 tons of pyrites delivered to plants in the Northern States, manufacturing sulphuric acid exclusively for the production of fertilizer, would represent 529,000 tons of 50 deg. Bé sulphuric acid.

In addition to the above fertilizer-acid, considerable quantities of sulphuric acid are manufactured in works doing a general chemical business and shipped to fertilizer works for treatment of phosphate rock, also sulphuric acid separated from sludge acid from petroleum refineries is shipped in considerable quantities to fertilizer works, bringing the consumption of sulphuric acid in the fertilizer business up to the total figures given above.

In the petroleum industry the consumption of sulphuric acid has increased slowly for some years, for the reason that the oil refiners have learned to economize in sulphuric acid and have decreased the quantity used per barrel in refining to largely offset the large increase in the production of petroleum products. For example, previous to 1888 in many oil refineries sulphuric acid was mixed and stirred with distillate only once, being then at once diluted and separated from the combined tarry matter and again concentrated to 66 deg. Bé before using again in the oil refining process. In 1890 the practice came into general use of using sulphuric acid a second time, taking the acid from a previous treatment of distillate and using the partially exhausted acid on a second batch of distillate before separating and concentrating. This materially reduced the consumption of fresh acid. Again, about the year 1896, the use of Fuller's earth was introduced in oil refining practice. Tarry matter was removed from distillate by agitation with Fuller's earth and a decreased amount of work remained to be done by sulphuric acid treatment. These two improvements made a material reduction in the use of sulphuric acid in oil refining. Subsequent improvements in method and practice in recovering sulphuric acid from sludge or spent acid have further reduced the net consumption of fresh sulphuric acid by the petroleum industry.

The location of acid plants supplying oil refineries is quite uniformly adjacent to the oil refineries on account of the transportation problem.

Transportation of crude oil by pipe line is so much cheaper than the transportation of refined products by rail, that oil refineries under conditions in the United States are located with reference to transportation and distributing of the refined product and seldom adjacent to oil producing fields, except only to supply the demand for the finished product in the radius of economic

shipment from the oil fields. The great oil refineries are, therefore, chiefly located where there is both rail and water transportation. There are oil fields in Pennsylvania, Ohio, Indiana, West Virginia, Indian Territory, Texas, California and some other States. The large oil refineries, however, are located along the Atlantic seaboard on the water front near New York harbour, Philadelphia and Baltimore; along the Great Lakes at Buffalo, Cleveland and near Chicago; on the Pacific coast, on San Francisco Bay. Minor oil refineries are located near the oil fields. In every case sulphuric acid plants are located near the oil refineries. The group near New York are supplied from a large chamber-process sulphuric acid plant on New York harbour, operated by the petroleum refining interest, with an output of about 60,000 tons of oil of vitriol per annum. Oil refineries at Philadelphia and Baltimore are supplied with oil of vitriol from a sulphuric acid plant at Philadelphia delivering about 40,000 tons of oil of vitriol per annum. The California crude oil requires treatment in part with an acid stronger than oil of vitriol, which is supplied from an oxide-of-iron-contact plant at the oil refinery, on San Francisco Bay.

One small refinery adjacent to the Texas oil fields burns brimstone from the Louisiana sulphur deposit.

In many cases, the oil refineries or chemical companies supplying them with sulphuric acid are equipped with appliances for separating sulphuric acid from the tarry matter taken up in the treatment of petroleum distillate and the separated acid of 35 deg. Bé and 50 deg. Bé is then again concentrated to 66 deg. Bé for further use. This repeated restoring of the spent acid greatly diminishes the amount of fresh sulphuric acid required by the petroleum industry and brings their net requirements down to the figure given above.

Mention should also be made of a practice by the petroleum refiners to a very limited extent of manufacturing sulphuric acid from sulphuretted hydrogen and sulphur dioxide fumes given off during the distillation of petroleum high in sulphur contents. In general, it may be said that the fresh sulphuric acid consumption by the petroleum refining companies represents chiefly the actual decomposition of a percentage of the sulphuric acid used by reduction to  $\text{SO}_2$  by the carbon in the oil treated, plus deliveries of separated sulphuric acid 50 deg. Bé gravity to fertilizer plants. In addition to the mechanical loss in use, there is actual decomposition to  $\text{SO}_2$  during treatment, especially of heavy oils, and also the decomposition is considerable in the process of separating and reconcentrating the sulphuric acid.

Counting the repeated use of sulphuric acid by the petroleum industry, their actual use of oil of vitriol would be about 334,000 tons per annum, representing 500,000 tons of 50 deg. Bé equivalent.

The iron and steel industry uses such considerable amounts of sulphuric acid that a tendency is developing for steel companies to erect and operate separate sulphuric acid plants.

The manufacture of sulphate of ammonia from by-product coke ovens has also been taken up by the steel companies. A coke plant consuming 2,000 tons of coal per day would produce from 14 to 30 tons of sulphate of ammonia daily, according to the nitrogen content of the coal used. Therefore, each 2,000 tons of coal, high

in nitrogen, converted into coke daily, would call for a sulphuric acid production of 10,000 tons of 50 deg. Bé sulphuric acid per annum.

The location of sulphuric acid plants to supply this demand has so far been adjacent to the steel plants in Pennsylvania, Indiana, Michigan, and Alabama.

By-product coke ovens are now being built or under consideration which will require 100,000 to 150,000 tons of 50 deg. Bé sulphuric acid per annum, in addition to the figure shown above. This development has so far been chiefly in connection with iron and steel industry.

One of the sulphuric acid plants operated by one of the steel companies burns brimstone from Louisiana. the other burn pyrites. All so far constructed have been chamber-plants, although one by-product plant now being built has contracted for its supply of sulphuric acid from a concern producing contact acid.

In the manufacture of nitrocellulose, nitro-glycerine and similar products, the chamber process has been practically eliminated by the contact process. Contact process has been installed wherever these explosives are manufactured. Several iron-oxide contact plants have been erected for this purpose as well as other contact systems.

In the general chemical industry, the various platinum and iron contact systems have made considerable progress, more especially where the demand is for sulphuric acid approaching the composition of the monohydrate.

Out of a total production of sulphuric acid in the United States of 3,250,000 net tons per annum, approximately ten per cent. is contact acid made either by the iron-oxide contact or by the platinum contact systems.

Of the Spanish pyrites imported during 1911, namely, 815,000 tons, 37 per cent. was copper bearing pyrites, of which about 200,000 tons were chloridized and leached for the recovery of copper values, after burning off the sulphur for the manufacture of sulphuric acid.

Of the 646,000 tons of iron pyrites imported during 1911 containing no copper values, about 230,000 tons was washed fines from which copper had been leached in Spain or Portugal before shipment to this country.

The practice of nodulizing cinder from pyrites burners has become general in all localities where there is a market for the nodulized cinder as iron ore. The iron industry of Pennsylvania furnishes a good market. In Alabama the iron manufacturers have not as yet offered prices for low phosphorus nodulizing kilns and there is in the South the accumulated cinder from years of sulphuric acid manufacture, waiting for prices which will make its utilization profitable.

An analysis of the source of sulphuric acid manufactured in the United States during 1911 would show as follows, figures given being expressed in terms of 50 deg. Bé sulphuric acid:

	Tons.
Manufactured from pyrites .....	2,665,000
Manufactured from blast furnaces, smelting	
copper sulphide ores .....	275,000
Manufactured from zinc sulphide ores.....	285,000
Manufactured from brimstone .....	25,000
Total .....	3,250,000

## ACTION OF ALUMINA IN COPPER SLAGS.

The subject of the behaviour of alumina in copper slags has of late been given much attention at the smelting works of the Consolidated Mining and Smelting Company of Canada, Limited, at Trail, British Columbia, and while we have not yet arrived at any definite conclusion in regard to its behaviour, we have worked out a formula which gives very satisfactory results in our case.

Taking an average monthly slag with the following composition:

FeO	SiO <sub>2</sub>	CaO	MgO	Al <sub>2</sub> O <sub>3</sub>
16.1	44.0	19.2	2.5	17.4

(1) Figuring alumina as acid oxygen ratio is 1:3.14

(2) Figuring alumina as base oxygen ratio is 1:1.28

(3) Figuring alumina as neutral oxygen ratio is 1:2.33

It will be seen that in case (1) we have an impossible slag, in case (2) a slag which appears too basic, judging from the appearance of our slag here, and case (3) is slightly on the acid side.

In our calculation we assume that the CaO present combines with the requisite amount of Al<sub>2</sub>O<sub>3</sub> to form the silicate of lime and alumina with the composition Al<sub>2</sub>C<sub>3</sub>, 3 CaO, 6 SiO<sub>2</sub>, this alumina acting, of course, as a base and any excess over the amount required for this formula will act as an acid.

Figuring the above slag on this basis, we have:

	Per cent.	Units O.
SiO <sub>2</sub> . . . . .	44.0	23.47
Al <sub>2</sub> O <sub>3</sub> . . . . .	17.4	8.17
CaO . . . . .	19.2	5.49
FeO . . . . .	16.1	3.57
MgO . . . . .	2.5	1.00

Leaving one oxygen equivalent of Al<sub>2</sub>O<sub>3</sub> to one of CaO on the basic side and moving the balance of the Al<sub>2</sub>O<sub>3</sub> oxygen to the acid side we have:

	Acid.		Base.
SiO <sub>2</sub> . . . . .	23.47	CaO	5.49
Al <sub>2</sub> O <sub>3</sub> . . . . .	2.68	Al <sub>2</sub> O <sub>3</sub>	5.49
	26.15	FeO	3.57
		MgO	1.00
			15.55

which gives ratio base to acid 1:1.68, a good economic slag.

Figuring all the slags mentioned in Mr. Bellinger's article, on this basis the result is a good practical slag in each instance and similar results have been obtained from calculations on many other slags which have come under our notice.

Our experience here is that the amount of alumina acting as a base is determined by the amount of lime present in the slag and the addition or subtraction of lime to or from the charge beyond certain narrow limits proves this to be the case.

It is quite probable that some other bases may act in the same capacity as lime.

[Editor's Note.—On August 15 the Journal published some information relative to the action of alumina in the formation of copper slags, as given by Mr. H. C. Bellinger, general manager of the Great Cobar, New South Wales, in his presidential address before the Australasian Institute of Mining Engineers, who spoke of his own experience with Rossland ores, among others. The following notes are by Messrs. Jas. Buchanan and F. E. Lee, of Trail, B.C., here Mr. Buchanan is superintendent of the Consolidated Company's big smelting works.]

## NOTES ON GRANBY COMPANY MATTERS.

In its notice of the annual report of the Granby Consolidated Company, the "Boston Commercial" of October 5 made a serious mistake concerning the quantity of ore developed and shipped last year at the company's mines at Phoenix, B.C. As the account of the "Commercial" has since been reprinted in British Columbia, it is desirable that a correction be made. The part of the account that is erroneous follows: "During the year the company developed 14,408,000 tons of ore and shipped 7,975,000 tons, making the amount of ore now in sight 6,433,418 tons, which is slightly more than the amount in sight at the beginning of the year." The facts are that in all years, from the time the company commenced smelting on August 21st, 1900, to the end of the fiscal year ended June 30th, last, an aggregate of 7,944,373 tons of ore from the Granby mines at Phoenix had been smelted. At the close of the fiscal year ended June 30th, 1911, the quantity of ore "estimated in sight," according to the report for that year, was 6,720,267 tons. It would appear that the company now claims that the quantity of developed ore in its mines at Phoenix was, on June 30th, last, 6,433,418 tons, or about 287,000 tons less than at the corresponding period of 1911, after having shipped about 722,000 tons to its smeltery during the last fiscal year.

In its notice of the Granby Company's last annual report, the "Mining and Engineering World, of Chicago, observes: "One of the most important features of the report is the data given on ore reserves. No new ore bodies have been developed at the Phoenix property, but previously-known orebodies have been further extended. The total reserves are placed at 6,433,418 tons, as against 6,420,267 tons for the previous year, showing that more ore was developed than extracted. During the year just closed 721,719 tons of Granby ore was smelted. The average value of the 6,433,418 tons now in reserve is not given." Passing over as of minor importance, the discrepancy of 300,000 tons in the figures for the quantity of ore in sight on June 30th, 1911, as respectively stated by the journal just quoted and in the company's printed report for 1911, the following information as to average value of the ore may be of interest. The printed annual report of the company for the year ended June 30th, 1910, contains full information relative to the then estimated ore reserves as arrived at by Mr. O. B. Smith, Jr., the company's chief mining engineer and superintendent of mines, and Dr. Otto Sussman, of New York, the expert, whose report on the property occasioned so much concern in 1910. Mr. Smith's conclusions as to ore reserves are contained in the following brief excerpt from his report: "Tons of ore remaining blocked out, 6,429,169. Estimated value per ton of ore blocked out: Copper, 1.25 per cent.; gold, 0.043 oz.; silver, 0.250 oz. In regard to the amount of ore which will be lost in the course of mining, in pillars, loose muck, etc., I can judge only from past experience in stopes which are nearly worked out. We hope to mine and ship 90 per cent. of all the ore developed. In some places we will be able to do better than this, but in others we will not be able to hold to the average." Allowing ten per cent. loss in mining, Mr. Smith's estimate of recoverable ore at that time was 5,786,253 tons. Dr. Sussman reported: "The total amount of recoverable ore in the property is approximately 5,595,000 tons, averaging copper 1.24 per cent., silver 0.25 oz., and gold 0.04 oz. per ton." It will be seen that these estimates are practically in agreement, the difference in quantity of recoverable ore being only 191,253 tons, and in metal contents only

fractional. Further, Dr. Sussman allowed for a recovery, (that is, 1.24 per cent. less smelting loss in slag) of 19 lbs. of copper to the ton of ore; while a table recently published in the "Boston Commercial" shows the actual recovery of metals per ton of ore to have been—for year ended June 30th, 1911, copper 18.13 lbs., silver 0.37 oz., gold 0.42 oz., and for year ended June 30th, 1912, copper 18.39 lbs., silver 0.29 oz., gold 0.043 oz. The quantity of Granby ore smelted in the former year was 959,563 tons, and in the latter, 721,719 tons, together 1,681,282 tons. If the average recovery shown is for Granby ore only, these figures would seem to indicate that the estimates of average value first above given are being fairly well realized.

