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The Canadian Mining Journal

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CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

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CONTENTS.

SALARIES AND THE SURVEY.

Within the memory of the present generation there has been no substantial increase in the salaries of the officers of the Geological Survey of Canada. Meanwhile, no one will dispute the statement that the cost of living is easily 30 per cent greater than it was ten years ago. House rents have crept up amazingly. Provisions bring prices sometimes 100 per cent. higher than those obtaining in the early nineties. And so on through the whole gamut. We could dwell with deep conviction upon the iniquitous tailor, the destructive milliner, the reprehensible plumber, the callous coal man, and the aestival ice man.

These things being so, it is not to be denied that the salaries of yesterday are altogether out of keeping with the conditions of to-day. To expect a competent geologist to exist contentedly upon the pittance offered him by the Government is out of all reason. There may be some degree of justice (we grant it merely for argument's sake) in keeping the salaries of office men and clerks down to the minimum. But between these and the officials of the Survey there is nothing in common. The geologist is a specialist of the highest class. He is a pioneer, an explorer, a scientist, an author and a producer. There is nothing more remote from economy than attempting to retain his services for pay that will not permit of his living in comfort. Already our own survey has lost some of its best and brightest members. In every recent case those who have resigned their billets at Ottawa have been engaged by private corporations and are receiving salaries from three to five times larger than those offered by the Government. Whilst we are still able to point with pride to the men who constitute the staff of the survey, there is no lack of evidence that the growing demand for field geologists will, sooner or later, rob that staff of its best and brainiest.

The geologist is no money-grabber. Possibly his commercial sense is under-developed. But he has an inalienable right to secure as good a living as he can. His efforts are constantly revealing new sources of wealth to the public—wealth in which, if he be an official in Government employ, he cannot participate. If, after some years of miserably underpaid work on our Survey, he accepts a flattering offer from persons who know his value, who can blame him! Yet we are confident that, since for many good reasons there is a certain professional glamour pertaining to the work of Survey officials, but very few members of the staff would hesitate to remain in the employ of the Government for salaries much smaller than they can easily obtain outside. But these salaries must be considerably larger than the meagre allowances of to-day which are

consonant neither with the dignity of the Canadian Government nor with the requirements of modern life.

THE GRANBY CONSOLIDATED.

Through the courtesy of Manager A. B. W. Hodges of the Granby Consolidated Mining, Smelting & Power Company, Limited, Grand Forks, B.C., we are able to present on another page of this issue a summary of the progress made by his company during the past year.

We wish to note a few salient facts that are presented in Mr. Hodges' communication.

The Granby smelter treated more than one million tons of low-grade copper ore, producing therefrom 23,535,009 pounds of copper. There was no serious interruption throughout the year. Not only were the records of former years excelled, but large additions were made to the smelting plant. At the mines the necessary development work and diamond drilling were not neglected.

The capacity of the smelter is now about 3,000 tons of ore per day. During this year, when the company's plans for enlargement shall have been completed, the plant will have an ore capacity of 4,000 tons per day.

The vigorous and sanely constructive policy pursued by Manager Hodges is an object lesson to Canadian mine managers. Those who are familiar with conditions in southeastern British Columbia will appreciate the vigilance and strength with which the affairs of the Granby Consolidated are administered.

PARLIAMENTARY REPRESENTATION.

The desirability of parliamentary representation for the larger Canadian universities has been discussed editorially by the daily press. For the present it is probable that no definite action will result from this discussion. No agitation is perceptible. Apparently the country is hardly prepared to act upon a suggestion that, though good in itself, requires a deal of digestion. And, no doubt, our universities are content to wait the fullness of time.

Meanwhile the mining industry suffers from an actual absence of representation in our legislatures. At Ottawa we need, and must have, not one but several members of parliament and senate, appointed primarily to guard mining interests. An industry whose annual output is valued at one hundred million dollars can claim a right to a considerable voice in the administration of national affairs.

Possibly a good beginning would be the selection of a suitably qualified mining man to fill one of the vacancies in the senate.

MINE ACCIDENTS.

The distressing frequency with which accidents are occurring in the mines of the Cobalt regions calls for strong comment. In the Seventeenth Annual Report of the Bureau of Mines of Ontario, Mr. E. T. Corkill, Provincial Inspector of Mines, sounds a note of warning. After analysis of the tale of accidents for 1907, Mr. Corkill concludes that due care on the part of superintendents and workmen would prevent many of these fatalities. This is true also of practically all the recent mine casualties.

The employment of incompetent workmen in any positions where their ignorance or unfitness may endanger the lives of their fellow-laborers is unjustifiable. The careless superintendent or foreman begets carelessness in his men. The vigilantly watchful superintendent inspires those under him with a sense of their individual responsibility.

When then it can be stated that a large percentage of the accidents occurring in the mines of the Cobalt district are traceable to neglect on the part of superintendents or workmen, or both, it is high time that some examples were made. The man, whether he be boss or mucker, who through disregard of all reasonable precautions imperils the lives of his fellows, is essentially a criminal, and should be treated as such. Undoubtedly offenders of this class deserve the most rigorous punishment.

DIKES AND VEINS.

To those who wish to acquire an accurate conception of the geology of the Montreal River district we recommend the excerpts from Dr. Barlow's report that appear on another page of this issue. On another page, also, Dr. Barlow replies to Mr. Tyrrell's criticisms. We shall not touch upon the controversial points, for when doctors disagree the role of spectator is most profitable.

We desire, however, to draw attention to a recommendation made by Dr. Barlow. "The use of the terms 'dike' and 'vein' as separate names in regard to pegmatite is misleading. The strict limitation of their meaning has led to certain misconceptions as to its manner of formation. I would prefer," says Dr. Barlow, "to make the two terms synonymous, or, better still, to use 'vein' in both senses, for, accurately speaking, every 'mineral vein' is intrusive into the surrounding country." This sounds suspiciously like common sense. Let us, by all means, simplify our heterogeneous technical terminology. If "dike" offends us let us cut it out.

RESCUE APPARATUS.

It is to be hoped that the subject of life-saving in coal mines will be one of the topics chosen for discussion at the March meeting of the Canadian Mining Institute. There is, certainly, no subject that more needs publicity. Apart from the collieries of the Dominion Coal Company at Glace Bay and those of the Nova Scotia Steel and Coal Company at Sydney Mines,

there is not a colliery in Canada equipped with rescue apparatus.

Considering the rapid extension of the coalfields of Alberta, Saskatchewan, and British Columbia, it is pre-eminently desirable that fully equipped stations be established at suitably central points where groups of mines could be served. Such a station is proposed for Pictou County, Nova Scotia, where the collieries of the Acadia Coal Company and of the Intercolonial Coal Company are situated. Perhaps the best demonstration of the practical utility of rescue apparatus was given last year, when a party of fire-fighters was sent by the Dominion Coal Company to fight a conflagration in the workings of one of the Nova Scotia Steel and Coal Company's mines. Since then the latter company has ordered equipment for its own collieries.

From both the humanitarian and the business points of view rescue apparatus, providing means of respiration in irrespirable atmosphere, is a modern necessity. The Canadian Mining Institute will do well to encourage, by every means possible, the general introduction of any approved type of apparatus in Canadian coal mining centres.

FROM REAL LIFE.

A mining engineer, manager of a well-known Ontario mine, has sent us a naive document. From a town in one of the middle states a searcher after truth addressed a letter to our correspondent, who, in turn, has forwarded it to us.

The letter consists of a series of leading questions concerning certain Cobalt mines. Not only does the enquirer demand specific information about these enterprises, but he requests that the opinions of the engineer's friends be obtained. "I would like very much," declares this ingenuous citizen of the great republic, "for you to answer by return mail and state what you and others, who should know, think."

As if to bind the engineer irrevocably, a dime (ten cent piece) was cunningly affixed to the back of the letter by means of mucilage. Under it is a legend that should be preserved: "Please buy Canadian stamp for my return directed envelope and please keep balance for trouble in replying." That he might be sure of receiving full measure for this staggering fee, the writer takes advantage of a blank space remaining to subjoin one last query.

Fantastic as is this letter, it is not altogether out of keeping with the attitude of the public towards mining engineers. We know of many instances that illustrate this point. Often the mining engineer is offered a fee at which a bricklayer would scoff.

A CONTRADICTION.

Positive assertions have been made in late newspapers to the effect that the O'Brien Mine, Cobalt, has been sold. There is no foundation for either assertions or rumors on this point. We are authorized to state that no such transaction has taken place.

A CORRECTION.

In the statements of ore shipments from Cobalt the O'Brien Mine has been done an injustice through the omission of the figure indicating millions of pounds. It will be noticed that the O'Brien, in point of view of tonnage, is third in the list of shippers.

CANADIAN MINING INSTITUTE.

The following is a list of gentlemen elected to membership at council meeting held on December 5th, 1908: Wm. J. Elmendorf, M.E., Box 1039, Spokane, Wash., U.S.A.; W. A. Fairchild, M.E., Nipissing Mines, Cobalt, Ont.; H. E. Lawson, M.E., 38 Elgin Ave., Toronto, Ont.; Joseph T. Mandy, M.E., Box 585, Cobalt, Ont.; Morgan C. Milne, Elk Lake, Ont.; John T. Shadforth, Victoria, B.C.; Henry Strangways, Crean Hill Mines, Victoria Mines, Ont. Associate Members—A. E. Bowers, Northport, Wash., U.S.A.

Mr. Henry Strangways was formerly a student member.

The following drafts have been returned (wrong address): Frank M. Perry, 27 Walmer Road, Toronto, Ont.; Chas. H. Hayes, 114 Bay St., Toronto, Ont.; B. B. Harlan, 9 King St. West, Toronto, Ont.; W. K. McNeill, Toronto, Ont. (address insufficient); R. J. Gaskin, Kingston (left there, said to be in Toronto). The Secretary of the Canadian Mining Institute will deem it a favor if the above named members will forward their present addresses to him. His address is Room 3, Windsor Hotel, Montreal.

To show how great may be the generation of static electricity in German factories, Prof. M. M. Richter has drawn sparks an inch to an inch and a half long from a 5-inch belt on a wheel making 10,000 revolutions a minute. The risk of explosion in dust or gases seems to have been overlooked. Coating with bronze or aluminum powder prevented static charges, while a weekly application of acid-free glycerine was a remedy and added durability to the leather.

When such substances as glass or porcelain cannot be used for acid-proof apparatus, platinum has been the one material available, but for many purposes this is too costly. As a substitute, M. Jouve, a French engineer, has announced a series of alloys which he calls, "metillures." These are silicides of iron and manganese, with a large percentage of silicon, and they are so resistant to strong acids, hot or cold, that they have been employed in distilling nitric acid and in concentrating sulphuric acid.

A RESUME OF THE NOVA SCOTIAN COAL MINING INDUSTRY FOR 1908.

By F. W. Gray.

In the 1907 resume we forecasted for 1908 a steady increase in coal production, and on the whole the forecast has been maintained. The progress made is, however, more real than apparent, because 1908 has been a year of financial depression, and the market has not admitted of the increased outputs that Nova Scotian coal mines are prepared to produce when the demand arises. An approximate estimate of 1908 shipments compared with the figures for 1907 as as follows:—

	1907.	1908.
Dominion Coal Company.....	3,156,000	3,200,000
Nova Scotia Steel & Coal Co...	630,000	640,000
Acadia Coal Company.....	322,000	320,000
Cumberland Ry. & Coal Co....	276,000	350,000
Intercolonial Coal Co.....	274,000	240,000
Inverness Ry. & Coal Co.....	243,000	260,000
Port Hood	64,000	100,000
Other companies	150,000	150,000
	5,115,000	5,260,000

In common with the remainder of the Dominion, the province had an early and open spring, and a summer of exceptionally fine and dry weather. Coal shipments to Montreal commenced about six weeks earlier than in the previous year, and the lead gained was well maintained until the month of September. Towards the end of this month the navigation of the St. Lawrence was greatly hindered by the smoke from forest fires, which for weeks together obscured the river from Gaspe to Montreal. The weather was serene and sunny, and at times the blue haze of the smoke reached as far as the Cape Breton coast. Notwithstanding, however, the serious delays from this cause, the tonnage of coal shipped from Nova Scotia to St. Lawrence ports during the season of 1908 was the largest in the history of the trade. The Dominion Coal Company's shipments for the season totalled 1,346,000 tons. Their St. Lawrence shipments during 1907 were 1,146,000 tons, a record figure at that date.