**SOME GRANBY FIGURES.**

Occasionally it is stated by men interested in copper mining in British Columbia that they are unable to find reliable statistical information that will enable them to get an intelligent idea of the results of copper mining and smelting in the province. On October 5th, the "Boston Commercial" printed tables giving many figures showing the financial aspect of the Granby Company's operations during nine years, 1904-1912, and other particulars of quantity of ore smelted, average recovery of metals per ton, and total metal production in each year of the twelve fiscal years—ended on June 30th, 1911, and on to 1912—the Granby Company has been producing and smelting ore. Much of the information relative to production of ore and metals, down to the year ended June 30, 1910, inclusive—was printed in the company's annual report for the last mentioned year, but the "Commercial" has added the figures for the last two years as well.

While the tables of figures that follow do not comprise the whole of the information contained in those printed by the "Boston Commercial," they give the most useful particulars concerning production of ore and metals, and financial results of operations.

**Ore Smelted.**

Year ended June 30.	Granby. Tons.	Customs. Tons.	Total Tons.
1901	169,087	7,832	176,919
1902	293,645	7,455	301,100
1903	289,583	13,914	303,497
1904	516,059	40,472	556,531
1905	550,738	39,382	590,120
1906	796,188	36,158	832,346
1907	649,022	16,893	665,915
1908	858,432	24,179	882,611
1909	964,789	19,944	984,733
1910	1,175,548	21,829	1,197,377
1911	959,563	24,783	984,346
1912	721,719	17,800	739,519
Totals	7,944,373	270,641	8,215,014

The next table gives production of metals from the quantities of ore shown in the foregoing table:

Year ended June 30.	Copper, pounds.	Silver, ounces.	Gold, ounces.
1901	5,435,955	34,900	8,871
1902	10,836,851	274,511	30,786

1903	12,551,758	277,574	35,121
1904	16,020,986	275,935	54,493
1905	14,244,692	215,449	42,980
1906	19,939,004	316,947	50,020
1907	16,410,576	201,337	32,738
1908	21,092,288	300,204	40,068
1909	21,901,528	335,520	45,760
1910	22,754,899	356,746	48,752
1911	17,855,130	343,504	41,744
1912	13,231,121	225,305	33,932
Totals	192,254,788	3,158,022	465,265

**RECOVERY OF METALS AND COST PER TON.**

The quantities of metals recovered per ton of ore are for "dry tons shipped" each year. As the yearly tonnages differ a little from those shown in the first above-printed table (there is not room in this column to show the exact figures here) calculations will not work out correctly. As, however, the difference between the respective totals of all years is less than 8,000 tons, the discrepancies are too small to seriously affect the proportions of metals per ton here shown, as under:

Year ended June 30.	Copper, pounds.	Silver, ounces.	Gold, ounces.	Cost, per ton.
1901	31.49	0.4406	0.1003	\$4.77
1902	27.23	0.2952	0.0808	4.08
1903	24.58	0.2772	0.0717	3.75
1904	22.87	0.2819	0.0608	3.35
1905	24.68	0.2688	0.0599	3.14
1906	24.30	0.3107	0.0513	2.87
1907	24.43	0.3038	0.0503	3.28
1908	23.42	0.2865	0.0454	3.11
1909	21.90	0.2730	0.0435	2.85
1910	18.70	0.2281	0.0370	2.50
1911	18.13	0.37	0.042	2.77
1912	18.39	0.29	0.043	2.90

Note.—The cost per ton is not inclusive of cost of marketing blister copper.

**RECEIPTS AND EXPENDITURES.**

The amounts realized from sale of metals produced during nine years 1904-1912, the yearly expenditures, and the net amounts realized, are shown in the next following table:

Year ended June 30.	Gross receipts.	Expendi- tures.	Net earnings.
1904	\$2,966,347	\$2,682,833	\$283,514
1905	2,749,145	2,036,496	712,649
1906	4,751,059	3,927,442	1,823,617
1907	4,521,549	2,596,612	1,924,937
1908	3,790,184	3,183,662	606,522
1909	3,983,537	3,302,402	681,135
1910	4,009,925	3,534,978	564,947
1911	3,216,014	2,999,489	216,525
1912	2,874,760	2,291,381	583,379
Totals	\$32,952,520	\$25,555,295	\$7,397,225



## PLACER GOLD ON MEULE CREEK, SEIGNIORY OF RIGAUD-VAUDREUIL, QUEBEC.

Abstract of Report by Joseph Keele in Summary Report of the Geological Survey.

### Introduction.

Placer gold mining was carried on in the Chaudiere River valley during many years, the most active period of mining operations being included between the years 1863 to 1878. The Chaudiere River is a northwesterly-flowing tributary of the St. Lawrence, heading near the Quebec-Maine boundary and joining the St. Lawrence not far above Quebec City. The gold-bearing territory, known as the Beauce gold district, borders the middle third of the river valley. Some of the ground was very rich, the Gilbert River, one of the principal tributaries of the Chaudiere, for example, yielded nearly \$2,000,000 in coarse gold in a distance of 2 miles, the gold being taken out principally by open-cut work. Much of the ground in the district though it carried good pay could not be profitably worked by individual miners, on account of the great thickness of over-burden lying on bed-rock—where mostly all the gold was found—the presence of underground water, and the large size of the boulders frequently encountered in the workings. Mining operations, however, were carried on until 1896, but were mostly unprofitable during this later period.

Recently a Montreal syndicate operating under the name of the Champs d'Or cie Rigaud-Vaudreuil, have acquired the mining rights on the territory known as the seigniory of Rigaud-Vaudreuil, comprising an area of 70,000 acres, and covering a great portion of the Chaudiere valley and its tributaries, including Gilbert River. Prospecting was begun early in 1910 on Gilbert River, River des Plantes, Bras River, and Meule Creek, using Keystone and Empire drills for piercing the gravels. As the prospects and water supply were favourable on Meule Creek, the work of installing an hydraulic plant was begun there during the winter of 1910-11.

Only a few days were spent by the writer in this field, so that the following descriptions are incomplete.

### Geographical and Geological Sketch.

The region that includes the gold fields is a dissected plateau lying northeast of the more hilly portion of southern Quebec, and has a general elevation of 1,200 to 1,500 feet above sea level.

The Chaudiere River traverses the region in a northwesterly direction; it occupies a valley of considerable dimensions, and carries the drainage of the gold district into the St. Lawrence River, its mouth being about 8 miles above the City of Quebec.

The valley is underlain principally by grey and reddish Ordovician slates. These slates are penetrated by narrow bands of basic igneous rocks, which recur at intervals of one-half to 1 mile.

The wider part of these valley occur where the comparatively soft slates have been eroded by the river, and the contractions are formed where the harder igneous bands project as spurs from each side of the valley walls. The valley is apparently an ancient one, as the river for the greater portion of its course flows without change in grade over hard and soft rocks alike. A mantle of unconsolidated material principally of glacial origin, is nearly everywhere present.

The valley of the Chaudiere is rather thickly settled, and all the bottom lands and much of the side slopes are cultivated. Fairly extensive tracts of mixed timber still exist in the small tributary valleys, and on the upland, a quantity of pulp wood being produced annually from them.

The Quebec Central Railway crosses the valley of the Chaudiere at Valley Junction, situated 43 miles southeast of Levis, the railway's terminal point on the St. Lawrence. A branch line of this railway extends up the valley of the Chaudiere from Valley Junction for a distance of 56 miles.

The only mining now being done is on Meule Creek, a tributary of Mill River, which enters the Chaudiere opposite the village of Beauceville, 12 miles south of Valley Junction.

The prevailing bed-rock seen in the creeks is composed of dark grey or red slates of Ordovician age. The cleavage of the slates is the most pronounced structure of these rocks, and is parallel to the bedding planes. The beds are also traversed, irregularly, by numerous joint planes at various angles to the cleavage. On weathering, the rock breaks down into thin slabs, wedge-shaped fragments, and splinters.

The slates have been disturbed from their original attitude, and the beds are now in a vertical position.

The slate bed-rock is penetrated at intervals by dyke-like sheets of diabase of 100 feet in width or more. These intrusive sheets may have originally been injected as sills between beds of the sediments while the latter were in their original horizontal position, the whole being subsequently dislocated until the formation stood on edge, and the intrusive sheets assumed the appearance of dykes. Enclosed within the diabase sheets are bands of quartz porphyry or porphyrite, of irregular width. Whether the porphyrite originated from the same magma as the diabase, or has subsequently eaten its way up through it, could not be determined without more extended observations. Both the diabase and porphyrite have schistose phases, and show considerable alteration in places.

Veins, stringers and kidneys of quartz are often locally abundant in the intrusive bodies, but are by no means a persistent feature in them. In certain parts of the district quartz veins are found traversing the slates and other sediments.

A mantle of unconsolidated material, principally of glacial origin, is spread nearly continuously over the region. The thickest deposits of boulder clay appear to occur in the narrow valleys of the tributary streams, while terraces of alluvial sand, gravel and clay border the main river.

Pre-glacial deposits of sand, gravel and clay, overlying the bedrock, are still preserved on some of the side streams. These pre-glacial beds are of no great thickness, they are overlain by thick deposits of glacial drift, and their presence is only revealed during mining operations.

### Mining.

Meule Creek is a small stream flowing in a narrow valley of rather steep grade, with heavily timbered side slopes. The gold is mostly all found on bedrock,

so that mining operation involve the removal of the overlying materials, and the hydraulic method is here used for moving these alluviums.

The workings in August, 1911, consisted of an open pit, made on the right limit of the creek, about half a mile above its junction with Mill River. At the time of the writer's visit, the operations preliminary to a clean-up were being made after a month of hydraulicking. The plant in use is the first of its kind to be installed in this gold field, so that the results obtained from it are awaited with great interest.

Water for the monitors is obtained from Lake Fortin, a sheet of water which measures one and one-half miles by three-fourths of a mile in its extreme dimensions. A ditch nearly seven miles long, of which distance about 4,500 feet is flumed, brings the water to a penstock, from which starts a riveted steel pipe 18 inches in diameter, tapering to 15 inches. At a distance of 1,400 feet from the penstock this pipe branches into 10-inch lines, each 500 feet long, terminating in monitors or giants. One of these giants is used for cutting down the bank of gravel, and the other for driving the gravel through the sluice to the elevator pit, the fall from the penstock to the monitors being 260 feet.

The sluice leading from the hydraulic pit is about 100 feet long, and about three feet wide, and is floored with steel rails laid longitudinally.

At the end of the sluice a bucket elevator, equipped with a stacker, has been installed to handle the tailings and to save whatever gold was not caught in the sluice.

The tailings are raised 40 feet by the chain of buckets, each of which has a capacity of  $1\frac{1}{2}$  cubic feet. The buckets deliver the tailings into an elevated sluice, and the material is driven through it and stacked by a powerful stream of water supplied by a centrifugal pump electrically driven, having a capacity of 6,000 gallons a minute. Power is supplied from a steam power house built near the railway station at Beauceville; it is transmitted to the field of operations by a copper transmission line 8,000 feet long, at a voltage of 2,200, which is reduced by a transformer to 440 volts.

Many large boulders, too heavy to be moved by the giant, become concentrated in the bottom of the pit as hydraulicking proceeds. These are moved to one side and piled with a derrick, the power for this purpose being supplied by a Pelton wheel driven by a water jet.

The timbering of a shaft and drift are revealed at the bottom of the bank at the upstream end of the hydraulic pit. These are the remains of the old workings of Coupal, who operated here on a small scale in 1896.

The overburden is heavy on the south side of the pit as the bank rises on this side and forms the lower part of the valley slope. The section revealed in this bank consists of one to four feet of yellow gravel and clay lying on bedrock; above this and showing a fairly distinct unconformity with it is 25 feet of blue boulder clay. Above the boulder clay is 10 feet or so of slide material, which is an unsorted mass of loamy clay, gravel and rock fragments which has crept down the valley slopes.

The yellow gravel lying on bedrock is composed chiefly of fragments of slate and diabase mostly angular, but with some well-rounded pebbles; this material is all in small pieces, none being over six to eight inches in diameter, and all derived from the drainage basin of the creek. These gravels are mixed with a highly plastic, smooth, yellow clay, which is very different in

colour and texture to any other clay found in the vicinity, either in the boulder clay or the later stratified clay of the river terraces.