As previously intimated, the season's shipments would have been very much larger had it not been for the marked depression in the demand which characterized the late summer. Nova Scotia did not feel the full reflex of the financial panic of the previous October until the autumn. The mining centres, indeed, were not affected until the cessation of shipments to the St. Lawrence.

One other feature of the season just past, which at the present time is exercising an adverse influence on the coal mines of Nova Scotia, is the persistent and strenuous attempt which is being made to introduce United States coal into Quebec and Ontario. The United States operators are evidently making a determined effort to capture the Canadian market, and the recent proposals of the Pittsburgh coal operators asking for free customs entry of United States coal into the Dominion, are not without their significance to the Nova Scotia mining industry.

For many reasons United States coal can be put on the Montreal market in better physical condition than coal from Nova Scotia. The very excellence of the Cape Breton coals, for example, militates against their appearance when they arrive in Montreal. These coals are pure and fragile in their structure. They quickly disintegrate, but the process does not adversely affect their heating or commercial value to the consumer. In many respects Cape Breton coal resembles Pocahontas coal. Did our Nova Scotian coals always sell on their B.T.U.'s, they would very easily challenge competition with any United States fuel that retails in Montreal. Purchasers of coal are very human, however, and they often prefer looks to quality. One large company in Cape Breton intend to hold their trade in Upper Canada against all comers, and they are facing this problem at the present time with a view to so improving their coal handling appliances that their product will be placed on the market in the best possible physical condition.

Realizing, no doubt, that the coal industry is the most important one in the province, the General Assembly of the Legislature devoted a large proportion of the session to the consideration of matters connected with the mining law. A much-needed measure was "An Act to Consolidate the Coal Mine Regulation Act," which passed the Houses on the 16th of April. The old Coal Mines Regulation Act had been so often amended that the amendments exceeded in bulk the original enactment, and the consolidated measure renders it much easier to understand the statute. Power is given to the Commissioner of Mines to appoint a commission to enquire into the method of illumination in coal mines, and if the commission report that safety lamps are required, the Commissioner has power to order that they shall be adopted in any coal mine. The submarine mining law provides that "the Commissioner may vary or modify provisions where from the report of the Inspector it appears to his satisfaction that valuable coal areas cannot be otherwise wrought or mined." Some day Nova Scotia is going to have submarine coal mines of greater magnitude than anything that has yet been projected, and without doubt the provisions of the mining law as they relate to submarine workings will keep pace with the progress made and the experience gained. During the summer the Government employed Mr. T. E. Forster, of Newcastle-on-Tyne, to report on the submarine areas of the province. Mr. Forster is a gentleman who has had a unique experience in undersea working of coal seam,s and no doubt any modifications that may be made in the regulations will be based on his expert advice.

The report of the commission appointed by a previous session to enquire into the status of the colliery relief societies and the possibilities of an old age pension scheme was presented to the House. Acting upon the recommendations of this commission, an Act was passed entitled "An Act to incorporate the Nova Scotia Colliery Workers' Provident Society, and to create an Old Age Pension Board." The Act provides for the formation of a board, composed of the Commissioner of Mines and Works, who is chairman; the Provincial Treasurer, as treasurer; the Deputy Commissioner, who is secretary, and three other members, one of which number is the appointee of the coal owners, the other two being nominated by the members of the relief societies. This board takes custody of all society

branch funds in excess of $1,000. Towards the ordinary work of relief the Government contributes a sum not to exceed 12½ cents per month per member, nor an aggregate of $18,000 yearly. The coal owners contribute 6½ cents per month per member, and the members continue their present subscriptions. An emergency fund is to be created for the purpose of special aid in case of serious disaster, to be accumulated in the manner following.

Ten per cent. of all surplus funds is to be reserved, and a contribution of 30 cents per head per year will be made by each member, in addition to which the Government may contribute a sum of not more than $2,000 per year. When the fund by process of yearly accretion has grown to $50,000 it is to be available for the support of widows of deceased members. When it has grown to $100,000 the children of deceased members are also to participate. The pension and total disability fund is to be raised by a contribution from the Government equal to that made to the ordinary relief branch, and a levy of 75 cents per annum per member on the operators. All relief afforded through the operation of the Act is exempt from lien or attachment for debt of any kind.

The Act comes into effect by proclamation of the Governor in Council, until which time the present relief societies continue as they are.

The proposals of the Government, if carried to their logical conclusion, contain the embryo of some of the sanest and therefore ultimately the most beneficial legislation that has come to our notice. The burden of providing relief and of caring for the victims and the worn-out in the industrial battle is equitably apportioned between the operators, the workmen, and the owners of the royalty—in this case the Government itself. This division avoids on the one hand the Scylla of the British Workmen's Compensation Act and its attendant millstone of old age pensions, and on the other hand it steers clear of the Charybdis of the German system of state-controlled compulsory insurance.

Unfortunately, the provisions of the Act are still in abeyance, owing, we understand, to objections urged by the miners in Cape Breton County.

At the request of the members for Cape Breton, the Government appointed a commission to enquire into the probable effect and the feasibility of an eight-hour day in Nova Scotian industries. The commission is composed of three members. Professor Magill, now of Dalhousie University, is the chairman, the two other members being Mr. Robb, of the Robb Engineering Company, Amherst, and Mr. Henry Macdonald, of Glace Bay. Following the lead of the English Commission, these gentlemen have issued preliminary questions to employers of labor, and expect to begin their sittings of enquiry early in 1909. Any proposal of an eight-hour day for coal workers will meet with the most determined and strenuous opposition from all colliery owners and operators and from large coal consumers. It is well within the mark to say that a statutory limit of eight hours to the working day in coal mines will throw the coal trade entirely into the hands of the large companies, who alone could survive the alteration in conditions. It would extinguish all the smaller companies, raise the price of coal to the consumer by 50 per cent., and would give over the St. Lawrence market to the American operators. In addition to this the large companies would be compelled to force a reduction in wages equal at least to the decrease in the working day, and serious industrial troubles would in all probability ensue.

Another matter with which the Government dealt was that of technical education, and their proposals in this connection cannot but meet with the cordial approval and support of the mining population. Provision has been made for the gradual establishment of technical schools in the large industrial centres. A Technical College is under construction at the present time in Halifax, which will eventually form the headquarters of technical education in Nova Scotia. The coal mining districts have been divided into five, in each of which an instructor is appointed, who devotes his whole time to the teaching of mining subjects, and, where necessary, local assistants are appointed to aid the instructor. Where circumstances justify the expenditure engineers' certificates required by the provincial law. At both the mining and engineering classes a certain knowledge of arithmetic and English is required. Preparatory classes are provided for those who do not possess these qualifications, and there is, therefore, no obstacle whatever in the way of the man who wishes to advance himself in the technical knowledge of his trade. The general supervision of the technical education work is given to a Director of Technical Education, an office ably filled by Prof. F. H. Sexton. An amendment to the statutes passed at the last session provides that the Council of any municipality may grant an amount for the support of a technical school, and may include this amount in their annual estimates, the money being collectable through the municipal rates in the same manner as other rates and taxes. The tuition given by the Government's classes is quite free of charge to those who comply with the rules as to attendance.

The proposals of the Government appear to have been well thought out, and so far the attendance at the classes has been as large as was anticipated for the first year. There are few places in the Dominion where technical education is more needed than in Nova Scotia, and once the young miner and steelworker realizes the value of the opportunities offered to him it is certain the work will advance rapidly. That the action of the Government was timely and necessary is evidenced by the great number of students of American correspondence schools that are to be found in Nova Scotia. The education obtained by personal tuition, aided by the actual handlink of the mechanism and objects used in everyday work, is much more valuable and lasting than that obtained through correspondence classes, and incidentally it will keep a lot of money in the province that formerly went to the United States. In making these remarks we do not wish to disparage correspondence classes. They have done invaluable pioneer work, and many men to-day owe their positions to conscientious study of correspondence lessons in their homes. It is just this class of men who will welcome and use the facilities now offered by the Government.

Of considerable interest to the coal companies who have a large export trade is an enactment of the Federal Government, which becomes effective on the 1st of January, 1909, excluding from Canadian coastal waters all vessels of foreign register under 1,500 tons gross tonnage. This law provides further for the entire exclusion of foreign ships after the expiration of a period of three years from 1st January, 1909. The order is aimed entirely at Norwegian shipping in the coastal and lake trades, and is a modification of an Order-in-Council which prohibited any foreign vessel from plying between Canadian ports after 1st January, 1909.

The proposals of the Federal Government necessarily imply a heavily subsidized shipbuilding industry for the future, as it is entirely out of the question that Nova Scotian coal companies can afford to become large owners of ships, for which during six months of each year at least they would have no employment. Mining is a sufficiently risky business without the added uncertainties of the business of the shipowner. Whether, in face of the enormous tonnage of unemployed freighters that are now lying at anchor in ports all the world over, it will pay to build special colliers in Canada within the next three years, is open to question.

The early part of the year saw a great many Boards of Conciliation appointed under the provisions of the Lemieux Act, so-called. The Provincial Workmen's Association made a general demand upon the operators for an increase in the wages of the laboring class at the mines to date from the 1st of May. The three years' agreement between the Dominion Coal Company and its workmen expired with the year 1907, and as detailed in our previous resume, the company opened up negotiations for the renewal of the old arrangement. This was refused by the men, whereupon the Coal Companw issued a new schedule of wages, the principal features of which were an increase to the unskilled laboring class and to the unskilled contract coal-loaders in the mine; a decreased rate for pillar drawing, and an increase in the price of house coal to workmen. The men applied for the appointment of a Board of Conciliation, which was granted, and a satisfactory settlement was arrived at in March, which is to hold good until the 31st of December, 1909. The chairman of the Board of Conciliation was Professor Adam Shortt, a gentleman whose conspicuous abilities in the gentle art of conciliation are unfortunately no longer available. The basis of the adjustment arrived at was an increase to the ill-paid men and a decrease in the wages of the higher-paid classes. The policy which guided the Glace Bay Board seems to have been followed by all the others of later date. At Sydney Mines, Port Hood and Springhill a similarly satisfactory settlement of wages disputes was made.

Following possibly the lead of the United States operators an attempt has been made by the United Mine Workers of America to capture the organization and the funds of the Provincial Workmen's Association of Nova Scotia. The methods of the latter union, as interpreted by the Grand Officers, do not appear to have been sufficiently aggressive for some of the more fervent spirits, and attacks were made particularly on the Grand Secretary and the Grand Master, who asked to be allowed to resign. The Grand Council in session refused to allow them to do so. The question of amalgamation with the U. M. W. A. was referred to a vote of the members of the P. W. A., who were, however, so indifferent that not half of the membership visited the polls. The result of the referendum was a majority of about 500 in favor of amalgamation with the American body, but it was recognized that so indecisive a vote did not justify any change. Since that date the sympathizers of the U. M. W. A. amalgamation have entered action against the P. W. A. for a share of the Defence Fund. They also succeeded in getting an injunction forbidding the Grand Council to act in an official capacity until the action had been adjudicated upon. The injunction was later dissolved, no grounds being found for its continuance. This was followed by an action for perjury against the Grand Secretary, of the P. W. A., brought upon pretexts so flimsy that the defendant's counsel relied upon the evidence of the prosecution to acquit his client, and did not call any witnesses for the defence. The judge dismissed the action, and expressed a strong opinion that the time of the court had been wasted. The suit of the U. M. W. A. against the Grand Council will be heard in January.

The labor supply during the season was more plentiful than for many years previous, in consequence of the industrial slackness. The loss of output due to absenteeism was not so marked as in years when the supply of labor was scanty. The increase in wages, which was given to the unskilled laborers, proved of benefit in retaining the services of these men. The cost of living, especially in the Cape Breton mining districts, remains inexcusably and oppressively high. The price of groceries is not excessive, but dairy produce, clothing and boots are sold at prices which severely tax the pockets of the miners.

It is once more a matter for congratulation that no great disaster has marked the year in our coal mines, more especially when we read of recurring mining catastrophes in other parts of the world. The accident involving the greatest loss of life occurred at Port Hood Colliery on the 7th of February, on which occasion ten men lost their lives through the contact of a naked light with an explosive mixture. The Government appointed a Commission to enquire into the accident, and as a result of the Commission's report the Government compelled the company to provide safety lamps. We hope before long to see safety lamps become compulsory in all Nova Scotian mines whether they are reputed "gassy" or non-gaseous mines.

The Rescue Station of the Dominion Coal Company was completed in the latter part of 1907 and went into full operation early in 1908. The training of rescuers has been carried on continuously throughout the year, and considerable additions were made to the equipment. The first call on the services of the station was made in September, when 22 of the Dominion Coal Company's men went to Sydney Mines and rendered valuable assistance in coping with un underground fire in the No. 1 mine of the Nova Scotia Steel and Coal Co. This company have just recently purchased twelve sets of Draeger aparatus, the same type that is used at Glace Bay, with the needful accessories, and are about to erect their own station. A project was mooted some time ago for the erection at the joint expense of the mainland collieries and the Provincial Government of a rescue station in Pictou County, but so far as we can learn, nothing further has been done. It is to be hoped that this project will not be allowed to drop.

An interesting feature of the year was the flying visit, one might almost say, meteoric visit, of the represtnatives of the English Institution of Mining Engineers and the Iron and Steel Institute to Nova Scotia in August. These gentlemen were the guests of the Mining Society of Nova Society, and, under their guidance, visited the mines of the Nova Scotia Steel Co. at Sydney Mines and those of the Dominion Coal Company at Glace Bay. They visited also the works of the Dominion Iron and Steel Co. in Sydney. A banquet was given in Sydney in honor of the visitors, which was attended by the Lieutenant-Governor and the Premier of the Province.

The most important new development of the year is the opening of new collieries by the Dominion Coal Company on their Lingan-Victoria areas. Three new collieries are projected, to be known as Nos. 12, 14, and 15 Mines. Nos. 12 and 14 are slope mines on the Victoria Seam, and are already under way. No. 15 is yet to be opened on the Lingan Seam, but the site is not as

yet definitely decided upon. The face of the deeps of No. 12 is down a distance of 1,500 feet from the entrance of the slopes, and by the summer of 1909 the mine will be sufficiently developed to produce an output of over 500 tons daily if required to do so. The bankhead is partly erected and most of the permanent colliery erections are completed. At No. 14 the face of the deeps is 500 feet down, and a temporary bankhead and boilers are erected. No permanent structures have as yet been biult.

A branch railway has been constructed connecting Nos. 12 and 14 with the main line of the Sydney and Louisburg Railway. A number of the miners' houses have been built, and the sites of the towns have been graded. This new development marks a distinct stage in the coal industry of Cape Breton. Within the next five years these new mines will add possibly an additional million tons per year to the coal production of the Province.

The Hub Mine, of the Dominion Coal Company, resumed hoisting in the spring, and the improvements effected since the fire will bring the output to over 1,000 tons daily next summer.

Rumors of new mining enterprises have been more than usually rife, but nothing of any importance has taken place in this connection during the year. Messrs. Harmsworth, of "Daily Mail" fame, have bought the New Campbellton mine and areas at the entrance to the Great Bras d'Or, and are credited with the intention of mining coal for their pulp mills in Newfoundland. These areas are small and it is not likely that their operation will be a serious factor in the market.

Nothing further has been done with the abandoned property of the Broughton Company near Sydney, although the promoters have visited the property during the year.

The North Atlantic Company operating the old Gowrie property are producing about 500 tons per day, and have important developments in prospect.

The C. P. R. are credited with the intention of bonding several detached areas in the Sydney coal field, lying outside the areas of the Dominion Coal Company, and covering some of the lower and little known seams. It is extremely unlikely, however, that these areas will be touched until the exhaustion of the more profitable and easily worked seams makes it possible to work the thinner seams at a profit, and this is a day yet far distant. The present prices of coal will not permit of the profitable operation of thin or inferior seams by themselves, although they can be worked in conjunction with more valuable seams.

It is also reported that a Toronto syndicate have in contemplation the formation of a merger company to absorb the Inverness County coal trade, and take over the Inverness, Port Hood and Mabou Mines. The Inverness County outputs, with the possible exception of Mabou Mines, show a general increase.

The Maritime Coal and Railway Company, which is now operating the Chignecto Mines and has acquired the mine and railway of the Old Joggins Mine, has shown considerable enterprise during the year, and is reported to have made winnings on the Joggins Main Seam, which greatly add to the value of its areas. It would appear from the recent researches of the Geological Survey in this neighborhood that systematic search may reveal more valuable coal deposits than have hitherto been suspected between Apple River and the mines now working at Chignecto and Springhill.

At the present time the coal trade is very quiet indeed, and present indications are that the coming year will not be one that will break any records in the way of coal production. The whole world is suffering from a period of depression, and although signs are not wanting that this is moving away, it is probable that Nova Scotia will be slow to feel the improvement as she was slow to feel the depression, owing to our position on the fringe of things. In any case there is no justification for any glowing forecasts of the progress of the coal industry in 1909. Whenever the spurt is required Nova Scotia wil be found more than ready, but at present it looks as if the capacity for coal production will be ample for the needs of next year.

MAGDALEN ISLANDS AND THEIR RESOURCES.

The Magdalen Islands are situated about the middle of the Gulf of St. Lawrence, and are within the parallels of forty-seven degrees and thirty minutes and forty-seven degrees and five minutes north latitude, and between sixty-one degrees and eight minutes and sixty-two degrees and twelve minutes west longitude, and at a distance of about one hundred and fifty miles from the coast of Gaspe, sixty miles from Meat Cove, Cape Breton (the landing point of the cable, connecting the islands with the mainland), and one hundred and twenty miles from Pictou, Nova Scotia.

There are ten distinct islands in the group, now designated on all charts and in public documents under the names of Entry Island, Amherst, Dead Man's, Grindstone, Allright, Wolfe, Grosse Isle, Coffin and Bryon, and the grant also includes the Bird Islands. Four of these, namely, Entry, Dead Man's, Bryon and the Bird Islands are isolated, having no connection with each other or with the principal group. The other six islands, namely, Grosse Isle, Coffin, Allright, Wolfe, Grindstone and Amherst comprised in the Letters Patent, under the collective name of "Magdalen Islands" are, in a way, united to each other by sand dunes. In some places lagoons of considerable extent are formed by these dunes.

The principal harbors (at which the steamer from Pictou, N.S., calls twice a week landing mails and passengers) are Amherst, House Harbor and Grand Entry.

The steamer also calls at the breawkaters at Amherst and Grindstone, and the landing places at Allright Island, Coffin Island and Etang du Nord.

Some idea may be formed of the great extent of the islands when it is considered that there is a distance of seventy miles from Amherst Harbour, the south-east extremity of these islands to East Point, the extreme north-east limit of the principal group, and that the extent of coast line is about one hundred and forty miles. Including the beaches, sand dunes and low lying tracts of land, the estimated total area is 77,980 acres.

All the islands have good roads well maintained. They offer special advantages and inducements to the farmer. The soil requires little or no manure, although no part, perhaps, of the continent of America has with-

in itself so much material suitable for fertilizing purposes.

Here the farmer can settle down on lands that for attractiveness are not easily excelled. Good crops can be grown year after year in general abundance, and the location is such that the principal markets of the Maritime Provinces are within easy access, as well as the large cities on the St. Lawrence River.

The population of the islands is about 5,000, principally of French descent. The exceptions are Entry Island, which is Scotch, and Coffin Island, which is English. The people are of good moral character, cheerful and industrious.

Joseph Bouchette, in his report to the Crown Lands Department of the Province of Quebec, has this to say respecting the history of the Magdalen Islands.

"Contemporaneous with the earliest discoveries of the River and Gulf of St. Lawrence, and of the territories adjacent thereto, may be dated the discovery of Jacques Cartier, in 1534 and 1535, and by other French navigators in the early part of the sixteenth century of that remarkable group of islands in the Gulf of St. Lawrence, collectively known as the Magdalen Islands.

"These islands, with the countries bordering on the Gulf of St. Lawrence, were subsequently involved in the various conflicts between England and France, and were the subject at different periods of treaties and conventions, transferring them from one of these sovereignties to the other, until finally by the Treaty of Peace, they were, together with all the countries known as La Nouvelle France, or Canada, Nova Scotia or Acadie, the Island of St. John (now Prince Edward Island), ceded by France to England, and in virtue of the Royal Proclamation of 7th October, 1763, annexed to the Government of Newfoundland, to which they remained attached until the Imperial Act 14, Geo. III., Chap. 33, comomnly called the 'Quebec Act,' they were detached from that Province and annexed to the Province of Quebec, thereby created.

"By the Imperial Act 31, Geo. III., Chap 33, repealing certain parts of 14th, of the same reign, and which divided the Province of Quebec into the Provinces of Lower and Upper Canada, the Magdalen Islands were attached to the County of Gaspe, agreeably to the proclamation of Sir Elured Clarke, dated 17th November, 1791, and on the division of the said County of Gaspe into the counties of Gaspe and Bonaventure, in virtue of the Provincial Act 9, Geo. III., Chap. 73, the said islands were declared to form part of the first-named county, to which they have remained attached under the Union Act already cited.

"Shortly after the cession of Canada to Great Britain, under the treaty of 1763, the Honorable the late Major Samuel Holland, being appointed (1764) by His Majesty George III., Surveyor-General of the Northern District of the British North American Provinces, received orders from the Lord Commissioner of Plantations to execute a survey of the Magdalen Islands and the adjacent islands situate in the Gulf of St. Lawrence.

"This service was assigned to Lieutenant Frederick Haldimand, by whom it was performed with great care and considerable talent.

"Agreeably to this survey of the Magdalen Islands Major Holland returned a description on the 2nd April, 1793, called for in Mr. Secretary Ryland's letter, dated 13th December, 1797, in compliance with the directions received by the Governor of this Province, from His Majesty's Ministers, to make a grant to Captain Isaac Coffin of the Magdalen Islands as a reward for his naval services, the grant to contain, however, the usual reservation for the maintenance of the Protestant Clergy in Lower Canada required under the Imperial Statute, 31 Geo. III., Cap. 31."

In pursuance of the directions referred to the Magdalen Islands were granted by Letters Patent of the 24th of April, 1793, to Isaac Coffin, of London, then Captain of the Royal Navy, afterwards Sir Isaac Coffin, Baronet, His Majesty's Admiral of the Red.

Topography.—The low lands which border the sea coast present a uniform appearance, generally undulating or level. The centre of the islands are made up of numerous conical-shaped hills, some as high as 580 feet above sea level.