These yellow gravels are probably remnants of pre-glacial or Tertiary accumulations, which, owing to their protected position in the bottom of narrow stream channels, escaped total destruction by the advancing ice-sheet during glacial times.

The boulder clay, which is the direct glacial contribution to the drift, is a mixture of pebbles, chiefly well worn and smooth, of diabase, porphyry, slate, granite, gneiss, and occasional fragments of serpentine. Boulders and blocks up to three and four feet in diameter are encountered in this deposit, the whole being bonded by a very compact gritty clay. Portions of this deposit do not break down very readily under the stream from the giant and have to be blasted.

The bedrock surface exposed in the bottom of the pit shows the greater part to be dark grey slates of rather fresh appearance, having their cleavage running in the same direction as the flow stream. The slate is well-jointed in a direction across the flow of the stream, but the principal crevices to a depth of a foot or two.

There is a portion of a band of diabase and porphyry, partly decomposed and crumbling, exposed along the north side of the pit; it forms a tighter bedrock than the slate, and does not allow the gold to penetrate so far.

The bedrock surface, where cleared up, is very uneven, ridges of the harder parts standing up a foot or so above the more weathered portions. The yellow clay was found to have been forced into the larger crevices and had to be removed by hand-picking, as, owing to its smooth and sticky qualities, the stream from the giant was unable to tear it out.

The hydraulic pit measured about 200 feet long by 100 feet wide, and the area of bedrock cleaned up after one month's hydraulicking was about 17,000 square feet. Of this area about one-third was said to have been worked out by Coupal, leaving an area of virgin ground amounting to 11,300 square feet.

The amount of gold recovered from this area is reported to be \$7,500, or an equivalent of about 70 cents to the square foot of bedrock. The amount of dirt moved amounted to 16,600 cubic yards, which would give 45 cents to the cubic yard.

The yellow gravels are said to contain some gold, but there is no doubt that the greater portion is on bedrock, so that it is obvious that the less overburden to be removed, the more profitable the mining operations.

The black sand resulting from the final washing of the gold consists mostly of grains of magnetite. The quantity of fine gold carried over into these concentrates is so large that it might be worth while to install a small magnetic separator for its recovery.

#### Origin of the Gold.

The gold so far found on Meule Creek is all coarse, and varies in size from nuggets worth \$150 to grains the size of the head of a pin, but a considerable portion is about the size of flaxseed.

The gold is very smooth; many of the particles are flattened and show signs of wear by prolonged attrition. There are a few rough pieces of gold, some with quartz still adhering to them, but these can be explained on the assumption that they had not been long enough released from a quartz fragment to become worn smooth.

The well-worn appearance of the gold is generally supposed to indicate that it had traveled from some

distant source, and had suffered much abrasion from being transported by water in company with the usual alluvial material, but this, however, is not always the case with placer gold, as it may have a local source and still present this worn appearance.

The origin of the gold is obscure, as it seems to have no connection with the bedrock on which it lies. Locally the slates contain small cubes of iron pyrite, but no mineralization was observed in the intrusive portions. A large number of assays made from the quartz veins and intrusive rocks of this district, in former years, gave only small quantities of gold or none at all.

Owing to its gravity, coarse gold soon drops out of the current and remains behind, while every particle of the rocks which originally contained it is eventually carried away.

The horizontal movement of gold lying in bedrock as the creviced slates of Meule Creek is very small, the vertical downward movement as erosion proceeds is the principal one.

The gold while passing downward during the various stages of erosion becomes pinched and flattened in bedrock cracks, is subjected to all manner of abrasion from the ash gravels, and is probably found now at not more than a few thousand feet in a horizontal direction from its source. But during this time it may also have traveled 1,000 feet or more in a vertical direction, which would be the principal factor in giving the gold the well-worn appearance which it now presents.

#### Prospecting.

In future operations in this field a considerable portion of the mining costs are to be charged up against prospecting, as the old reports on the district indicate that the ground is "spotted," or, in other words, that the "leads" or paystreaks are not continuous.

If the gold originated in veins in the intrusive rocks, and if the rich veins were bunched in certain parts of the intrusive, while the greater part of it was barren, then the breaking down of such rocks would give rise to spotted ground. If the gold originated in these intrusive rocks, then the most probable places to repay prospecting would be on the downstream side of these rocks.

The bottoms of the narrow valleys of the tributary streams generally contain the richest concentrations of gold on account of the restricted area in which the gold accumulates.

There is a prevalent opinion that the valley bottom of the Chaudiere must contain considerable gold, but this has not been proven, as the few shafts sunk there did not reach bedrock on account of too much underground water.

The side streams do not contribute very much to the gold values in the main rivers, and in many cases the paystreaks on the tributaries do not reach down the main valley at all.

All the gold that is liable to be in the main river valley may be restricted to whatever that stream itself has broken down from quartz veins which is traversed in its course.

The amount of gold-bearing veins broken down would probably be much more than those of the side streams, but the area of bedrock over which the gold would be distributed in the main valley would be large.

Very little gold, only amounting to a few fine colours to the pan, is found in the boulder clay. The paystreak in any stream in the district, if it existed, was

always found on bedrock below a variable thickness of yellow gravel and clay, which are pre-glacial.

The extent and distribution of the yellow gravels throughout the region is unknown. Since they are always covered with a varying thickness of loose overburden, of a widely different character, their presence is only revealed in mining operations or by borings. So far they have always been found resting on bedrock, and in some cases they are actually composed of fragments of weathered and rotted bedrock in situ.

They are generally regarded as being of pre-glacial age for the following reasons: (1) They contain no material having a source outside the drainage basin in which they occur; (2) no foreign material has been found underlying them. (3) they are overlain and sharply divided from deposits of glacial drift, or later stream gravels largely derived from the drift.

During some of the earlier prospecting in this field, the glacial drift was found resting on bedrock, and, when this occurred, the gold was either absent or did not occur in paying quantities.

Whenever prospecting is carried on by means of the Keystone drill, the yellow gravel may be used as a guide. If hard rock is encountered, without having pierced the yellow gravels, it may probably prove to be a large boulder, and it would then be advisable to move the drill a short distance away.

No benches or rims of bedrock at a higher elevation than the present streams, and carrying gold-bearing gravels have ever been located. Mr. Wm. P. Lockwood, who spent thirty years in prospecting over a great portion of this district, is of the opinion that no high-level, gold-bearing gravels exist here.

It may be noted in this connection that remnants of old channels or terraces at high levels on the valley slopes would suffer from erosion during glacial times, and that the gold in the boulder clay may be derived from that source.

Dredging in the wide flats at the mouths of tributary streams is proposed for this district. Before commencing operations of this kind, the ground should be thoroughly prospected with an Empire or other similar make of drill. The principal obstacles to the success of dredging here, will be the presence of large boulders, and the difficulty of recovering a great deal of the gold, if present, from the deeply-creviced bedrock.

## THE CADEBY MINE EXPLOSION.

Written for the Canadian Mining Journal.

The explosion which occurred on July 9th in the Cadeby pit, near Conisborough, South Yorkshire, had a melancholy interest for many in the mining districts of Cape Breton, as a number of miners have migrated from this district to various parts of Canada, and to Sape Breton in particular. The tragic part of this explosion was that more men were killed in the rescue parties than in the initial explosion, including three of the mines inspectorate, among them being Mr. W. H. Pickering, than whom a truer and braver gentleman never gave his life for his fellows. The disaster arose from the ignition of a gaseous mixture by a gob-fire, and the most surprising feature is not that the explosion should have occurred, but that during twenty years of fighting gob-fires this should have been the first serious disaster. Considering the fiery nature of many of the South Yorkshire mines, particularly those working the Barnsley bed on the eastern limits of the field, where the coal is reached at great depths, the district has been singularly immune from serious explosions, a fact

which in itself is a tribute to the precautionary measures commonly employed in the collieries of the English Midlands.

The recovery of the bodies of those killed in the various explosions has been attended with great difficulty, and has once more, in the most telling manner, shown the utility of oxygen breathing apparatus. It was found impossible to recover some of the bodies because of the fire existing in that section of the mine where the explosion originated, and in order to extinguish the fire the section was sealed off and inert gases were forced in—a mixture of nitrogen and carbon-dioxide.

For several weeks relays of men wearing Draeger apparatus have been working in the irrespirable atmosphere endeavoring to recover the bodies still in the mine. The process has been a slow and a laborious one, and attended by conditions of a most nauseating character. The apparatus corps could advance only by stages as it was necessary to construct air-locks so that the sealing of the affected area would not be interfered with. The work was attended by one unfortunate accident, in which a member of one of the apparatus corps displaced his mouth-tube and was immediately suffocated, and, at the same time, the remaining members of the party were placed in grave danger and were rescued by another party only just in time. It is evident from the proceedings at the inquest that the man who lost his life was upset and overcome by nausea by suddenly coming across a dead body. By some means, not quite clear, the unfortunate man's mouth-tube slipped out of his mouth, and before his comrades could reach him his teeth were tightly clenched and could not be opened. From the evidence of other members of the party it is clear that the sudden encounter with the dead body drove him delirious, and that he lost control of himself altogether.

The remarks of the Coroner in closing his enquiry are worthy of reproduction. After referring the services of the jury, the Coroner remarked: "He had further to allude to the services of the rescue parties. Where all men had been engaged in the work of rescue it was impossible to particularize, but he considered that the search party who recovered the bodies had done even more heroic service than the brave men who rushed down the mine immediately after the explosions had occurred. They all knew that sudden danger called forth indomitable heroism, that kind of heroism which he thought deserved the most notice. The men engaged in this work knew that there was no possibility of saving human life, but only to collect bodies. That had been a work which had not called forth much enthusiasm, but he did consider that all those teams, most of them strangers to the mine—because unfortunately the local men perished—had rendered a service which was invaluable. The apparatus which had been demonstrated before them was only in its infancy, and he had no doubt, that men in the future would be able to enter foul air and rescue their fellow-workmen free of all danger to themselves. The thanks of the whole community were due to these men for carrying out their difficult and dangerous work. No one who had not seen the condition of the bodies could realize the repulsive work they had had to do."

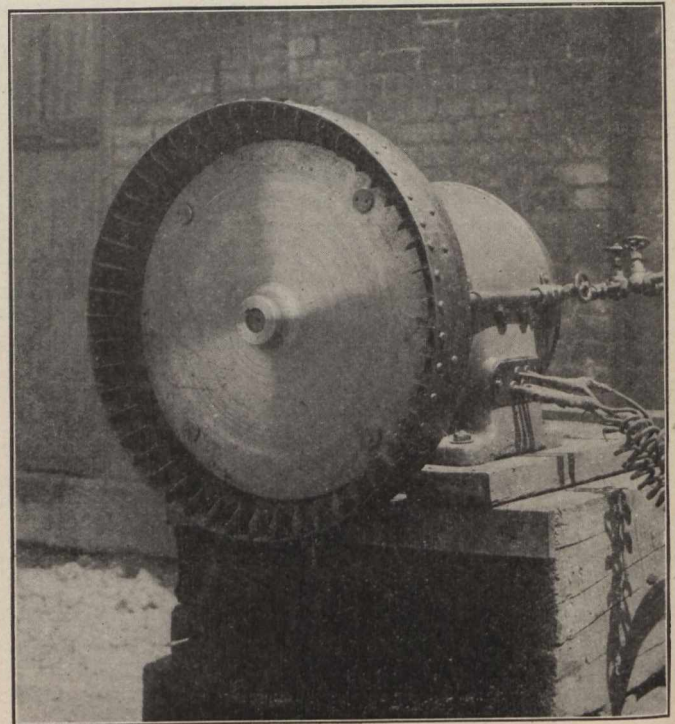
When it is considered that for weeks at a stretch relays of trained men have been working in an atmosphere so deadly as to cause immediate death to those who breathed it, engaged in the most unpleasant task that can be allotted to men, there is little need to en-

large upon the lessons to be learnt. One fact, however, should never be forgotten, that mine rescue work with oxygen-breathing apparatus is no work for amateurs or weaklings. Men must be rigidly trained, their apparatus must be in perfect and reliable condition, and thorough discipline and obedience to rules must be enforced. Oxygen-breathing apparatus will not enable men to do foolhardy or impossible things, and improperly used it becomes rather a source of danger than otherwise. But that these devices can be of incalculable benefit in time of emergency can no longer be doubted. As one mine manager remarked: "You may never need apparatus, but when you do need it, you need it bad." Mere provision of the apparatus, however, without training and proper supervision is suicidal and simply an invitation to disastrous accident.