No rocks are observed protruding through the wall, which extends from the highest to the lowest point and every foot of land is available for cultivation.

A more agreeable seaside resort than the Magdalen Islands could not easily be found on any part of our coasts. The great extent of clean, sandy beach, backed by a deep green sward, resembling a well-kept lawn and the comparatively shallow water, considerably warmer than it generally is on the St. Lawrence, afford unrivalled bathing facilities.

These islands are not the barren, isolated spots, conceived by some, but, on the contrary, the best authorities assert that the soil of the Magdalen Islands is much richer than that of Prince Edward Island, which is considered the "Garden of the Gulf."

Geology.—The geological formations of these islands present great uniformity, and what may be said of one can apply with equal accuracy to the others.

In appearance they show the numerous conically-shaped hills to be made up of eruptive rocks, principally diabase and dolerite. These rocks exposed by eruptions to the atmospheric elements have disintegrated and decomposed, forming a heavy overburden of clay and loam.

This series is overlain by the Silurian Division, in which we find the Niagara and Clifton groups. This again is overlain by the Lower Carboniferous series, giving us the cherts of marine limestone and gypsum. Following upward we find the triassic formation, similar to that of Prince Edward Island, and forming almost the entire sea board of the islands.

There is very little, if any, evidence of glacial erosion, but the erosion due to local forces has been very great. But few outcrops of the limestone are found, and none of the cherts in the solid. Evidently the latter have been made up of thin layers, and are now only represented by scattered fragments.

The eruption of the basic rocks, accompanied by chemical actions, in which the metallic sulphides have been oxydized, has converted much of the carbonate of lime into sulphate of lime, which exists in large quantities on all of the islands. It is also possible that the maganese occurring here originally existed in the carbonate state, and was subsequently transformed into an oxide.

Economical Minerals.—The following minerals of economic value are known to exist on the islands: Maganese in the forms pyrolusite, psilomelane, manganite, and wad or bog ore. Limonite, carrying a high percentage of maganese. Gypsum in large quantities, limestone and dolomite. Clays of various colors. Ochres, red and brown. Silica sands, some showing 95 per cent. pure silica.

Manganese.—From the above, manganese seems to demand special attention. Here it is found in the

residual clay derived from the decay of the limestone. This clay covers a large area, and the manganese occurs in lenticular masses as oxides of various forms, but principally, as above mentioned, as pyrolusite and psilomelane, the hydrous and anhydrous peroxides. Nevertheless, there seems to be all gradations in degree of admixture, and it is often difficult to draw the line of demarcation.

Some attempt has been made to prospect this area, and numerous pits and trenches have been put in, but in no place has this work determined the extent of any body of ore. It is true that from one pit on the Quinn farm about ten tons of ore was produced, from another about three tons, and in almost all the pits ore in more or less quantities was found, yet the work was stopped and no attempt has been made to develop the area.

An analysis made by Messrs. Torrey and Eaton, New York, 1901, from ore taken from the Quinn pit gave the following results:

Metallic Manganese	64.62	per cent.
Oxides or Iron and Aluminum	1.55	per cent.
Silica	1.40	per cent.
Moisture	.80	per cent.
Sulphur	nil	
Phosphorus	nil	
Oxygen by difference	31.63	per cent.
	100.00	per cent.

Gypsum.—The mineral which shows the next in importance on the islands is gypsum. This is found in great variety and in large quantities, but no attempt has been made to exploit it.

SUGGESTIONS AS TO THE USE OF CONTOURED MAPS.

By D. B. Dowling, B.Sc.

Mapmakers are always striving to give as much information on their productions as possible. With the advance of surveys the maps become more accurate, but difficulties arise when it is proposed to show the surface slopes and elevations. Hill shading is the most graphic and easiest understood, but it is apt to obscure portions where other details are to be shown. The method of showing contours is the best from an engineer's standpoint. We occasionally find, however, that even with men who are familiar with the contour map, many have great difficulty in making the mental picture of the relief implied.

For these let me suggest a simple expedient, which need not necessarily be carried past stage 2, as shown in the appended illustrations.

Mount a number of copies of the map, if printed copies are obtainable, on cardboard sheets, or trace each contour line separately on a sheet. It is not a difficult matter then to cut along one contour line on each sheet, beginning with the lowest and discarding the part that represents lower portions.

With the printed map on each piece of cardboard it is easy to fit the pieces in proper order, and you then have the map as at first, but with a rough step-like relief. When the contours have to be traced on the cardboard it is better to trace not only the line to be cut, but some of the other details above it to the next contour line.

If the cardboard can be selected from a large stock, the vertical scale can be made very nearly correct.

To illustrate, I have taken the map of the Crow's Nest coal fields reduced in Fig. 1, and mounted copies on sheets of cardboard. These when cut out along the contour lines were built up, with the result as shown in Fig. 2. The question naturally is asked, How should they be fastened in place? A wooden base should be provided and the layers of cardboard built up on it.

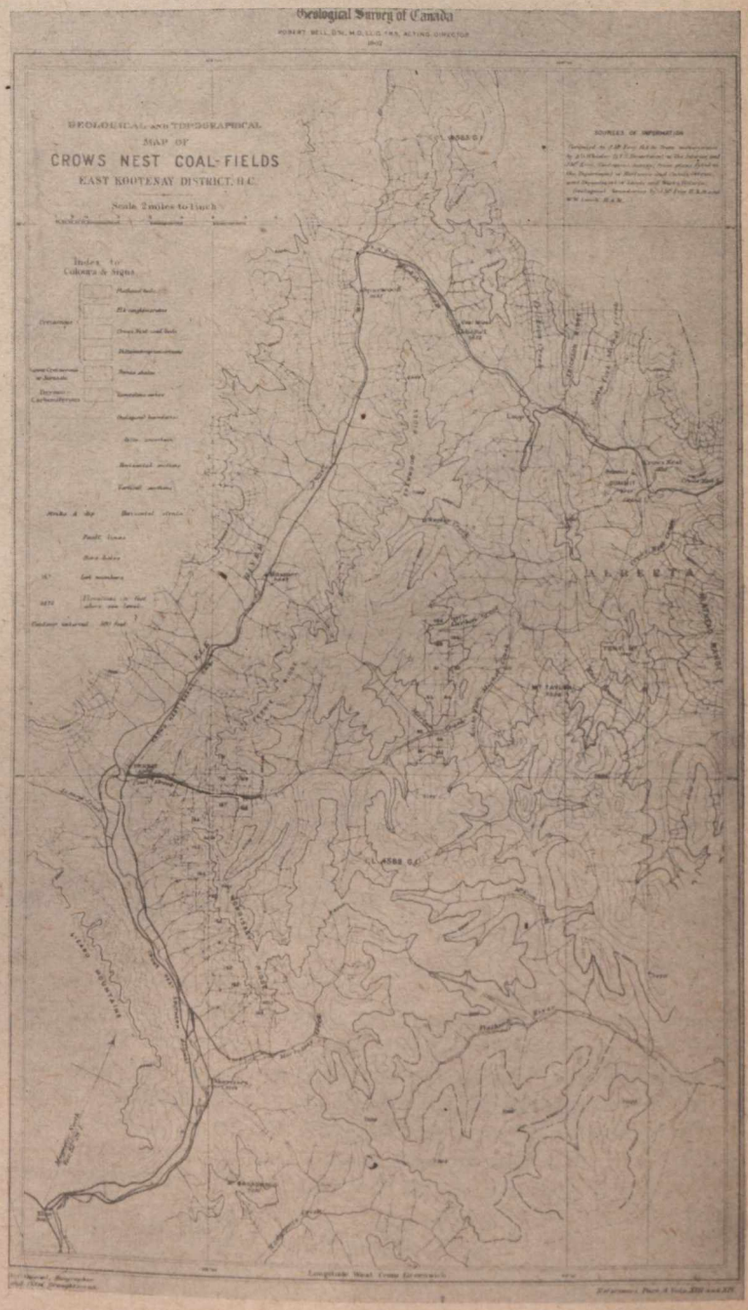


FIG. 1.

The best medium is carpenters' glue and a hot flatiron to press the sheets flat and remelt the glue. The centre portions of the sheet need not be glued; small-headed tacks are used, care being taken that they are to be covered by the next succeeding sheet of cardboard.

The rough model thus obtained, as in Fig. 2, goes a long way toward showing the relief of the country, but many would prefer smoothing off these slopes. This can be done either by carving or filling the steps

with putty, clay or wax. The filling is possibly the easier, but the surface is not very permanent. I have favored carving the cardboard by using curved knives instead of carving tools. The surface thus obtained is smooth, and will take paint or other coloring. In Fig. 2 a start has been made toward carving, but Fig. 3 is a representation of the finished surface. It will be noticed that the blank spaces on the side of the map, including the space for title, are built up to a higher plane than the rest of the map. This plan is optional, but it serves as a protection. In Fig. 4 details, such as coloring and conventional signs for railways, streams, boundaries, etc., are added. The coloring representing the coal measures has photographed very dark, and occupies the central part of the trough.

FIG. 2.

One advantage of a model is the ease with which sections may be shown. Cuts may be made across the model and the section painted on the edge of the cut.

CANADIAN COPPER COMPANY.

By D. F. BROWNE.

During the last four years the converting department of the Canadian Copper Company has been in temporary quarters in one end of the furnace building. This building was designed to cover five furnaces, each 50x204 inches. Three of these furnaces were erected in 1904 and 1905, and the space designed for the other two was appropriated for four converter stands. The crane span, being but 31 feet wide, while ample for the needs of the furnaces alone, was ill adapted to the needs of the converters, and as the space occupied by these stands was required for the erection of the two remaining furnaces, the removal of the converting department to permanent quarters was necessary. In the fall of 1907 the new converter building was started. As this building presents many features of structural and economic interest, the following description is given.

The converter building lies 80 feet to the east of and parallel with the furnace building. It is 522 feet long and 130 feet wide at its widest point. It covers

CONTOURED MAPS.—FIG. 3.

CONTOURED MAPS.—FIG. 4.

four departments, first, the quartz crushing and clay drying room, 70 feet by 60; second, the storage bins for quartz, clay and old linings, with the pugmills for crushing and mixing the lining material, which requires a space of 60 feet by 60 feet; third, the relining platform and drying stands, 112 feet long and 130 feet wide, and fourth, the converter room, with space for 10 converter stands and the necessary sculling tracks and the matte moulds, which require a stretch of 280 by 95 feet.

The building is of steel, with a uniform height of 47 feet to the roof truses. The roof is of Bonanza tile, made of concrete and expanded metal. The sides of the converter and re-lining room are covered with corrugated iron, while the quartz crushing and pugmill department, where greater protection from the winter's cold is required, is sided with ferro inclave and cement plaster.

The plan of the building shows two matte tracks No. 17 whereon the furnace matte is transferred in 7-ton steel ladles on a transfer truck by an electric motor and cable from the furnace to the converter building. A system of signals is installed, whereby the foreman of the converter building can see at a glance just how much matte is in the settlers in the furnace building, and can call for any desired amount of matte for the converters.

The converter room is 60 feet wide and 280 feet long, with a shed 35 feet wide on the east side. The stands are arranged along the west side at a distance of 16 feet from the wall. The converters are 23 feet 6 inches from centre to centre, except at the north end of the building, where a space of 30 feet 6 inches is left for crane repairs between the north end wall and the first stand, and also between No. 5 and No. 6 stands, where a space of 33 feet 6 inches is left for the matte transfer track and the converter flue stack.

These ten converter stands are electrically operated from two pulpits, each taking care of five stands. These pulpits are opposite the converters on the east side, one opposite the space between No. 5 and No. 6 stands, the other opposite the lower matte track at No. 10 stand. The centre line of the converters—that is, the centre of revolution—is 10 feet from the floor line. This allows the use of large ladles for matte and slag, and does away with the floor pits, which were a source of annoyance in the old building.

The converter gases are carried away by a sheet iron flue 4 feet wide and 13 feet high, which is carried on brackets behind the converters at a height of 11 feet

from the floor. This leads from both ends to a steel stack outside the building 125 feet high, 12 feet in diameter at the bottom, and 9 feet at the top. Above each converter a breeching 5 feet wide projects 5 feet from this flue. In this breeching the hood proper swings out from the top over the converter, as shown in the section. As the lines of this hood lie parallel with the edge of the converter flame, and as the gases have a clear rise of 20 feet before striking the top of the flue, all ejected sparks of matte and slag are so cooled that they do not stick to the iron work, and the former accumulations of fused masses in the hood are entirely avoided. The lower portion of the breeching is on an angle of 45 degrees, and a door here dropping on hinges allows the loose accumulation of flue dust to fall on the floor behind the converters. Doors are also provided along the bottom of the flue and in the base of the stack for the removal of this dust.

gooseneck swivel union, from which a 10 inch wrought iron pipe rises opposite the centre of rotation of the converter. This pipe rises to a height of 4½ feet above the centre of the shell is brought back by a cast iron return bend to this centre. Here it ends in a cast iron adjusting sleeve, by which the blastpipe is affixed to the trunnion of the converter shell. In order to allow the shell to be raised or lowered on the stand without striking the blastpipe this latter swings on the gooseneck as a centre, its motion being controlled by a screw which is fastened to an upright I beam. The rise of the blastpipe above the trunnion serves to prevent the matte surging back into the blastpipe in event of any accident to the blowing engine or to the electric motors. Below each of the Dyblie valves on the wind box a fusible plug is provided for the same purpose. In the old building one one or two occasions a lightning flash threw off both the current and the blast at

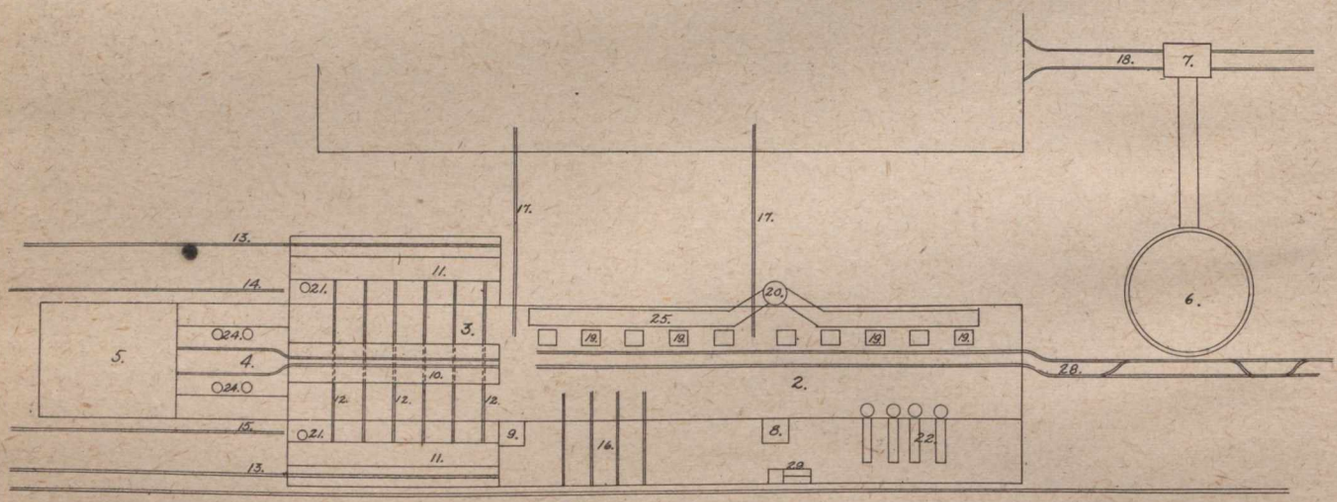


FIG. 1.

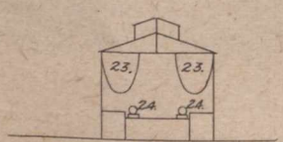


FIG. 2.

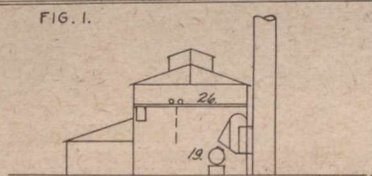


FIG. 3.

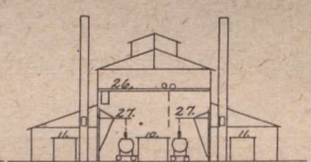


FIG. 4.

LEGEND.—Fig. 1—General Plan. Fig. 2—Section through Pug Mill and Bin Department. Fig. 3—Section through Converter Room. Fig. 4—Section through Relining Department.

1—Furnace Building. 2—Converter Room. 3—Relining Department. 4—Pug Mill and Bin Department. 5—Crushing and Drying Department. 6—Slag Casting Machine. 7—Slag Bin. 8 and 9—Pulpits. 10—Relining Platform. 11—Wood Platforms. 12—Relining Tracks. 13—Wood Tracks. 14—Quartz Track. 15—Clay Track. 16—Sculling Tracks. 17—Matte Transfer Tracks. 18—Furnace Charge Tracks. 19—Converter Stands. 20—Converter Stack. 21—Shell Drying Stacks. 22—Casting Moulds. 23—Lining Bins. 24—Pug Mills. 25—Converter Flues. 26—Travelling Crane. 27—Jib Crane. 28—Converter Slag Tracks. 29—Escolator.

The converter blastpipe, 3 feet in diameter, is carried on steel trestlework at a height of 19 feet across the yard from the substation to the southeast corner of the converter building, where it turns at right angles and is carried at the same height under the shed roof behind the pulpits. At each pulpit a 24 inch branch is led off to a manifold in the base of the pulpit, from which five 12 inch cast iron pipes are led underground, one to each of the five converters operated by this pulpit. The stem of the quick-opening gate valve in each pipe is brought up through the floor of the pulpit and ends in a rack which engages a pinion on the shaft of a sprocket wheel. The chain of this sprocket wheel passes round a controlling hand wheel at the front of the pulpit. Two turns of this hand wheel raises or lowers the gate valve in the blastpipe below. At the converter this cast iron pipe ends in a

the same time, and the sudden rush of matte into the wind box plugged up the blastpipe. The new arrangement prevents this accident. The wind box also is situated above the tuyeres, the latter being connected individually to its under side. This arrangement also tends to prevent any matte getting into the wind box.

The motion of the converter is controlled by a 30 h.p. induction motor directly connected to a worm gear. The wires for each converter are led in ducts from the pulpits. An electric button on the wall opposite each converter actuates a bell and annunciator in the pulpit, so that no mistake can be made as to which converter is to be turned up or down.

The tread ring on these converters is continuous, so that the shells can be completely revolved on the stands. This does away with the possibility of breaking the wind box and also allows the blast to be deliv-

ered at any desired angle under the matte. Hence there is much less sloppage of the charge and less converter scrap to be rehandled in the furnace.

The furnace matte is tapped fro mthe settlers in the furnace building into steel pots protected by a thin clay lining of slag. It is lifted by the crane and set on one of the transfer cars, which are hauled across to the converter building by an electric motor and cable. In the converter building two Morgan electric cranes handle the matte to and from the converters and the shells to and from the lining stands. These cranes have 50 ton main and 20 ton auxiliary hoists. The crane span is 55 feet 8 inches from centre to centre of the rails, and the lowest point on the crane is 35 feet from the floor. The crane travel is 200 feet per minute, and the speed of the main hoist is 18 feet, and of the auxiliary is 36 feet per minute.

The converter slag is poured into pots, which are hauled to the slag casting machine by a light locomotive. The slag cars carry 5,000 lbs. apiece. The slag casting machine is at the north end of the converter building, and 50 feet therefrom. It was built from the designs of the Tacoma Smelting Company, with some minor changes. It consists of two circular angle iron rings 59 feet inside and 66 feet outside diameter, supported on axles four feet apart and rotating on a circular track. In the annular space between the inner and outer circles rest 144 cast iron moulds, each overlapping the next. This ring rotates in 10 minutes, and the moulds will hold approximately 10 tons of slag. The moulds are automatically dumped into one of two skips, in which a spray of water is played. These skips are raised by an electric hoist on an inclined track and dumped into a steel bin, from which the slag is discharged into the furnace charge cars as desired.

When a shell is burnt out it is lifted from the stand and placed on a sculling car, and the top is lifted off. Four sculling tracks are laid at right angles to the building and run from the outside edge of the shed twelve feet under the crane span. In the shed are provided platforms the height of a flat car floor. The sculling cars are hauled out by a cable and motor to these platforms, the lining is cooled, and the adhering slag and any loose lining broken out and thrown on these platforms. The cars are now run back and the shell lifted to the relining cars beside the relining platform.

The relining platform is 112 feet long, 20 feet wide and 10 feet high. It projects down the centre of the crane runway above the lining tracks, which pass underneath at right angles to the platform. Six tracks thus allow 12 shells to be under lining at one time, six at each side of the platform. The platform itself is of steel, with a concrete floor, and carries two 24 inch tracks, on which the lining material is trammed from the pugmills to the shells.

The shells to be relined are set down by the crane on cars on either side of the relining platform. The top of the lower section of the converter shell comes flush with the top of the platform and about 18 inches away from it. A sheet iron apron is laid between the edge of the platform and the shell to prevent the lining material from falling on the tracks below. The material for lining the shells is wheeled from the pugmills in small steel cars with a swinging body and end dump, so that the lining is piled on the floor near the edge of the platform. This is shovelled by one man into the shell, where two men guide the ramming machine. After the bottom of the shell has been levelled up to two inches below the tuyeres the centre mould is put in position and the lining carried on up to the top of the shell.

The ramming machines are made in the company's shops, and consist of a somewhat modified rock drill mechanism, without the feed screw and rifle bore. The cylinder has a heavy cast iron jacket. The whole machine weighs 525 lbs. This extra weight absorbs the shock of the stroke, and prevents the machine from dancing. The machine is hung from a jib crane by a trolley chain block. This gives free motion horizontally and a quick and positive vertical adjustment.

After the bottom is finished the tops, which have been lined on a separate car and partially dried, are put on the shells, the joint being made tight by a layer of soft clay and quartz mixture, which the weight of the top squeezes out into all the crevices. The lining cars are now moved out under the drying hood and beside the wood platform.

The cordwood for drying the converters is brought in on flat cars under the shed roofs at both sides of the relining department. The wood is thrown on two platforms 12 feet wide and 10 feet high. These platforms serve to hold several days' supply of wood.

The converters come directly under hoods 16 feet apart, which hoods open into two flues 4 feet wide and 5 feet high. These flues lead to two stacks 5 feet in diameter and 75 feet high, which carry off the wood smoke during the drying of the shells. The tuyeres of the converters are pricked through the lining when the centre mould is in position, and also during the drying operation.

After 15 hours' firing the converters are moved back under the crane runway and placed on the stands. Here they are turned down and the tuyeres pricked out again, and the hood is swung out by the crane and locked in position.

With a new shell the first tap is small, about 1 to 1½ tons. This is blown about 20 minutes, and the slag is skimmed. The second tap 1½ to 2 tons is put in on top of the charge and the blow continued about half an hour, when the slag is skimmed again. The third tap about 3 or 3½ tons is now put in and blown for half an hour, skimmed and blown again till all the slag is "up," which means that the iron is practically oxidized. This last slag is skimmed, and the finishing blow of about 10 minutes is given. This granulates the slag so that it remains behind in the converter. The matte is now cast, and this ends the first blow.