### A NEW TYPE OF MINE AIR HUMIDIFIER.

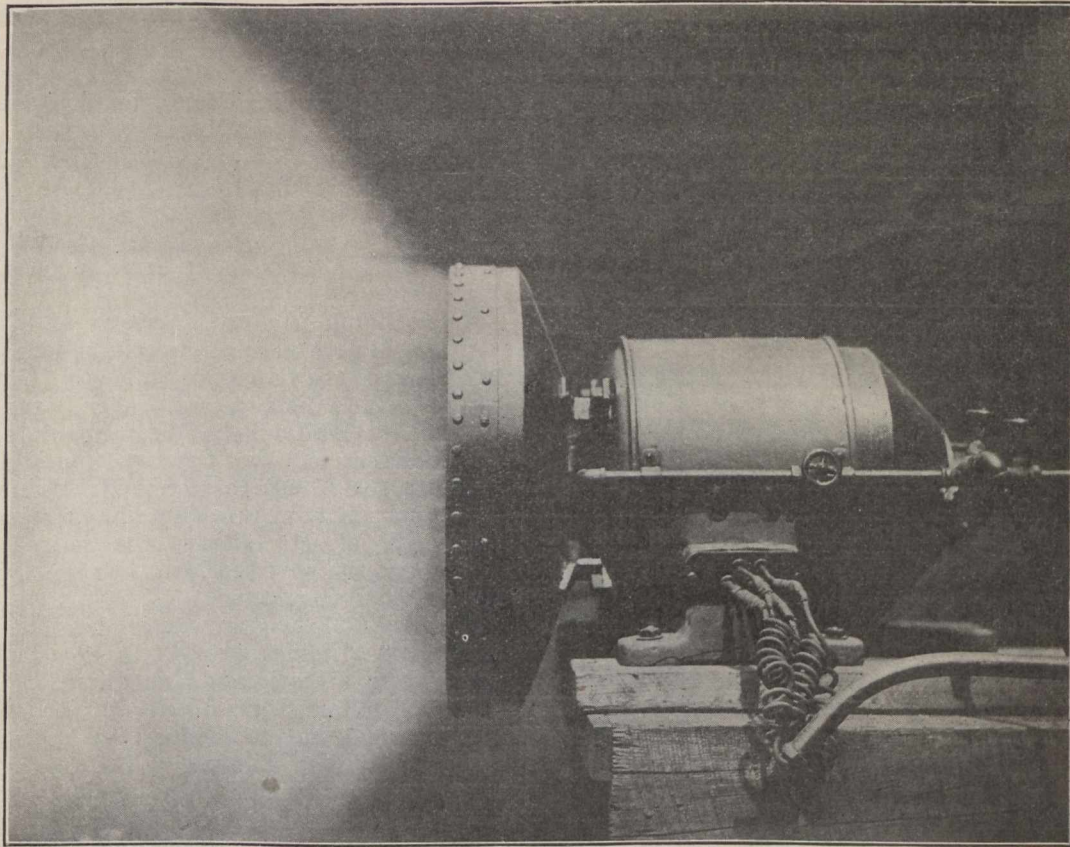
The United States Bureau of Mines has on exhibition at its Pittsburg testing station, a machine for producing water mist that is almost fine enough to be termed a fog.

As shown in photographs 1, 2 and 3, the machine consists of a hollow wheel mounted upon the shaft of an electric motor. The wheel is provided at its periphery with spray nozzles, at its hub with an opening



Centrifugal Humidifier, showing improvements.  
Front View.

for the admission of water, and on its back with fan blades. The back and rim of the wheel is enclosed in a steel housing that serves as a casing for the fan, as a support for the air diffusion vanes, and as a shield for the revolving parts. When the wheel is rotated at normal speed by the motor, and water is admitted (under practically no pressure) to the opening in the hub, centrifugal force develops, at the nozzles in the wheel's



Centrifugal Humidifier in action, discharging 1.65 gallons of water per minute, showing the appearance of the mist as it leaves the humidifier.

periphery, an hydraulic pressure of more than 200 pounds per square inch. This pressure drives the water through the nozzles in the form of a fine spray which is seized, broken up still more, and finally carried away by the blast of air that the fan blades on the back of the wheel blow out all around the rim of the wheel between it and the surrounding housing. The diffusion

vanes cause the air to be discharged in the form of a cylinder whose axis is coincident with the fan shaft.

The mist produced is extremely fine and there is practically no dripping of solid water. The device which was developed by H. H. Clark, one of the bureau's engineers, is not yet in its final form, and has not yet been tested in actual practice.

## PERSONAL AND GENERAL

Mr. C. L. Cantley, of New Glasgow, N.S., was in Montreal last week.

Mr. Charles MacNutt, of Casilla, Antofagasta, Chili, is in Montreal. Mr. MacNutt has been a member of the Canadian Mining Institute for a number of years.

The Australian Mining Standard announces that Mr. H. C. Bellinger, general manager of the Great Cobar, Ltd., and formerly associated with undertakings in British Columbia, is about to take a four months' holiday, and will spend a part of that time in England. Our contemporary adds that Mr. Bellinger, as general manager of the greatest copper producer of the Commonwealth, has achieved an unquestionable success. He has not had by any means an easy task to accomplish, for besides the mining and metallurgical problems he has been called upon to solve, he has had to deal with labour difficulties that were far from considerable.

Capt. T. L. Angel, for many years with the De Beers Company, at Kimberley, as mechanical engineer, has arrived in Canada and proposes to practice his profession in this country.

Mr. A. B. Willmott, consulting engineer of Toronto, has returned from a trip to the Eastern Townships

where he examined a pyrites property for American clients.

Mr. James Ashworth, Vancouver, B.C., recently completed several examinations of coal properties in Alberta and Saskatchewan.

The address of Mr. G. M. Colvocoresses, formerly of Gowganda, Ontario, is now Room 1407, 43, Exchange place, New York city.

Mr. David H. Browne, of Copper Cliff, recently delivered an interesting address before the Undergraduates Society of Applied Science of McGill University on the subject of the early history of the Canadian Copper Company.

While examining a property near Ottawa the other day, Mr. J. Beidelman, consulting mining engineer of Montreal, was severely injured from falling down an 18-foot shaft.

In its issue of October 26th, The Engineering and Mining World published an appreciative article on the work of Dr. Reginald A. Daly, who, as we announced some months ago, has been appointed to the head of the Geological Department of Harvard University, filling the Sturgis-Hopper Chair, in succession to Professor Davis. Our contemporary remarks, "the position

is probably the highest obtainable on this continent in geological work, and is a life appointment." Dr. Daly is a native of Napanee, Ontario, and was a member of the staff of the Geological Survey of Canada from 1902 to 1907.

Mr. T. J. Flynn, jr., formerly of Colorado and Porcupine, has been appointed the Canadian agent for the Taylor Engineering & Manufacturing Company, of New York.

Mr. Walter C. Adams, who graduated from McGill University in 1894, and has been mining in Mexico for the past ten or twelve years, is visiting Montreal and may spend the winter in that city.

Mr. C. P. Hill has returned to Montreal from British Columbia.

Mr. Charles Fergie has returned from the West.

Mr. J. W. Evans, of Belleville, was in Montreal on business last week.

Mr. G. C. Bateman, of the Canadian Mining and Exploration Co., Limited, Toronto, was in British Columbia last month.

Dr. J. Macintosh Bell was in the Kootenay and Similkameen districts, British Columbia, at the end of October. He went thence to the Coast cities, Vancouver and Victoria. He was accompanied by Mr. Gwynn G. Gibbons.

Mr. Frederick K. Brunton, metallurgical engineer, formerly assistant engineer of tests for the Anaconda Copper Co., Anaconda, Montana, U.S.A., has been appointed assistant superintendent at the British Columbia Copper Co.'s smeltery at Greenwood, B.C.

Mr. Marius R. Campbell, geologist in charge, economic geology of fuels, U.S. Geological Survey, and Mr. W. Nelson Page, have been examining coal properties on Graham island of the Queen Charlotte group, British Columbia.

Mr. Herbert Carmichael, provincial assayer, Victoria, B.C., left that city during the latter part of October on a trip to Mexico.

Mr. Robt. Clark, who had been in charge of the work of driving a long low-level adit at the Payne mine, in Slocan district, B.C., was seriously injured by an explosion of gelignite. It is feared he will lose the sight of both eyes, beside being otherwise disfigured.

Mr. Graham Cruickshank, of the engineering staff of the Consolidated Mining and Smelting Company of Canada, Ltd., has been conducting experiments in connection with the reduction of lead-zinc ores, at the Canada Zinc Co.'s electro-thermic zinc smeltery at Nelson, B.C.

Mr. H. E. Dodge, who for years had been accountant at the smeltery offices of Consolidated Mining and Smelting Co., of Canada, Ltd., recently left Trail, B.C., for New York, where he will be chief accountant for the several companies with which Mr. W. H. Aldridge, formerly managing director for the Consolidated Company, is now prominently connected.

Mr. Colin Fraser, mining geologist, of London, England, formerly chief geologist for the Geological Survey of New Zealand, is in British Columbia, after having visited mines in Cobalt district, Ontario.

Mr. John Hopp, the largest operator of hydraulic placer-gold mines in Cariboo district, B.C., has been visiting Victoria and Seattle at the close of the gravel-washing season in Cariboo district.

Mr. Sidney J. Jennings, of Boston (United States Smelting and Refining Co.); Mr. D. D. Muir, jr., of Seattle, Washington; and Mr. L. O. Kellogg, of Tacoma,

Washington, have been examining the Standard silver-lead mine, near Silverton, Slocan lake, B.C.

Mr. A. G. Larson, has returned to Vancouver, B.C., after having examined for a London company several mining properties on Moresby island of the Queen Charlotte group. He was assisted by Messrs. G. H. Dickson and B. Kirk.

Mr. Douglas Lay, superintendent of the Van-Roi mine, near Silverton, B.C., has returned to his post after having been absent about three months on a trip to England.

Mr. J. Ralph Lockard, formerly of Pittsburg, Pennsylvania, is now general superintendent of the several coal mines of the Canadian Collieries (Dunsmuir), Ltd., in Cumberland district, Vancouver island, B.C.

Mr. C. O. Mailloux has been appointed assistant to the president of the Granby Consolidated Mining, Smelting, and Power Co., Ltd. Mr. William H. Nichols, New York, is now president, having last month succeeded Mr. G. M. Luther, who retired owing to ill-health, and the new president has been given an assistant, as above-mentioned.

Mr. T. L. McAllister, superintendent of the Noble Five group of mines, near Cody, Slocan, B.C., has been on a visit to Victoria and Vancouver.

Mr. I. L. Merrill, president, and Mr. W. B. Dickson, vice-president of the Hedley Gold Mining Company, were at Hedley, Similkameen, B.C., last month, visiting the company's Nickel Plate group of mines, and 40-stamp mill. The company has already paid three five per cent. dividends, aggregating \$180,000, and is expected to pay at least ten per cent. more at the end of December, proximo.

Mr. W. G. Norrie, for some time past on the staff of Mr. A. G. Larson, consulting engineer, Vancouver, has been appointed superintendent of the Lucky Jim zinc mine, at Bear Lake, Slocan, B.C. Mr. Norrie has been, during a number of years, on the staffs of, respectively, the Le Roi Mining Company, McGillivray Creek Coal and Coke Company, Columbia Coal and Coke Company, and Ikeda Mines. For the last two years he has been with Mr. Larson.

Mr. J. L. Parker, of Vancouver, B.C., has spent the summer and autumn months of the current year on his Lee Lake ranch, near Burmis, southwestern Alberta, in the vicinity of which he has, as well, some coal lands.

Mr. Thos. G. Proctor, of Victoria, B.C., managing director of the Lucky Jim Mines, Ltd., has been in Winnipeg, Manitoba, conferring with his co-directors concerning the future operation of the company's mine, in Slocan district, B.C. Shipment from the mine of zinc ore has been in progress during recent months.

Mr. J. L. Retallack, of Kaslo, B.C., has been in Hazelton district, Skeena river, examining the Silver Standard silver-lead mine, owned by the Stewart & Welch syndicate. A local newspaper states that much more underground development is to be done, and a compressor and power drills are to be added to the mine equipment.

Mr. A. B. Ritchie, who recently returned to British Columbia from a trip to the Provinces of Ontario and Quebec, is now superintendent of the Consolidated M. and S. Co.'s Molly Gibson mine, in Nelson mining division.

Mr. M. K. Rodgers, of Seattle, consulting engineer, has gone to Mexico to look at some mining properties in that country. Mr. Rodgers is well known in British Columbia in connection with the earlier development of the Nickel Plate and Hidden Creek mines, both in the province.

## OBSERVATORY INLET, BRITISH COLUMBIA.

By R. G. McConnell, in "Summary Report of Geological Survey," 1911.

So much interest is being taken in the development by the Granby Consolidated Mining, Smelting and Power Company, Limited, of what it is believed will prove to be a large copper mine, situated near one of the bays of Observatory Inlet, that the following extract from the report of Mr. R. G. McConnell, of the Geological Survey of Canada, on Observatory Inlet, will most likely be widely read by those who do not usually see the "Summary Report" of the Geological Survey Department. It may be well to here state that Goose Bay, mentioned by Mr. McConnell, is known as Granby Bay.

### Observatory Inlet.

"Observatory Inlet parallels the lower portion of Portland canal on the east, and is connected with it by a passage north of Pearce Island. Its shore-lines are more irregular than those of Portland canal, and toward its head it divides into two branches known as Hastings arm and Alice arm. Hastings arm continues in the general northerly direction of the main inlet, while Alice arm bends to the east and, like Portland canal, cuts through the granitic batholith of the Coast range and penetrates for some distance the argillites and associated rocks which border it on the east.