The second blow starts with about 3 tons of furnace matte, which is blown about 50 minutes, then slag is skimmed and another tap of 3½ tons is put in and blown say 50 minutes, skimmed, blown again about 25 or 30 minutes till the slag is up, and then blown 10 minutes to finish after the slag is skimmed. The matte is now cast.

The third blow starts with a full ladle of about 6 tons. This is skimmed twice and blown to a finish.

The fourth blow is the same as the third ,using a full ladle of 6 or 7 tons of furnace matte.

One lining will average about 4 casts, 8 taps, and 7 hours blowing time, producing about 6½ tons of Bessemer matte, according to the grade of matte from the furnace.

One lining requires about 4 tons clay and 8 tons quartz. This clay includes all supplied to the furnaces for matte chutes and budding clay, which comes back ultimately to the old lining bin. The quartz carries

about 93 per cent. silica, with no copper or precious metals, while the clay is a local silt containing about 60 per cent. silica. The Bessemer matte contains 80 to 81 per cent. copper nickel, 16 to 17 per cent. sulphur, and ½ to 1 per cent. iron, the balance being oxygen and a small amount of converter slag. This matte is poured by the crane into stationary ladles, which stand on concrete piles at the north east corner of the converter building. A hole in the side of these ladles close to the bottom allows the matte to flow out through clay-lined chutes into cast iron moulds. These mould's are sectional, each section being 2 feet by 5 feet, with a lip or edge 4 inches high. Twelve of these bolted together form a continuous mould, holding about 3 tons of matte.

When this is cold it is pried up by crowbars on one edge and pipe rollers are slid underneath. The cake of matte is now easily rolled out on a cast iron floor, broken, loaded into barrows and weighed. The barrows are wheeled to an escalator behind No. 1 pulpit, which carries them to a platform level with the matte car floor.

The quartz and clay bins lie immediately behind the relining platform, as shown in the plan. The bins are of ⅜ inch plate, and of the suspended catenary type. These are in two rows, one on the east, the other on the west side of the building. Each row is really one continuous bin, with vertical plate partitions. The total length of each row is 60 feet, and the depth 22 feet. These are subdivided so as to form on each side one large bin for quartz and two small bins, one for clay and one for old linings. The bins will hold 800 tons of quartz in all, and about 500 tons of clay.

There are 8 chutes under each bin row. These chutes are directly over 24 inch tracks, on which run small plate iron end dump cars. These cars shuttle back and forth under the bins and bring the quartz and clay to the pug mlls. The concrete platform on which these cars run is 5 feet above the platform on which stand the pug mills. In this way the material can be dumped directly from the bin cars into the mills, while the mill plows can throw the mixed material into similar cars on the lower platform, thus avoiding any shovelling.

At present the pugmills are as follows: One 6 foot under-drive Allis-Chambers mill, belt driven, by a 30 h.p. induction motor; one 6 foot heavy type Power and Mining Machinery Co.'s mill, over-drive, belt-driven, by 30 h.p. induction motor; one 7 foot over-drive Carlin mill, belt-driven, by a 35 h.p. motor.

All the motors for these mills are lodged in a dust-proof room overhead, but all the controllers are arranged beside each mill. Space is provided for the addition of three more mills as they may be required.

The quartz crushers, clay driers and elevators are directly behind the bins at the south end of the building. The quartz comes in on a track parallel with the west side, and the clay on a track parallel with the east side of this department. Both are unloaded on platforms as high as the car floor.

The quartz is shovelled into a Gates crusher No. 4 K, which has a capacity of 10 or 12 tons per hour crushed to 1½ inch size. This crushed quartz falls into an elevator boot, from which it is lifted to a screen 10 feet long, with ¾ inch holes. The fines from this slide directly into an elevator boot, while the coarse passes through an Allis-Chambers 30x14 roughing rolls, crushing to ¾ inch, and then drops to the elevator. The quartz is now hoisted to a distributing chute 47 feet from the floor. A system of gates in this allows it to fall through chutes on either belt and drop into any bin desired.

The distributing belts are 14 inch rubber-faced, and convey the material at an incline of 20 degrees. Stationary trippers are provided at each bin, so that the material can pass over any bin or drop at any point required.

The clay is unloaded on a platform, and in the summer wheeled directly up an incline and dumped on the concrete floor behind the pug mills. In the fall and winter, however, when it comes in frozen in lumps, it is passed through a Jeffrey coke sizer and then shovelled into the clay drier. This is built by Ruggles-Coles, and has a capacity of about 4 tons per hour, and is 30 feet long and 70 inches diameter.

The flame from the firebox passes down a central pipe and then back through the annular space in which the clay rotates. The machine both dries the clay and rolls it into pellets before it is delivered to an elevator and passes to the distributing belts.

The clay drier is driven by a 15 h.p. motor, and the quartz crusher rolls and elevators by a 66 h.p. motor. These are housed in a room on the same floor as the pug mill motors.

FIELD WORK OF THE GEOLOGICAL SURVEY OF CANADA.

The distribution of the parties was as follows:—

Yukon and Mackenzie.

Mr. D. D. Cairnes, assisted by Dr. O. Stutzer, was engaged in the Tantalus district, near White Horse, defining the coal area, with the object of determining the character of the coal and discovering the point nearest transportation where a commercial supply exists. Mr. Matheson had charge of the topographical work in connection with this investigation.

Mr. V. Stefansson descended the Mackenzie, and will winter with the Eskimo in the Arctic. The expedition, which is sent out by the American Museum of Natural History and the Geological Survey conjointly, while primarily for ethnological purposes, is expected to add to the geographical knowledge of the Arctic coast. In addition, an endeavor will be made to obtain information regarding mineral occurrences. Mr. Stefansson took with him a set of ore specimens to assist him in eliciting information as to ore occurrences from the natives, who are good observers in this respect.

Mr. Joseph Keele, who wintered on the divide at the head of the Pelly River, continued his exploration across to the Gravel River, and descended this stream to the Mackenzie.

British Columbia.

Mr. R. G. McConnell spent the season on Texada Island prosecuting a somewhat detailed geological survey of the northern part of the island. The copper and

iron deposits here are attracting attention, and it was in response to an urgent appeal for a geological survey of the island that this work was undertaken. Mr. F. Maclaren was engaged in a topographical survey of the same field as a foundation for the geological map.

Mr. R. Graham continued the survey of the Pacific coast and inlets begun in 1906 by Mr. Leroy and continued in 1907 by Mr. Bancroft. The work this season was the section between Kingscome Inlet and Bella Coola.

Mr. W. W. Leach continued his explorations in the Bulkley Valley near the route of the Grand Trunk Pacific. Coal, copper and lead prospects and the advent of transportation facilities make this field of importance.

Mr. C. H. Clapp, assisted by Mr. Kenneth Chipman, commenced a survey of Vancouver Island.

Some work had been done by the Survey in the Nanaimo coal areas in the 70's. The northern end of the island was studied by Dr. Dawson in 1886, and a few of the inlets of the west coast in 1902, but for the most part the geology and topography of the island is unknown to the Survey. From an agricultural as well as from the mining standpoint the island is rapidly increasing in importance, and it was decided to begin its systematic survey. Mr. Clapp made the start at the southern end of the island as affording the most favorable opportunities for geological investigation.

Mr. John Macoun, assisted by Mr. W. Spreadborough, naturalist to the Survey, was engaged making a representative collection of the fauna and flora of the island for the new museum. Mr. C. Roberts, one of the preparators of the Survey, was stationed at Nanaimo, mounting the fresh specimens.

Mr. Macoun was also instructed to visit the Rossland mines for the purpose of studying the fungi, whose growth in mine timbers causes their rapid destruction, entailing a heavy expense upon the mines. The object of this investigation was to discover, if possible, a commercial method of preventing their growth. On a later page will be found an account of a cheap method of preserving the timbers kindly furnished me by Mr. Watson, of the visiting British engineers, with whom I discussed the problem.

Mr. Charles Camsell completed his detailed study of the Hedley mining camp, and began a survey of the Tulameen district. The latter is unique in that it is the only district in Canada where platinum gravels have been worked on a commercial scale. Railway facilities for this section are projected, and with the solution of the transportation problem it is expected that this portion of the country will receive active development. The present work is in anticipation of this.

Mr. L. Reinecke was engaged in the topographical surveying of the districts examined by Mr. Camsell.

Mr. W. H. Boyd was employed on a detailed survey of the Phoenix camp. At the close of the season he made a hasty examination of the Slocan district to plan for its survey next season.

Mr. O. E. LeRoy made a detailed investigation of the Phoenix camp and its ore deposits. After finishing this he spent a month on the underground geology near Sandon.

Alberta.

Mr. George Malloch made a geological and topographical survey of the Bighorn coal area on the Brazeau River. Coal in quantity and of exceptional quality is found here.

Alberta and Saskatchewan.

Mr. Dowling was engaged in investigating the coal supply of various portions of Saskatchewan and Alberta.

Saskatchewan and Keewatin.

Mr. W. McInnes spent the season on surveys from Lac la Ronge down the Churchill to South Indian Lake. The prospect of a railway to Hudson Bay has created a demand for information concerning this north country and tis mineral possibilities. The Survey had no information concerning this section of the Churchill, although the upper and lower portions had been explored. To fill the gap this work was undertaken. Reported discoveries of valuable minerals at Lac la Ronge made exploration of that region important.

Keewatin.

Mr. Owen O'Sullivan completed the instrumental survey of the shores of Hudson Bay. A section of 250 miles remained undone, and as so much interest now centres round Hudson Bay, it was deemed advisable to complete its survey.

Ontario.

Mr. A. W. G. Wilson spent the field season about Lake Nipigon, completing the geological work necessary for the map of this region, which the National Transcontinental will open up.

Mr. W. H. Collins made a geological examination of the upper part of the Montreal River. The lower portion of this river received much attention from prospectors last year, and it was hoped that geological information would be secured regarding the upper country before it would be required by the advancing prospectors.

Mr. W. A. Johnson continued work on his Simcoe sheet in Southern Ontario.

Mr. F. B. Taylor and Mr. Goldthwaite, who have been for some years working on the superficial geology and the history of the Great Lakes region for the United States Geological Survey and for State Surveys, extended their studies into Ontario, under the auspices of the Geological Survey of Canada. Mr. W. A. Johnson co-operated with them in this work.

Mr. E. D. Ingall spent his field season in the gas and oil region of Southern Ontario, obtaining information for a new map of the productive districts.

Quebec.

Mr. M. E. Wilson, who had been studying the country east of Lake Temiskaming during the past two seasons, was this year engaged in extending this work northward in Quebec. Considerable prospecting is being done in this region east of Larder Lake on the Quebec side of the interprovincial line.

Mr. W. H. Boyd, with a party of topographers, spent a few weeks on a map of St. Bruno Mountain, required for Mr. Dresser's report on the geology of this old volcano.

Mr. J. A. Dresser in the early spring examined the recent gold discoveries in Megantic, and issued a preliminary report on this field. Mr. E. R. Faribault also visited this district and contributed a sketch map for the report. Mr. Dresser's main field work was along the National Transcontinental Railway in Eastern Quebec, which will open up a district about which the Survey could furnish but meagre information to the numerous enquirers.

Mr. R. W. Ells investigated and reported on the landslide at Notre Dame de la Salette.

Mr. W. McInnes, and later Mr. H. M. Ami, made brief visits to Bergeronnes, on the Lower St. Lawrence, to examine the condition of the clay banks in its vicinity, as the inhabitants were in some apprehension of slides.

New Brunswick.