"At the junction of the two arms, the inlet expands in width and contains a number of islands, some of large size. Larmoc Island has a length of seven miles, and Brooke Island of three miles. West of Larcom Island is Goose Bay, an irregular sheet of water three and a half miles in length and from half a mile to a mile in width. The principal known mineral deposits of the inlet are situated in this vicinity.

"The inlet is bordered on both sides by mountains in groups and short ranges except near the head of Alice arm. From this point, a high rough plateau broken by basaltic cliffs extends eastward to the Nass valley. The mountains present, as a rule, steep, glacier-worn sides toward the inlet, and range in height from 3,500 to nearly 6,000 feet. Glaciers occur in some of the valleys, but are not so large and conspicuous as along Bear River.

"The streams entering the inlet are all of moderate size. They include Falls creek, a short stream with numerous falls emptying into Goose bay; the Kitzault and Ilianci, at the head of Alice arm; and a branching sediment-laden stream at the head of Hastings arm. Falls creek is utilized to operate the plant at the Hidden Creek mine. It is a steep stream and flows a large volume of water during the greater part of the year, but, like all of the streams of the district, the supply becomes greatly diminished during the midwinter months.

### Geology.

"Observatory inlet has its whole course in the Coast range and the rock sections along it consists mostly of granite. A large included mass of argillites associated with greenstones, mostly pyroclastic in origin, occurs at the junction of the two arms, and argillites also occur along the upper part of Alice arm.

"**Granites.**—Granites occur along Observatory inlet from Pt. Ramsden, opposite Pearce island, northward to a point near the southern end of Goose bay, where they are replaced by argillites and greenstones. The latter are exposed along the shores of the inlet for a distance

of nine miles, and are then followed by granites and allied rocks, which continue to the head of Hastings arm and for some distance beyond.

"Alice arm extends eastward beyond the eastern edge of the Coast Range batholith. The mountains along the lower portion consist of granite, and those bordering the upper portion of argillites interbanded in places with greenish feldspathic beds.

"The granites along Alice arm and the lower part of Hastings arm are medium-grained, occasionally porphyritic, greyish rocks made up mostly of quartz orthoclase and plagioclase with sparingly distributed biotite. In the upper part of Hastings arm, the grey granite is replaced by a dark-colored, more basic and apparently older variety, feebly schistose in places, and cut near the contact by acid granitic dikes. This rock is very coarse-grained in places, has hornblende as the principal dark mineral, and represents a transition phase between the granites and diorites.

"**Argillites.**—An area of dark argillaceous rocks with some greenstones, enclosed on all sides by granite, occurs at the junction of Alice and Hastings arms. The area has a width along the west shore of Observatory inlet of nine miles, but narrows to the east. On the east shore it is barely two miles wide, and the area appears to wedge out in the bordering mountains. Larcom, Brooke, and some smaller islands near the junction of the two arms, consist of argillites cut by granitic dikes. The area, while not traced through, probably extends westward to Portland canal, as similar rocks somewhat more highly altered occur in the same strike in the vicinity of Maple bay.

"The argillites and associated beds are very similar to the rocks of the bitter Creek series of Bear river, but cannot be definitely correlated with them until the intervening region shall have been more closely examined. The principal variety is a fine-grained sedimentary rock, made up largely of partz grains with some feldspar, darkened with carbonaceous material. Mica, mostly secondary, is usually present, and in places the argillite passes into a quartz mica schist. Secondary quartz, pyrite, calcite and hornblende are also common constituents.

"In texture the argillites vary from a hard, fine-grained, compact rock to a granular one in which the grains are distinctly visible. The color varies with the texture, becoming lighter with increasing coarseness, and in places the fine-grained, dark and coarse, greyish more feldspathic varieties alternate in thin bands.

"The argillites are seldom, and only over limited areas, cleaved into slates. Usually they occur in rather heavy beds from one inch to six or more inches in thickness, and in weathering form a talus of angular fragments.

"The associated rocks are greyish limestones and beds and wide bands of greenstone. The limestones are not prominent, and only occur in small beds and bands seldom traceable for any distance. The greenstones largely replace the argillites toward the southern edge of the area. They are granular, mostly fragmental rocks.

"The beds of what may be called the Goose Bay argillite area, are folded into a number of anticlines and synclines, striking approximately east and west, or parallel to the long axis of the area. The dips, as a rule,

are regular and comparatively low, although, in places, the strata are steeply tilted and strongly distorted. No faulting on a large scale was observed.

"The Goose Bay sedimentary beds occupy a depression in the granitic rocks of the Coast Range batholith, and are cut by numerous acidic dikes genetically connected with it. Various types are represented, including pegmatite, aplite, quartz porphyry, and granitic dikes. A second system of lamprophyric and basaltic dikes, younger and more basic in character than those connected with the granitic intrusion, is also prominent. The dikes of this system are later than the mineralization of the region.

"Dark, sedimentary rocks very similar to those in the Goose Bay area occur along the upper part of Alice arm, east of the main granite area. They consist mostly of fine-grained, dark, slaty rocks, often in heavy beds, with coarser feldspathic bands, some of which hold small angular fragments. Farther north along the Kitzault valley, in the vicinity of the Red Bluff group of claims, the dark sedimentary rocks are largely replaced by fine and medium-grained greenish fragmental rocks, tuffaceous in character. These rocks include dark argillaceous bands and are much less altered than those in the vicinity of the granite. Their relation to the latter was not ascertained, as in the course travelled along the valley the connecting section is concealed.

"No fossils were collected and no evidence in regard to the age of the sedimentary rocks was obtained, other than that they are cut by, and are, therefore, older than the Coast Range granitic batholith usually referred to late Jurassic or early Cretaceous. The argillites are often highly altered locally, in places passing into mica schists, but this is attributed to the great granitic invasion and affords no proof of extreme age. It is probable that none of the sediments are older than the Carboniferous.

#### Mineral Deposits.

"The mineral deposits of Observatory inlet consist of quartz veins containing value in silver and lead and, in one case, in molybdenum, and of what can only be described as mineralized areas containing low value in copper. The latter will be described first.

#### Hidden Creek Copper Company.

"The claims controlled by the Hidden Creek Copper Company were staked about ten years ago, and a considerable amount of surface and underground work was done on them by the Hidden Creek Copper Company under the direction of Mr. M. K. Rodgers. Recently the claims were acquired by the Granby Consolidated Mining, Smelting and Power Company, operating at Phoenix, British Columbia.

"**Situation.**—The claims are staked on the summit and sides of a hill 920 feet high, enclosed between two branches of Hidden creek, and situated 8,500 feet north of Goose bay, near its outlet into Observatory inlet. A good wagon-road, planked where necessary, about two miles in length, has been built from the portal of the main tunnel to a wharf at Anyoux on Goose bay, the shipping port of the mine, and a tramway, partly gravity and partly traction, to the same point, was commenced some years ago, but never completed.

"**Rock.**—The rocks in the vicinity of the mine consist of dark and dark-grey argillites with occasional light-coloured, coarse-grained, feldspathic beds, and rarely some limestone. Beds and bands of greenstones, probably largely of pyroclastic origin, occur with the

argillites, but are not prominent in the vicinity of the mine. Both argillites and greenstones are always more or less altered, and in places pass into mica, quartz-mica, and chloritic schists. The bedding is coarse, and while a strong cleavage is developed in spots, the bedding planes over most of the area constitute the principal partings. The beds have been compressed into several folds, and, in places, dip steeply, but are seldom, in the section examined, overturned, and no large faults were observed. The strike, while generally east and west, shows considerable variation in places.

"The argillites and associated rocks are exposed over an area about nine miles wide, where cut by Observatory inlet. They are surrounded by the granite rocks of the Coast range, and are considered to be an undestroyed and deeply sunken portion of the old roof of the Coast Range batholith. The basin they occupy is of great depth, as the sedimentary rocks of the inclusion are exposed from base to summit of mountains more than 5,000 feet in height, and they must extend for a considerable depth below the present surface.

"The argillites are cut by numerous dikes, one set being older than the mineralization of the region, and genetically connected with the enclosing granitic rocks. These vary widely in character and include granitic, dioritic, quartz-porphyry, aplitic, and pegmatitic types. In addition to these, a second widely distributed set occurs, the members of which intruded after the mineralization of the region. These are fine to medium-grained basic dikes often of a lamprophyric character. Thin sections from examples cutting Mammoth bluff showed laths and occasional phenocrysts of felspar, mostly plagioclase, with abundant brown hornblende in long prisms and occasional plates of mica. Rounded, irregularly-bounded quartz grains, possibly of foreign origin, are also present, and large calcite areas, probably representing original olivine, are of frequent occurrence. A second type obtained from a dike crossing the main tunnel of the Hidden Creek mine between the two orebodies, contained large olivine and augite phenocrysts in a fine-grained hornblende-feldspar base and is classed as an olivine basalt. A third type, represented by a dike crossing the Redwing, consists mainly of hornblende and plagioclase and possesses a well-marked ophitic structure.

"The later dikes may be connected with a basaltic flow which caps the hills south of Alice arm. They do not appear to affect in any way the orebodies they cut.

"**Workings.**—A large amount of surface and underground work has been done on the Hidden Creek mine. The mineralized area is very large and was first outlined roughly by long trenches running in various directions. Subsequently a working tunnel was started below what is known as Cabin bluff at an elevation of 530 feet, and has been driven straight into the hill in a northwesterly direction for 950 feet. A drift to the left from the main tunnel, starting 85 feet from the face, has been carried in for a distance of 300 feet, and several shorter drifts from points along the main tunnel serve to explore the ground bordering it.

"Beside the main working tunnel and its branches, a number of shorter tunnels have been driven at various heights into the iron-stained slopes of Cabin and Mammoth bluffs. One of these, commenced in a depression at the foot of Cabin bluff, is connected by an upraise with the main tunnel.

(To be continued)



## SPECIAL CORRESPONDENCE

### NOVA SCOTIA

**Dominion Coal Outputs.**—The Dominion Coal Company's output still maintains a high level. In October the production from the Glace Bay mines totalled 422,000 tons, a figure that will probably stand as the largest monthly output of the year. Last October's output was 348,002 tons, or 74,000 tons less than was obtained this year. The output of the Springhill mines was 37,000 tons, so that the combined coal production of the company's collieries was 460,000 tons for the month of October.

Comparing the ten months ending October 31 with the same period of last year the production for 1912 totals 3,743,000 tons, against 3,322,000 in 1911, showing an increase of over 420,000 tons. With Springhill figures added the Company's total production for the ten months of this year is approximately 4,100,000 tons.

**Changes in the Coal Company's Management.**—It is announced that Mr. M. J. Butler has resigned the position of general manager of the Dominion Iron and Steel Company, and of the Dominion Coal Company, which he has held since the beginning of 1910. Mr. Butler's resignation took effect on the 1st of November. Mr. D. H. MacDougall, who has, during Mr. Butler's managership, filled the position of assistant general manager of the Dominion Coal Company, along with the position of superintendent of mines and quarries for the Dominion Steel Company, is appointed second vice-president and general manager of the Dominion Coal Company. It is understood that Mr. MacDougall's duties will comprise the direction and control of the mines and quarries of the Steel Company, or, in short, the production and assembly of all raw materials. At the time of writing no official announcement has been made of the exact nature of the changes which Mr. Butler's resignation will entail, beyond that of Mr. MacDougall's appointment.

**Accidents in the Use of Breathing Apparatus.**—A tendency has recently manifested itself on the part of rival makers of breathing apparatus to make use of any mishap or accident which may occur in the wearing apparatus to decay the manufacturers of the rival maker and point out the excellencies of their own. It may be pointed out that this is a very unwise procedure and will eventually react on all types of breathing apparatus. Your correspondent is in receipt of a pamphlet from the United States representative of an English firm of rescue apparatus makers, which records the death of a member of the Pittsburg Mine Rescue Corps while wearing a breathing apparatus to explore a sealed-off district of a mine filled with noxious gases. An examination of the apparatus after the recovery of the body showed the presence of a small hole in the breathing bag, through which outside air was drawn by the action of the injector. It is also stated that a small crack was present in the solder joint of the "cooler," very hard to detect "except by pressure test." The leaflet further states that the water gauge test of the apparatus was evidently neglected. It seems an obvious conclusion that this particular apparatus must have been in poor condition, and that had it been submitted to the tests which every breathing apparatus should undergo before they are used in deadly atmospheres, it would not have been considered fit to use. Breathing apparatus are, and must neces-

sarily be, delicate pieces of finely adjusted mechanism. They remain unused for long periods, and when they are required the necessity is usually immediate. But it should be a rigid rule of every mine rescue corps that no man shall descend into irrespirable atmospheres except with an apparatus that has been thoroughly tested in the manner that every competent station superintendent knows his apparatus should be tested. To call attention to the possible defects and dangers of breathing apparatus and to suggest the remedy is a laudable proceeding, but to take every such occasion as an opportunity to "knock" the rival device is most reprehensible and unworthy of reputable makers, who should be content to stand on the merits of their own device. It is a proceeding which will most surely bring its own revenges. The accepted types of oxygen breathing apparatus which are on the market to-day are almost identical in principle and operation, and their differences consist largely in detail of arrangement, often necessitated by the avoidance of a patented specialty. A continuation of a campaign of the kind alluded to may well cause the unbelieving public to include all types of breathing apparatus in the same condemnation, and to lose faith in all of them. This would be a deplorable error, as these devices are to-day only in the beginning of their future usefulness.

One feature which the extended use of these devices is daily making more and more apparent is that people who undertake to provide breathing apparatus, must also undertake to have them kept in constant readiness and efficiency. Ill-kept apparatus is far worse than none at all.

**Cheap Coal from Nova Scotia.**—Nova Scotia keeps in the very forefront of modern mining practice, and if one could believe the Glasgow Weekly Herald, the mining engineers of the province by the sea are very brainy and progressive gentlemen. The following veracious news item is clipped from the Weekly Herald:

"The South Metropolitan and the Gas, Light & Coke Companies have received an offer from the owner of large coalfields in Nova Scotia to supply them with all the coal they require at a less price than that which they are now paying the colliery owners in the North of England. An economy in the cost of extraction and delivery of coal by machinery, and, more particularly, in consequence of the profits at the pit's mouth by distilling all the surplus coal for oil, sulphate and ammonia, and coke, has made this offer possible. The owner, whose name he at present wishes to remain unpublished, is prepared to land coal upon the Thames from Nova Scotia at a cost of about 1s. 3d. a ton carriage, the whole cost of the material being under 16s. a ton. A new type of collier has been designed to convey the coal. It is believed that return freights across the Atlantic will always be available, but apart from the offer to the companies to supply coal it is interesting to note that by the process which has been adopted at the collieries in Nova Scotia whereby the coal has been transformed into oil, the companies will be enabled, if necessary, to make the whole of their gas by means of the oil which can be procured from Canada. It is considered possible to obtain from the collieries, which extend over 40 square miles, anything between 10,000 and 20,000 tons a day, half of which would produce something like 2,000 tons of oil. At the present

moment the Gas Light and Coke Companies use oil exclusively in the production of gas."

It is to be regretted that the owner of these unusual Nova Scotian collieries wishes that his name should not be published. The statement that it is considered possible to obtain from these collieries "anything between 10,000 and 20,000 tons a day, half of which would produce something like 2,000 tons of oil" is delightful.

**Bettington Boilers.**—At the time of writing, two out of an installation of three Bettington boilers at the new power plant of the Dominion Coal Company in the Lingan district were just completed. At the first test on one of these boilers fifty pounds of steam was raised in twenty-three minutes from the starting of the flame. When it is considered that the bricks and tubing and everything connected with the boiler was damp, this is a very good showing. It is of melancholy interest to note that Lieutenant Bettington, the talented inventor of this new type of boiler, recently lost his life in an aeroplane accident near Salisbury Plain, England. The installation has been put in by Fraser, Chalmers & Co., under the direction of their engineers, and as noted previously is the first of its kind in America.

## ONTARIO.

### COBALT, GOWGANDA, SOUTH LORRAIN

**Cobalt, Gowganda and South Lorrain—Nipissing Shipments.**—In the month of October Nipissing mines produced \$90,000 and shipped \$322,000 net. The small production was due to the fact that the old sorting plant has been closed down and the new washing plant at the new mill had not started up. The entire output from the mine for the month was in bullion, no low-grade ore being shipped. The new mill will certainly be running by the middle of this month, as the bins are full and the plant is ready save for some small adjustments. In view of the excellent discovery on the Seneca Superior at Cart lake the Nipissing will probably reopen the old workings at shaft 86, which has not been touched for some time. The development on the Seneca Superior is proceeding satisfactorily, and the company definitely entered the shipping lists with a carload of screenings from the new vein.

**General Assets Acquires Cochrane Mines.**—General Assets, Limited, of Toronto, has taken over the Cochrane mine and will proceed to develop it. Camps will be built on the southern end of the lot and a shaft sunk. Previous work on the Cochrane was almost entirely confined to an endeavor to find the extensions of the Temiskaming veins, although on the surface promising silver discovery was made to the south. Mr. J. F. McKenzie, formerly in charge of the Dome Lake for the same company will superintend operations.

**Townsite Labour.**—After a brisk struggle the strike at the Cobalt Townsite mine has been broken. After being on strike for about two weeks the men took a vote and decided to go back to work. The Western Federation of Miners took no official part in the struggle. The question at dispute was the length of shift, the 200 men working underground striking for an nine-hour instead of a ten-hour day.

The mine was closed down for about ten days, when the company managed to induce some of the men to go back and some of the strikers returned to work.

**T. and H. B. Report.**—The annual report of the Temiskaming and Hudson's Bay Mining Company showed that the year had been as fruitful of dividends as usual.

The gross revenue was increased by \$127,000 and the net earnings by \$76,000. Dividends were paid amounting to \$290,404. The total production for the year was 957,055 ounces, an increase of 152,431 ounces, against the total for last year. The cost of production was 14.9 ounces, or exactly the same as last year.

No less than 2,700 per cent. was paid in dividends this current year, against 1,600 per cent. for the preceding year. As to the physical condition of the properties, Mr. A. H. Brown, the manager reports that "the mine workings and plant are in good condition, so that a production equal to that of last year may be expected during the coming twelve months." Three veins were found during the year, one of them important. Work at the Gowganda claims has been costly and the results not very satisfactory, but development will be continued and the shaft sunk to 200 feet, and, as it is believed that better and more consistent values will be found in the veins at depth.

**La Rose Lucky.**—A very welcome addition to the ore reserves of the La Rose has been made at the 180-foot level of the Lawson mine in the northwest corner of the property. The vein is in places six inches wide of high-grade ore, but does not maintain either width or values uniformly.

**Foster Lease.**—On the Foster operations are being conducted at the 50-foot level by the Flynn Syndicate. The new management has already met with a little success, and has opened up a mud seam carrying some silver in leaf form.

**Hargraves Affairs.**—The Hargraves has been milling some ore in the Cobalt Central mill and will make a small shipment of concentrates soon. The company is continuing to work the mine in the hope of discovering more ore shoots, and they are still in tolerably good financial position to continue development.

**Ruby Silver Progress.**—At North Cobalt a small two-stamp mill is being erected on the Ruby Silver, and an attempt is being made to find silver on the Cobalt Contact, the Red Rock and some others. A small shipment of smaltite ore was made by the Lost and Found Company from the Cobalt Contact. It is the Lost and Found Company that is now carrying on the work at the North Cobalt properties. No very encouraging developments have been made to date.

### PORCUPINE AND SWASTIKA

**Porcupine and Swastika—Hollinger Bulletin.**—With the issuance of the first four-weekly statement of the Hollinger Gold mines, the Porcupine camp is on a firm basis. There is no longer any doubt of the permanence of the industry. The report goes into considerable detail, and it is a matter for commendation that the company intends to inform its shareholders and the public exactly the position the mine is in every four weeks or at the time they receive their dividend. As Mr. Robbins says, milling operations date from July. Since that date \$509,000 represents the net profits of operations. The profits at the present time represent \$40,000 a week and the dividend \$90,000 every four weeks, so that there is plenty of margin left for contingencies. Satisfactory as the report of Mr. P. A. Robbins shows that the physical development of the property is, it is understood that since the summary was written there has been a marked improvement. To the observer superficially glancing over the report the table showing values on the No. 1 vein would not appear reassuring. As the No. 1 vein is the backbone of the mine this would appear serious. On the face of it the table shows that there is 1,000 feet of a vein 8 feet

wide of an average value of \$31.54 a ton at the 100-foot level, at the 200-foot level there is 839 feet 6.7 feet wide of 45.74 ore, but at the 300-foot level, where the No. 1 vein has only been opened up for 63 feet, the vein is 5.7 feet wide and only runs \$8.40 to the ton. Read without the note over the page, this is not reassuring as to the future of the mine. Mr. Robbins, in his note, partly elucidates the situation. He says: "On the 300-foot level development has been delayed pending the completion of a crosscut from No. 1 vein to No. 37 vein for the purpose of establishing ventilation. The average value of \$8.40 shown for the 63 feet of drifting upon the 300-foot level corresponds with the values contained in this particular block of ground on the level above. The winze from the 200-foot level to the 300-foot level was sunk in a position convenient for working without regard to values. There is no change in values of formation between the 200 and 300-foot level." That makes the position reasonably clear, but if it had been added that a flat drill hole had already been used to prospect ahead of the drift and that the core showed over \$30 ore it would make the situation quite plain.

Mr. Robbins states that "the average value of all ore removed from the mine to date is \$23.69 per ton established by treating 26,221 tons in the original test mill and in the new mill." This included dump ore, waste rock mined in drifting and sinking and ore from development work as well as ore from the stopes. The dump has now been cleared out of the way and in the future the ore will run well over \$30 as most of it will come from the stopes. There are now 30 drills running in the mine. On the 200 and 300-foot levels alone there are 18 faces in ore, twelve on the 200 and six on the 300-foot. There is every probability that in addition to the regular four-weekly dividend the company will pay a bonus as a Christmas or New Year's gift.

**Plenaureum.**—Of all the other Porcupine properties (excluding the Dome), it is possible that the Plenaureum has made the most headway during the past month. After connecting the two shafts under Pearl Lake drifting operations commenced on the veins and four are now being worked in both directions. Generally speaking results are entirely satisfactory and before the spring the Plenaureum should have a tonnage of ore in sight which will justify the erection of a mill. Still more important is the fact that a winze sunk on the No. 6 vein is at a depth of 67 feet below the 200-foot level still in high grade ore and the vein three feet wide. Its neighbour, the Jupiter, is also holding the improvement noted in the last two or three months. There has now been developed in the No. 1 series of veins a length of 270 feet of a good average milling width and values. Another body of quartz running parallel to the first vein has been located and will be opened up and sampled. If it proves to be milling ore the stoping width in this particular spot in the vein will be very considerable. Careful plans are being prepared for the erection of a mill next year if the continued good development of the property warrants it. At present the management is feeling its way very carefully.

**Vipond Mill.**—The Vipond mill is shut down and will remain so until certain alterations to the mill structure, necessary when the cyanide plant is installed, have been made. This will not be more than two or three weeks when the mill will be started up again and will continue to produce until the cyanide plant is ready. The cyanide plant is an addition to the present plant. Underground work continues, about 35 men being employed.

**Schumacher.**—The shaft at the Schumacher mine is being pumped out, and from present indications it appears possible that a concrete bulkhead can be built and operations resumed from the same workings. It will be remembered that the surface caved in on the drift at the 100-foot level and flooded the mine. There will, of course, be no further attempts made to proceed further with the drift towards the lake at the 100-foot level, but if pumping is successful in getting rid of the water the shaft will be sunk to the 200-foot level and the cross-cut towards the lake resumed from there.

Mr. R. B. Watson is to make an examination of the Foley-O'Brien mine and report to the company on the advisability of resuming work there.

**Crown Chartered Takes a Rest.**—The Crown Chartered is still closed down and will remain so until the directors can agree on joint action. The only property now working in Northern Tisdale and Southern Whitney is the Hughes. The Porcupine Lake is now sinking an incline shaft near the shore of Porcupine Lake, the fall has been spent in erecting a plant adequate for the very extensive mining campaign mapped out for this winter.

**C. M. and E.**—The Canadian Mining and Exploration Company is very thoroughly sampling the Smith and Markey claims in Night Hawk Lake. These claims include Gold Island, samples from which precipitated the rush into Night Hawk Lake in 1908. Under the direction of Dome officials the ore body is being very thoroughly sampled so that a mill run can be made. There was at one time a small mill on the property but it has been burnt down. As a consequence of the operations of the Canadian Mining and Exploration Company there has been much staking and re-staking in Langmuir and Cody. There has also been a revival of interest in Turnbull and other townships to the west of Porcupine.

**Alexo Won't Sell.**—The Alexo Mining Syndicate, possessing the nickel deposit near Kelso has refused an offer from the American Smelting and Refining Company, and has determined to work the mine themselves. The offer after an examination by Mr. Kirby Thomas was very similar to that offered for the property four years ago by the Canadian Copper Company, and finally given up after it had been diamond drilled. Though no underground operations have been conducted this year development have been very satisfactory. Stripping along the big vein has shown a considerable tonnage of ore where before no ore was believed to exist. The vein has now been opened up for 250 feet, and for that distance there is continuous ore of high-grade quality. Since the tenth of August 1,300 tons have been taken out by an open cut and shipped to the Mond Nickel Company at Victoria Falls. This company so appreciates the high-grade of the Alexo ore that it has made certain concessions which will net the company three dollars more per ton. They are now paying on copper contents when it runs less than one per cent., and they have removed the penalty for cobalt. A small plant will be installed soon when underground operations will be resumed and it is hoped that a car a day will be shipped. So far all the ore has come from the surface, two glory holes and open cuts not more than six feet deep. The force has this summer never exceeded seven men, and the ore has been most economically extracted. A good profit has been made on the season's operations and the plant will be bought out of the profits.

Mr. C. A. O'Connell, recently manager of the Trethewey mine, has been appointed to superintend operations at the Tough properties near Swastika. Developments

here have been so satisfactory that Mr. C. E. Foster who has purchased the control, will proceed to open up the veins on a much more considerable scale.