Mr. G. A. Young was occupied during the field season in a detailed survey of the Bathurst district. The iron ores of this district are receiving attention, and the Survey had been petitioned to make a detailed study of the local geology.

Mr. R. W. Ells was commissioned to go to Scotland to report on the important oil shale industry of that country, and on his return to examine the Albert shales of New Brunswick with a view to determining their possibilities as a basis for a similar industry in this province.

Mr. L. Lambe, vertebrate palaeontologist, was engaged in collecting Devonian vertebrates in New Brunswick and Nova Scotia, chiefly in Albert County, N.B., and Kings County, N.S., to secure palaeontological evidence regarding the geological ages of the formations believed to be or which might possibly be Devonian. In the Maritime Provinces, where economic materials such as coal occur in definite geological horizons, such work is of great economic value.

Mr. W. J. Wilson made collections along the Bay of Fundy, paying special attention to plant remains.

Nova Scotia.

Mr. Hugh Fletcher continued work on the map sheets of parts of Cumberland, Kings and Annapolis Counties. Geological work in this section is of extreme importance on account of questions as to the continuity of the coal measures.

Mr. E. R. Faribault was also engaged in extending the surveys on his map sheets in Lunenburg County and Kings County, covered by the Gaspereau Rover, New Ross and Chester Basin sheets.

Mr. H. M. Ami spent a portion of the summer in Antigonish to determine the horizon of carboniferous rocks near Big Marsh, which the Survey had mapped as lower carboniferous. The presence of bituminous shales (which in places pass into coal) in these rocks had led a number of local people to hope that the rocks would be found to belong to the coal measures. Mr. Ami also cellected fossils from several Nova Scotia localities.

Prince Edward Island.

The work of the Survey in Prince Edward Island took the form of deep boring operations to determine the depth at which the coal measures occur, and, if possible, to prove the presence or absence of coal seams within working distance from the surface.

. . . . . .

Outside his office duties, Mr. Brock spent a few days at Cobalt, made two visits to Prince Edward Island in connection with the boring operations, made an official trip with the Minister of Mines through Southern British Columbia, accompanied the mining engineers throughout the western portion of their excursion, visited several of the field parties at work in British Columbia, and spent some weeks in the Slocan, the Sheep Creek gold district south of Nelson, and in Rossland.

The growing interest in and use made of the work of the Survey is shown by the increasing demand for Survey publications. Over twice as many publications were asked for and distributed the past year as were called for the year before; many reprints have to be made of the more valuable reports, and a large increase made in the regular editions of Survey reports.

A topographical division of the Survey is being organized under the supervision of a topographer.

A well records division has been organized to collect, preserve and publish the information to be gained from boring operations throughout the country. Very valuable geological information, bearing on the stratigraphy, and on problems connected with oil, gas, salt, water, etc., is to be obtained from such borings, and it is of the highest importance to both scientists and practical operators that such information be preserved and rendered available. Sample bags, log books, etc., are sent to them to be filled, and these can be mailed to the Survey free of charge. Everything will be done to make their part of the work as little burdensome as possible. With the active assistance in this matter of the drillers, who stand to gain most benefit from this work, this division should become one of the most useful parts of the Survey organization.

TECHNICAL EDUCATION IN NOVA SCOTIA IN 1908.

By Director F. H. Sexton.

The year that has just been brought to a close has seen the successful termination of the first year of the system of evening technical schools under the new Department of Technical Education, beside the opening of these schools on their second year and the construction of the Nova Scotia Technical College in Halifax.

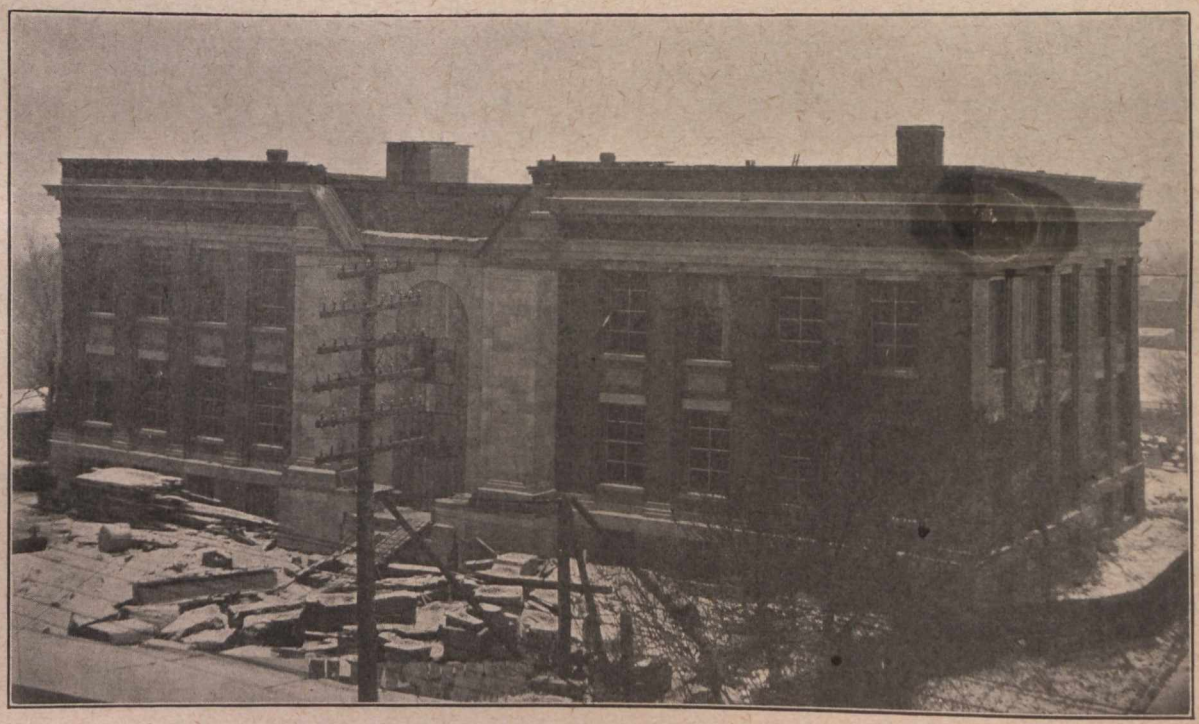
A cut of the college, as it stands to-day, is included in this brief article. The outside of this 150 x 90 building is completed, except for the main entrance, and the pillars on each side, and the central pediment above the pillars, on which the name of the college is inscribed. This building will contain the lecture rooms, assembly hall, scientific laboratories, Provincial Science Library, the Provincial Museum, and administration offices. The workshops, power and heating station, hydraulic laboratory, mining, and metallurgical laboratory and mechanical and electrical engineering laboratory will be in buildings of factory type, separate from the main college building. The college structure is of Nova Scotia red pressed brick with Wallace freestone facings. It has a steel frame and is of slow-burning reinforced concrete construction. The interior is now being finished and will be ready for occupancy by the end of May.

The Technical College is in a strong affiliation with all of the Nova Scotia colleges, four in number, and with Mount Allison University in New Brunswick. The Governing Board of the college is composed of one representative from each of the affiliated colleges, together with the Director of Technical Education.

At a meeting in June, the Governing Board adopted a uniform two-years course to be carried out in the affiliated colleges, and to be recognized as the first half of a four years engineering training. This two-years work contains the general mathematics, science, language, drawing, work-shop, etc., that can be easily car-

ried out by the affiliated colleges, without much additional staff or equipment over what they possess at present. The last two years of professional work in engineering are to be carried out in the Technical College, thus avoiding duplication of effort and equipment in all the colleges, if each attempted to carry out the full work for degrees in engineering. Equipment and instruction in the Technical College will be provided for the basal departments of civil, mechanical, electrical and mining engineering. Short courses will be provided in mining for colliery managers, in civil engineering for road inspectors, in mechanical engineering for firemen and steam engineers, etc. These short courses are necessary, in order to serve the province with the educational needs that are so apparent in the industrial circles.

In establishing a system of technical education, the government in Nova Scotia realized that they had to provide for both the youths that were about to become wage-earners and also those who were already engaged in the industries. The government thought that their



first duty was to raise the skill, efficiency, and productive capacity of those already in the trades as much as can be done by education instead of training more men for the trades. Therefore, they started a comprehensive system of evening schools.

The evening technical schools under the direction of the Department are of three distinct classes: Engineering Schools, Coal Mining Schools, and Technical Schools. The first two kinds are confined to the colliery districts and the last mentioned to manufacturing centres.

Engineering schools are maintained in the large centres and instruct firemen, engineers, and mechanics in the elementary scientific principles and modern practice in steam and mechanical engineering. This year classes in mechanical drawing, machine drawing, electricity and dynamo-electric laboratory have been established in connection with the engineering schools, and have been very well patronized. Men working about power plants find every year more and more necessity for a knowledge of electricity and for the ability to read working drawings. Steam engineers, who are most capable in their own line, see some electrical machine introduced suddenly into the plant over which they have supervision, and are more or less at sea because they have not had any fair chance to learn the principles and modes of operation of dynamo-electric machinery. To make the teaching in this subject effective, considerable electrical apparatus and a number of motors, dynamos, etc., were purchased and a laboratory started in each place so that the men may work with the actual machines, in addition to class-room work.

The coal mining schools aim to instruct miners in the science and art and modern practice in this difficult branch of industry. There is an evening school in practically every colliery town in Nova Scotia—some twenty in all. Day classes are held in the larger towns for men who work on night shift. The teachers, with the exception of a few assistants, are men who are best fitted by training and long practical experience to act as instructors. Every one had several years of underground experience of varied character and had risen to some position of responsibility. Each instructor gives his whole time to teaching, holding classes two nights a week in each of three places in his district, and holding day classes wherever there is a large enough number of students to warrant it. Assistant instructors from the colliery officials who work in the day time are appointed to hold classes in the smaller places more remote of access.

To enter the coal mining classes, as well as the engineering classes, the student must by examination prove that he is proficient in arithmetic through fractions and decimals, and that he possesses a good working knowledge of English composition. In coal mining towns, however, there is more than the usual tendency for boys to leave school just as soon as he is allowed by statute. Because of neglect or limitation of earlier educational opportunity, many older men, desiring a greater knowledge of the underlying principles of ven-

tilation, mechanics, modes of work, etc., find they have no basis upon which to advance to the desired goal. For this reason preparatory evening classes in arithmetic and English are carried on in every locality where the more technical classes are held. In the larger centres these are divided and graded in two, three or four sections according to the number of pupils. A number of men attend these more elementary classes who merely wish to improve their general education, which was of very limited extent when they were young. In some of the smaller sections where the evening schools are of the most benefit and hard to maintain on account of the small number of students, the public school trustees are anything but generous in their attitude toward the provincial government which bears the total expense, while most of the larger towns co-operate generously.

The attendance at the coal mining schools is large and the students are in earnest. Some of the mathematics in connection with theory of ventilation and machines is very difficult, and it is wonderful what great assiduity is displayed and the remarkable grasp of the subjects attained by some of the students who cannot work ordinary fractions when they begin in the schools. Most of the Nova Scotia coal miners are native born, are most intelligent and work under the best of conditions. The hours of labor are comparatively short for most of the men, and the evening instruction is not the tax on their powers that it is on men who do not have time for a good rest between the time they stop work and the time they go to school. There is no doubt but that the general diffusion of the knowledge of the principles underlying the processes employed in the mining of coal will do much to make a more intelligent, alert, responsible miner and will be a great safeguard against such disastrous catastrophes as are becoming alarmingly common in the United States of late. So far as the author knows this is the only local government (Provincial or State) in America that has a system of secondary mining education, generally applied over the whole domain.