## BRITISH COLUMBIA.

With the exception of the continuance of the strike of the miners at the coal mines of the Canadian Collieries (Dunsmuir), Limited, Vancouver island, and a reduction in numbers of men employed at two or three mines in Slocan district, where the miners had asked for higher wages, mining has been generally active in the province. Two metalliferous mining companies paid dividends during October, namely, the Consolidated Mining and Smelting Company of Canada, Limited, to a total amount of about \$232,000, and the Standard Silver-Lead Mining Company, with a total of \$50,000. The latter was the seventh monthly dividend the company had paid this year, and it made the aggregate of its dividends \$375,000, paid \$25,000 in April and \$50,000 a month since.

The following notes are on districts not producing ore to any considerable extent, but which are regarded as likely to eventually add considerably to the mineral production of the province:

### LARDEAU DISTRICT NOTES.

The outlook for mining in Lardeau district is now better than for several years past, as will be indicated by the following items of mining news:

**Ferguson Mines, Limited.**—The prospects for shipping ore the ensuing winter from this company's Silver Cup mine are promising; it is stated that not for at least three years have conditions been so favorable as now. The development work done during last summer has resulted in the mine having been placed on a basis that will allow of profit being earned on mining operations. This is the more encouraging since it is expected that returns will be received showing a larger output of silver-lead ore and proportionate earnings.

On the company's Ajax claim, adjoining the Nettie L., distant about one mile from the town of Ferguson, a recent development is attracting much notice throughout the district. In raising from No. 1 level, at between 30 and 40 ft. up a body of galena ore was found. When the information was received concerning this, there was 12 ft. 6 in. of ore exposed, and ore still in the face of the working. The value of this ore is given as from \$80 to \$100 a ton. As little production of importance has been made from this part of the company's property in recent years, this find is regarded as one of the most important developments experienced for a long time past.

The Nettie L., which formerly was one of the largest shipping mines of the Lardeau district, has been leased to Messrs. S. A. Sutherland & Co., after having been unworked for about seven years. The lessees have been operating here about three months, and already have taken out a carload of ore of excellent grade, while conditions indicate that it will be practicable to continue production.

**Noble Five Group.**—Mr. Andrew M. Craig, of Trout Lake City, has exposed in a 24-ft. open-cut on one of the claims of his Noble Five group, a 7-ft. lead of quartz matter in schist. In this there is about 20 in. of solid shipping ore. A cross-cut has been driven 90 ft., and to get under the above-mentioned good showing of ore this will have to be extended about 50 ft. A depth of 85 ft. from the surface will be gained, and,

owing to the steepness of the mountain, the gain in depth will be foot for foot of driving, when the lead shall have been cross-cut and drifting into the mountain be done. A shipment of 17 tons of ore from this property gave a net return of \$83 a ton, after payment of \$41.50 a ton for packing, freight, and treatment, making the total value of the ore \$124.50 a ton. Supplies will be taken in to the claim shortly, so that work may be resumed before next spring.

The Noble Five group is near the head of Brown creek, a tributary of Ten-mile creek, and is on the southern part of Silver Cup mountain. It is some 2½ miles beyond the Winslow group, and is 8 miles distant from Trout lake.

**Horseshoe.**—Mr. Craig has had packed out from the Horseshoe, which is three miles by trail from Trout Lake City, a few tons of sorted ore estimated to run about \$300 a ton. Work will be continued in the winter, and it is expected that more ore will be available for shipment by the time the trail shall be good enough for packing. The Horseshoe adjoins the Lucky Boy, which latter, as well as the Ethel, has been a shipper in the past.

**Other Properties.**—Beside those above-mentioned, there are other properties in various parts of Trout Lake mining division that are having attention, so that from some of these, as well, good results are expected.

### BIG BEND OF THE COLUMBIA.

**French Creek.**—Some placer-gold recently exhibited in Revelstoke has assisted in causing renewed interest to be taken in placer-gold mining on creeks in the Big Bend part of Revelstoke mining division. The heap contained between 40 and 50 oz. of placer-gold recovered by Mr. L. M. Remillard from his placer claims on French creek, situated immediately above the property worked in past years by the old French Creek Mining Company. Mr. Remillard has been working here for about two years, and is now well pleased with the results he is getting. The local water-supply situation is not favorable to the recovery of gold after the beginning of October, but he is continuing work in preparation for gravel-washing when conditions shall allow of its being done. He believes he has found an old channel through his ground and that it will pay him well to work it.

Higher up French creek is situated the Pioneer Placer Mining Company's ground, to which, it has been reported, a Keystone drill was taken lately for the purpose of testing the ground for prospective purchasers.

Below the Remillard group are three placer leases held by a Revelstoke syndicate, which has obtained a water record and intends to work this property next season. It is thought the old channel above referred to crosses the ground comprised within these leases, and that it will be found to contain good pay-gravel.

**Smith Creek.**—Chicago and Washington men have obtained an option from Mr. Harry Howard on his claims near the mouth of Smith creek and fronting on Columbia river. This ground formerly was held by the old Columbia Hydraulic Mining Company. The bonders have also secured seven placer leases up Smith creek to the westward, and they purpose beginning mining operations next spring.

**Other Creeks.**—Two placer leases have been taken up on ground on Eight-mile creek, and Mr. Raymond Allen has done a lot of work on Camp creek. Several placer leases have been taken up on other Big Bend creeks, so that altogether much activity in placer-gold mining next season is looked for.

**Mica in Big Bend.**—Two syndicates—one of Calgary and the other of Revelstoke men—have secured mica-bearing claims at the head of the Big Bend, and good samples of mica have been obtained. This mica-bearing locality is a different one to that of Tete Jaune Cache district, farther north, concerning which news has occasionally been published in past years.

#### QUEEN CHARLOTTE ISLANDS.

Among many mineral claims on Moresby island of the Queen Charlotte group are some in the vicinity of Hockport, Jedway, and Collison bay, respectively, that have lately been under examination by Mr. A. G. Larson, of Vancouver, and two assistants. It is understood that Mr. Larson is favourably impressed with some of the properties investigated. The majority of the mineral showings examined are thought to be sufficiently promising to justify further development.

While prospecting operations for coal and oil are being continued on Graham island, little definite information is made public concerning results. From time to time the island is visited by coal mining engineers, some of whom are strong in their denunciation of the gross exaggerations that have appeared in advertisements having for their main object the sale of shares. Several organizations, however, have been engaged in prospecting and development work, so that it is considered probable production of coal will be practicable from one or two properties whenever the necessary handling plant shall be put in.

#### IN SKEENA DISTRICT.

Among a number of promising silver-lead mineral claims in the vicinity of Hazelton, Skeena River district, on which silver-lead ores are reported to occur, are those comprising the Silver Standard group, on Glen mountain, about five miles north of Hazelton. A few weeks ago the Omineca Health gave an account of a visit paid to this property by Mr. John L. Ratallack, of Kaslo, B.C., a well-known Slocan min-owner and manager, and Messrs. J. W. Stewart and P. Welch, railway contractors, who are owners, or part owners of the property. The party was shown the mine by Superintendent Haskins. The Herald said: "After the inspection—and it may be mentioned that Mr. Retallack, who had examined the mine on two other occasions, stated there was absolutely no doubt about the Silver Standard becoming one of the best producers in the country—the owners of the property got together and decided upon plans for the immediate commencement of development on a much larger scale than has yet been attempted on any property in this district. The first thing will be to enlarge the camp to accommodate the larger number of men who are to be employed as quickly as things can be got in readiness for them. A compressor plant has been ordered for immediate shipment, and it is expected to arrive within the next ten days. Power drills have been ordered, together with all requisites for the new plant. Upon its receipt at the mine the machinery, etc., will be put in, and thereafter the heavy work will be commenced. One of the first things to be undertaken will be the work of driving a cross-cut tunnel from the 250-ft. level from the main shaft on No. 2 vein, to cut No. 3 and other veins above. This will open several of the larger veins and put the mine in shape to become a continuous and permanent shipper. It is estimated that this work will allow of some 40 tons of ore being mined a day and shipped to a smeltery.

#### CASCADE RIVER, PORTLAND CANAL MINING DIVISION.

During the greater part of the current year development work has been in continuous progress on the Cascade Falls Mining Company's group of mineral claims, situated in the Salmon River district of Portland Canal mining division, and results have proved generally satisfactory. Work has been restricted chiefly to driving a cross-cut tunnel, with the object of cutting at depth a vein described as being 20 ft. in width and containing silver-lead ore. This vein previously had been exposed in a number of surface cuts along a distance of between 300 and 400 ft. The underground cross-cut reached the vein early in September, and since then the working has been in ore of quite a different character to the galena, pyrite, and chalcopyrite found at the surface, for the fissure was filled with quartz and schist, which, though not at first thought to be of much value, has since been found to contain gold and silver, for assay returns of samples have been obtained that show from 1.24 oz. to 2.04 oz. gold and 87.4 to 93.4 oz. silver to the ton. The vein was reached at between 230 and 240 ft. from the portal of the cross-cut adit. The depth at the face is 135 ft. The ore obtained in the drift is stated to be of the highest grade yet found at depth in Salmon River district. A favourable smelting rate has been quoted, so it is the company's intention to ship ore during the coming winter.

The following excerpt has been taken from Mr. R. G. McConnell's report on the Salmon River district, included in the "Summary Report" of the Geological Survey for 1911:

"The first camp reached ascending Cascade river is that of Bunting Bros. and Dillworth, situated at an elevation of 1,050 ft. on the eastern bank of the east fork of Cascade river about a mile northeast of the International Boundary, and 12 miles from Portland canal, following the Salmon valley. A joint stock company, under the name of the Cascade Falls Mining Company, has recently taken over the five claims held by this syndicate.

"The principal showing occurs on Cascade Falls No. 2 claim, and consist of a mineralized zone traversing the greenstone schists which form the country rock in an easterly direction. The schists for a width of more than 30 ft. are altered and strongly silicified and pyritized. In portions of the zone galena is present in considerable quantities, associated with some zinc blende and occasional grains of chalcopyrite. A rough sample across 8 ft. of the best mineralized portion of the lead assayed in the laboratory of the Department of Mines, yielded: Gold, 0.14 oz., and silver, 7 oz. per ton, and lead 7.60 per cent. Ore of this grade could doubtless be mined at a profit in the district if present in quantity, but the extent to which it persists either in depth or along the strike of the lead has not yet been demonstrated. The mineralization is irregular both across the lead and along its strike, portions of the zone containing little or no galena, which is the principal silver-bearing mineral; and the present workings are limited to a shallow cut in the steep hillside across the lead and some surface stripping. The prospects are, however, considered favourable enough to justify a considerable expenditure for further exploratory work."

It should be remembered that about a year had elapsed between the time of Mr. McConnell's visit to the Cascade Falls group and that at which the information first above-given relates to, the latter having been only quite recently supplied.

## COMPANY NOTES

### CANADA IRON CORPORATION.

The second annual meeting of the Canada Iron Corporation was held in Montreal on October 24th. The profits for the year, ending May 31, were shown to be \$375,140, as compared with \$401,885 in 1911. After meeting interest and other charges a balance of \$46,566 was carried forward to the credit of profit and loss, making the total at credit at the end of the fiscal year, \$406,737. The president, Mr. T. J. Drummon, in his report to the shareholders, explained the somewhat disappointing result of the year's operations as follows:

"The adverse conditions in the iron trade of the United States during the last half of 1911 continued throughout the first half of 1912, and resulted in large quantities of American pig iron being dumped into the Canadian market and sold at sacrifice prices. The corporation had naturally to compete or lose the trade, and the result of such unusual competition has consequently affected the outcome of this year's operations; but your directors are pleased to report that the revival of the United States' iron trade has already resulted in an increased demand and advanced prices there, with the resulting falling off of shipments to Canada, so that the corporation has orders on its books for a very large tonnage of pig iron for immediate and future shipments, at remunerative prices."

As to the future for the pig iron ore department, Mr. Drummond stated that with American furnaces gradually coming into operation again, the corporation has already booked contracts for a considerable tonnage of ore, for immediate and future shipment, not only to the United States, but to Great Britain and Germany.

As to the foundry department, he said: "The business of the iron foundries at Fort William, Hamilton, St. Thomas, Midland, Three Rivers, and Londonderry, shows a constant and very healthy growth, and despite the effects of American competition, on the profits for 1911-1912, a yearly tonnage production is now being obtained in all departments, that ensures the permanent supremacy of the corporation in its special field of operation, from foundry pig iron to the finished product of railway and tramway car wheels, cast iron, water and gas pipes, and general castings. The actual volume of foundry trade exceeded that of the previous year by 23 per cent., and the opening months of the current year showed a still greater increase. The balance sheet of the corporation for the year shows total assets of \$15,229,955, as compared with \$14,602,765 a year ago."

### BEAVER DIVIDENDS.

The directors of the Beaver Consolidated mines, at their regular meeting on Saturday, declared a three per cent. interim dividend, payable on December 21st to stock on record December 9. This is the first disbursement made since last July, but is the third for the year to date. The record is as follows:

	P.C.	Amount.
1911—May 15 .....	2½	\$45,000
—Aug. 31 .....	3	60,000
—Dec. 15 .....	3	60,000
1912—April 20 .....	3	60,000
—July 15 .....	3	60,000
—Dec. 21 .....	3	60,000
Totals .....	17½	\$345,000

### IMPROVEMENTS AT THE COPPER CLIFF SMELTER.

During the past eighteen months extensive and important improvements and additions have been made to the plant of the Canadian Copper Company's reduction works at Copper Cliff. In a paper contributed to the Canadian Mining Institute last spring, Mr. David H. Browne outlined some of the changes that had then been made, referring more particularly to the substitution of basic for acid converters and to the provision of reverberatory furnaces to treat the flue dust. Since then the new plant has been in steady operation and has afforded the best possible results. Thus the tonnage now being produced from the basic converters, of from 110 to 120 tons daily from the treatment of from 400 to 500 tons of 20 per cent. matte, is said to constitute a world's record; while, notwithstanding that wages have advanced 25 per cent., and, since a greater tonnage of ore is being mined and treated, the average value of the ores smelted are lower, the reduction costs have been maintained at about the same level as last year. It is interesting, moreover, to note that before relining was necessary in the last occasion, the converters had treated 6,700 tons of material.

The two new reverberatory furnaces are, meanwhile, treating daily about 140 tons of flue dust and green fines, and 250 tons of hot slag. The coal charge is almost an infusible mixture. The company is now installing four Wedge roasters, and a third reverberatory, slightly different in design to those now in use, is being built.

Although event at present in point of metallic output the Canadian Copper Company is the most important undertaking of its class in the Dominion; in respect of tonnage treated it is second to the Granby Company, in the Boundary district. The present tonnage smelted represents from 1,800 to 2,000 tons daily, producing about 3,500 tons of matte a month; but next year, when four additional blast furnaces are provided, this will be increased to 4,000 tons daily, which is about what is accomplished at the Granby smelter when working at full capacity.

The basic converters are 37 feet 2 inches long by 10 feet in diameter, outside measurement; and turn on four tread rings 12 feet in diameter. The tuyers number 44, and are 7 inches apart, but none is directly under the stack. The length inside the lining is 33 feet 3 inches; the bottom is 2 feet thick; the back or tuyere wall is 18 inches and the front 15 inches thick. The converters have two openings or spouts in the front wall opposite to but above the tuyere line, and the shell is turned down to pour slag or matte or turned back to blow by means of two wire ropes surrounding the shell on either side of the central stack. The converters are lined with magnesite bricks. The initial charge is about 60 tons of furnace matte, additions being made as the slag is poured off, until finally there remains in the converter from seventy to eighty tons of finished product, which may represent from 300 to 400 tons of furnace matte. Mr. Browne points out that the basic converter has several advantages over the acid converter, among which are: the units are much larger, which simplifies the problem of dealing with large quantities of matte; no material is "slopped out" of the converter during the blow and so less furnace matte is required to produce a ton of Bessemer matte; the slag is lower in silica, thus effecting economy of flux; and, in general, the operation of converting is simplified.

## STATISTICS AND RETURNS

### ONTARIO RETURNS.

Returns to the Bureau of Mines for the 9 months ending 30th September, 1912, show the production of metals and metalliferous substances in Ontario to have been as follows:

Product.	Quantity.	Value.
Gold, oz. ....	53,488	\$1,117,335
Silver, oz. ....	22,231,451	12,707,826
Copper, tons ....	8,019	1,142,076
Nickel, tons ....	15,907	3,368,437
Iron ore, tons ....	37,265	101,284
Pig iron, tons ....	452,021	6,051,978
Cobalt in crude material, lbs.	209,899	57,614
Cobalt and nickel oxides, lbs.	711,180	176,786
White arsenic, lbs. ....	2,944,104	66,316

**Gold.**—The gold mines of Porcupine began to produce bullion during the summer, and their output bids fair to assume important dimensions. The yield of gold for the first nine months of 1912 is more than double in value that of any preceding twelve months. The bulk was from the Hoilinger and Dome mines. Other contributors were the McIntyre and Vipond at Porcupine, and the St. Anthony at Sturgeon Lake. The Cordova mines in Hastings county and the Olympia at Lake of the Woods also turned out bullion.

**Silver.**—As compared with the corresponding period of 1911, the production was 963,601 ounces less in quantity, but \$1,114,090 more in value, silver being now much higher in price than last year. The productivity of the silver mines of Cobalt is being well sustained. The shipments comprised 15,408 tons ore, 7,859 tons concentrates, and \$2,239,124 in bullion. South Lorrain contributed 616,692 ounces to the total, and Gowganda 449,281 ounces.

**Nickel and Copper.**—The mines of the Sudbury district yielded 15,907 tons of nickel, as compared with 12,711 tons during the same period last year, and 8,019 tons of copper, as against 6,769 tons. Both these metals are estimated in the form of Bessemer matte produced by the blast furnaces, constituting together about 80 per cent. of the matte by weight. A source of nickel ore quite outside the Sudbury region has been opened in the Alexo mine, on the line of the Temiskaming & Northern Ontario Railway, from which a quantity of ore was shipped to the smelters of the Mond Nickel Company at Victoria Mines.

**Iron.**—Considerably less iron was shipped during the nine months of 1912 than during the same period of last year, the reduction amounting to 135,603 tons. The Helen mine was the principal producer. On the other hand, the output of pig iron shows a large increase, being 452,021 tons, as against 296,856 tons last year.

**Cobalt By-products.**—The refining works in Ontario produce arsenic, cobalt crude material or residues, and the oxides of nickel and cobalt. Shipments amounted in value to \$300,716, as compared with \$125,907 for the corresponding period of 1911. Both the European and American market for cobalt oxides are now for the most part supplied by the product made from the ores of Cobalt.

### DOMINION STEEL FOR OCTOBER.

The Dominion Iron & Steel Co. made several new records during October. The output of pig iron, blooms and rods and coke is considerably in excess of that for any previous month. The figures for the wire and nail mill are not yet available, but it is certain that both

have established records.

The shipments, while well up to the average, are some 3,000 tons below the record. The blowing in of the new No. 8 blast furnace is responsible principally for the increased output. Following are the figures:

Pig iron, tons .....	31,090
Steel ingots, tons .....	29,975
Bloom, tons .....	27,880
Rails, tons .....	15,656
Rods, tons .....	8,868
Coke, tons .....	50,540

Total shipments, tons .....

### COBALT SHIPMENTS.

Shipments for the week ending November 9th were almost three times those of the previous week. Eleven mines sent out 19 cars during the week and of the consignment every car contained high grade ore. Coniagas led with six cars, averaging one each day, with La Rose, McKinley-Darragh, and Beaver each contributing two cars towards the total.

Wettlaufer, of South Lorrain, appears with one car shipment. The Nipissing sent out a car of concentrates to Denver. The week's total forms a new record from the camp this year and was as follows:

	High.	Lbs.
Hudson Bay .....	1	61,800
La Rose .....	2	132,000
Cobalt Lake .....	1	41,400
Coniagas .....	6	400,760
McKinley-Darragh .....	2	126,088
Nipissing .....	1	63,250
Trethewey .....	1	53,000
Beaver .....	2	128,752
Temiskaming .....	1	71,924
O'Brien .....	1	63,600
Wettlaufer .....	1	60,495
Totals .....	19	1,205,069

### B. C. ORE SHIPMENTS.

Ore production in the Kootenay and Boundary districts for the week was 55,612 tons and for the year 2,115,261 tons. Smelter receipts for the week were 49,947 tons, for the year 1,896,937 tons.

#### Nelson.

Hudson Bay .....	34	708
Second Relief .....	31	72
Yankee Girl .....	33	50
Granite-Poorman, milled .....	250	11,850
Mother Lode, milled .....	500	9,750
Queen, milled .....	490	14,700
Molly Gibson, milled .....	300	6,900
Other mines .....	...	9,241
	1,638	53,271

#### Boundary.

Granby .....	28,855	1,067,761
Mother Lode .....	6,956	315,093
Unnamed .....	165	9,957
Rawhide .....	6,475	206,921
Napoleon .....	921	9,790
Ben Hur .....	35	35
Cavanaugh .....	1	1

United Copper .....	33	1,306
Surprise .....	160	4,242
Knob Hill .....	51	1,661
Nickel Plate, milled .....	1,500	64,100
Jewell, milled .....	200	17,400
Other mines .....	...	28,598

Total ..... 45,352 1,726,865

**Rossland.**

Inland Empire .....	22	44
Centre Star .....	3,055	133,030
Le Roi No. 2 .....	750	22,019
Le Roi .....	1,115	39,031
Le Roi No. 2, milled .....	300	8,000
Inland Empire, milled .....	90	1,620
Other mines .....	...	307

Total ..... 5,332 204,051

**Slocan and Ainsworth.**

Bluebell .....	383	2,130
Silver Hoard .....	33	154
Utica .....	42	458
Rambler-Cariboo .....	72	834
Richmond Eureka .....	30	1,171
Whitewater .....	29	874
Standard, milled .....	400	15,200
Bluebell, milled .....	200	3,100
Van Roi, milled .....	1,100	49,200
Other mines .....	...	20,005

Total ..... 2,289 93,276

**East Kootenay.**

Monarch .....	36	1,175
Sullivan .....	630	26,056
Monarch, milled .....	425	9,850
Other mines .....	...	717

Total ..... 1,091 37,798

**B. C. Copper Co.'s Receipts.**  
Greenwood, B.C.

Mother Lode .....	6,956	315,093
Unnamed .....	165	9,957
Rawhide .....	6,475	206,921
Napoleon .....	921	9,790
Other mines .....	...	18,374

Total ..... 14,517 560,135

**Granby Smelter Receipts.**

Grand Forks, B.C.

Granby .....	28,855	1,067,761
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**Consolidated Co.'s Receipts.**

Trail, B.C.

Sullivan .....	630	26,056
Utica .....	42	458
Rambler-Cariboo .....	72	384
Richmond-Eureka .....	30	1,171
Knob Hill .....	51	1,061
Centre Star .....	3,055	133,030
Le Roi No. 2 .....	750	22,019
Le Roi .....	1,115	39,034
Whitewater .....	29	874
Monarch .....	36	1,175
United Copper .....	33	1,306
Yankee Girl .....	33	50
Surprise .....	160	4,242
Bluebell .....	383	2,130
Hudson Bay .....	34	708

Silver Hoard .....	33	154
Second Relief .....	31	72
Inland Empire .....	22	41
Ben Hur .....	35	35
Cavanaugh .....	1	1
Other mines .....	...	33,972

Total ..... 6,575 269,071

**N. S. STEEL AND COAL.**

The Nova Scotia Steel & Coal Co. made a record output of coal during October, the figures being 79,000 tons mined and 81,000 tons shipped.

Ore mined was 57,000 tons; pig iron produced 7,800 tons; steel output, 9,200 tons. The steel production was one of the best for years.

**SILVER PRICES.**

	New York,	London.
	cents.	pence.
Oct. 23 .....	63 1/4	29 1/8
" 24 .....	63 1/4	29 1/8
" 25 .....	63	29 1/8
" 26 .....	63 1/8	29 1/8
" 28 .....	63	29 1/8
" 29 .....	63 1/4	29 1/8
" 30 .....	62 7/8	29
" 31 .....	62 7/8	29
Nov. 1 .....	62 1/2	28 7/8
" 2 .....	62 1/2	29
" 4 .....	62 7/8	29
" 5 .....	....	28 1/8
" 6 .....	62 3/8	28 1/8
" 7 .....	62 7/8	29

**TORONTO MARKETS.**

Nov. 11.—(Quotations from Canada Metal Co., Toronto):

- Spelter, 6.35 cents per lb.
- Lead, 5.25 cents per lb.
- Tin, 12 cents per lb.
- Antimony, 52 cents per lb.
- Copper, casting, 18 1/2 cents per lb.
- Electrolytic, 18 1/2 cents per lb.

Nov. 11.—Pig Iron—(Quotations from Drummond, McCall & Co., Toronto):

- Summerlee No. 2, \$23.00 (f.o.b. Toronto).
- Midland No. 1, \$22.00 to \$22.50 (f.o.b. Toronto).
- Midland No. 2, \$21.50 to \$22.00 (f.o.b. Toronto).

**General Markets.**

- Coal, anthracite, \$5.50 to \$6.75 per ton.
- Coal, bituminous, \$3.50 to \$4.50 for 1 1/4-inch lump.

**Coke.**

Nov. 7.—Connellsville Coke (f.o.b. ovens):  
Furnace coke, prompt, \$4.00 to \$4.25 per ton.  
Foundry coke, prompt, \$4.25 to \$4.50 per ton.

Nov. 7.—Tin, Straits, 50.25 cents.  
Copper, Prime Lake, 17.50 to 17.65 cents.  
Electrolytic Copper, 17.39 1/2 cents.  
Copper Wire, 19.00 cents.  
Lead, 4.75 to 4.80 cents.  
Spelter, 7.50 cents.  
Sheet Zinc (f.o.b. smelter), 9.00 cents.  
Antimony, Cookson's, 10.37 1/2 cents.  
Aluminium, 27.50 to 28.00 cents.  
Nickel, 45.00 cents.  
Platinum, ordinary, \$45.50 per ounce.  
Platinum, hard, \$48.00 per ounce.  
Bismuth, \$2.00 to \$2.25 per pound.  
Quicksilver, \$41.00 per 75-lb. flask.