The last kind of evening school is the evening technical school established in the various larger manufacturing centres. There are at present four of these, viz., Halifax, Amherst, New Glasgow, and Sydney. In each place they are conducted in the public school buildings. The Provincial Government bears practically all the expense of the coal mining and engineering schools, but in the evening technical schools provides one-half the cost of instruction and furnishes the necessary apparatus, while the locality is required to supply the other half of the cost of instruction, besides the rooms, heat, light and janitor attendance.

Such courses are given as will teach the men in different vocations the drawing, science and modern practice connected with those vocations. The number and kind of courses offered in any locality depend on the number of students available and the dominant industries. There are some classes, such as Practical Mathematics, Mechanical Drawing, and Electricity, etc., that are demanded in every centre, and then there are others, such as Metallurgical, Chemistry, Pharmacy, etc., that are dependent on the size of the locality and the special industries.

These classes are not entirely free. An experiment was tried on the establishment of the schools to attempt to insure a constant attendance. During the first four sessions of any class, the student is required to make a deposit of $2.00 to $4.00, depending on the class. This deposit is kept until the end of the year, when it is refunded according to the attendance. The refund is made on the following basis:

100 per cent. attendance—whole deposit returned.
90 to 99 per cent. attendance—four-fifths deposit returned.
80 to 90 per cent. attendance—two-thirds deposit returned.
70 to 80 per cent. attendance—one-half deposit returned.
60 to 70 per cent. attendance—two-fifths deposit returned.
Below 60 per cent. attendance—none of the deposit is returned.

It was feared on one hand that the deposit might keep some students away, and on the other hand that it was not large enough to act as a strong incentive to attend regularly. Both fears were proven to be groundless.

The attendance was remarkably constant, in some classes averaging 84 per cent. for the whole year. Many students also received the whole deposit back for 100 per cent. attendance.

The courses offered in these schools are as follows:

Practical Arithmetic.
Business English.
Practical Algebra, Geometry and Trigonometry.
Mechanical Drawing.
Machine Drawing.
Machine Design.
Architectural Drawing.
Building Construction.
Architectural Design and Estimating.
Elements of Electricity.
Elements of Electrical Engineering.
Power Plants and Electrical Transmission.
Electrical Laboratory.
Electrical Engineering.
Elements of Chemistry.
Technical Chemical Analysis.
Elements of Surveying.
Surveying and Plotting.
Elements of Civil Engineering.
Pharmaceutical Chemistry and Pharmacy.

It was found necessary after the first year's experience to supplement the recitations and class lectures with laboratory method, especially in electricity. The practical men in the classes needed concrete illustrations even more than ordinary school pupils. About $10,000 was expended in the purchase of electrical apparatus, machines, and measuring instruments, and a small dynamo-electric laboratory started in connection with each of the four schools.

The different technical subjects are now so arranged that each may be followed for three years in successively advancing classes. By obtaining a pass-mark of 75 in each of the three classes, and the same standing in the general subjects of Practical English, Practical Arithmetic, Algebra and Trigonometry, Practical Geometry, the student is entitled to a full diploma, the highest honor in the schools at present. A diploma would be given, for example, for satisfactorily passing the following group: Practical English, Practical Arithmetic, Practical Geometry, Algebra, Trigonometry, Mechanical Drawing, Machine Drawing, and Machine Design.

To make these classes a success the department has been forced to supply the classes with all draughting

supplies at reasonable prices, owing to the fact that most of the classes are situated in places where these supplies are not at all available. The text-books of most of the subjects taught, were found to be far from suitable, and the department has been compelled to start publishing texts for its own peculiar needs. So far the only one issued has been a book on "Practical English," but a course in Mechanical Drawing and another book on "Mathematics for Coal Miners" are in preparation.

The total numbers registered in the different schools last year are as follows:

Engineer Schools	231
Coal Mining Schools	649
Evening Technical Schools	429
	1,309

The numbers this year have not increased as much as was expected, because the opening of the schools was much hampered by the intense political excitement that prevailed this autumn, especially in the industrial centres.

An evening Technical School for Fishermen, carried on in connection with the Dominion Department of Marine and Fisheries, is to be opened soon after the first year of the year. A movement on foot that is meeting with universal commendation so far is to establish at Halifax a day and evening trade school for women and girls. In it will be taught courses in millinery, dress-making and domestic economy. It will aim to train thoroughly those women, that have to resort to gainful occupations from necessity, for trades and domestic necessity.

The work of technical training in Nova Scotia is moving slowly, sanely, and surely, backed by a sturdy intelligent people, who have a reputation for possessing both desire and reverence for all education.

THE REPORT OF THE GERMAN DEVELOPMENT COMPANY, LIMITED.*

I.

1907.

Report on Mining Claims in the Montreal River Mining Division, by Alfred E. Barlow, M.A., D.Sc.— In August, 1906, Dr. Barlow first directed the attention of his principals to the Rabbit and Ko Ko Ko Lake areas. Diligent prospecting brought only negative results. A short campaign in the vicinity of Maple Mountain was also fruitless. The lateness of the season then rendered it imperative that a concession near Makamik Lake, in the Province of Quebec, be examined before snow fell. No veins worth staking were encountered here.

During the winter of 1906-07 an expedition under Mr. Albert Scott was sent out to explore the country in the vicinity of the Transcontinental Railway between Abitibi Lake and Bell River. Despite glowing accounts that had been received concerning the commercial possibilities of this region, especially regarding timber and pulpwood, Mr. Scott's report indicated nothing to justify the investment of capital.

Late in the summer of 1906 persistent rumors were current to the effect that cobalt, nickel, and silver had been found near the Montreal River, in the neighborhood of Maple Mountain and James Township. Throughout the winter promiscuous staking went on. For miles in and about James Township territory was staked. Most of the claims were recorded without discovery. Consequently over 90 per cent. of the claims thus staked were thrown out by the Government inspectors, only to be re-staked and recorded again. Dr. Barlow estimates that at the beginning of June, 1907, there were more than 3,000 prospectors working in the country drained by the Montreal River and tis tributaries, a territory including parts of the Townships of James, Smythe, Tudhope, Mickle, and Farr, covering an area of 40 square miles. The centre of the area is about 35 miles northwest of Cobalt.

During 1907 the land, or winter, route started from Earlton, on the T. & N. O. Railway, crossing the northern parts of the Townships of Armstrong, Beauchamp, Bryce, and Tudhope, to Elk Lake, opposite the mouth of Bear River, in the fifth concession of James Township. Seven miles of thie 30 mile trail had then been converted into a wagon road. The water route from Latchford to Bear River, 50 miles, broken by three rapids, was traversed by two lines of steamboats. The stages of the journey, which was then completed in not less than 12 hours, are:—

Latchford to Pork Rapids, 9 miles.
Pork Rapids to Flat Rapids, 27 miles.
Flat Rapids to Mountain Chute, 3 miles.
Mountain Chute to Bear River, 11 miles.

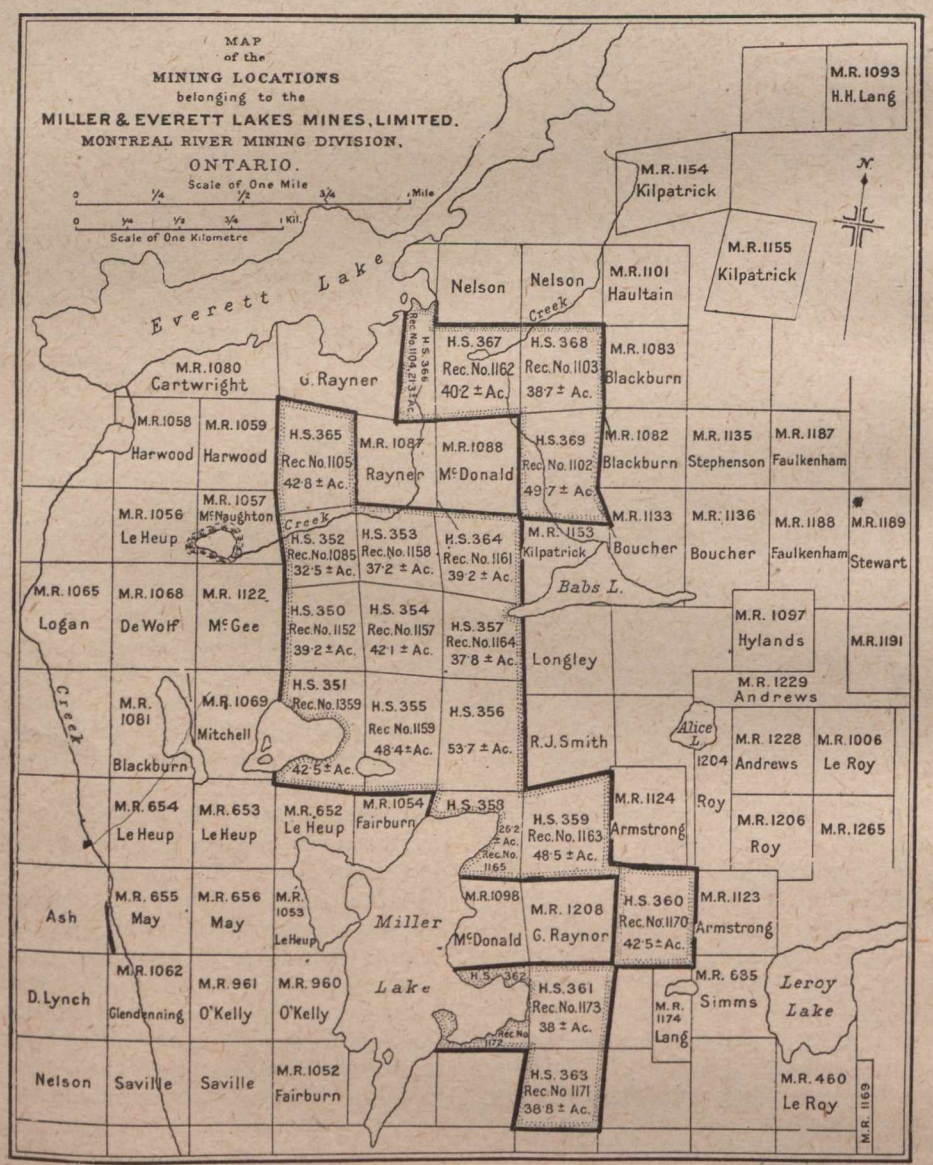
Physically, the district presents an uneven rocky surface, with intervening valleys occupied by swamps and lakes. Only low hills vary the scenery. Outcrops of rock are frequent on the higher ground, but much of the area is drift covered.

All of the ore bodies in the district occur as veins cutting a quartz-diabase or gabbro. Most of the veins occupy two sets of fissures running approximately north and south and east and west, respectively. The fissures are regarded as contraction cracks formed by the cooling laccolith and filled by later and more acid secretions of the same magma from which the accompanying diabase has solidified.

"The vein-filling must therefore be regarded as of pegmatitic origin, having the same genetic relationship to diabase that ordinary pegmatite does to granite. For purposes of discussion and correlation it may therefore be referred to as diabase-pegmatite in preference to the term "Aplite" by which the material in these veins or dikes is now known to the prospectors of the Montreal River district, for the latter would imply the formation of this material as a differentiation product of granite. As a rule these veins are more or less irregular, often curving, sometimes faulted, but surprisingly persistent over long distances. The fissures which they occupy vary from a fraction of an inch or a mere crack to two feet or even more in width. Very frequently too the same vein may show an equal variation in width

*See editorial in issue of January 1st, 1909.

both in its horizontal and vertical extension. The narrow veins, especially those from 4 to 8 inches in width, are more commonly met with, and are as a rule more richly charged with the desirable metallic minerals. The wider veins usually contain these metallic minerals either in fairly uniform and continuous through comparatively narrow streaks, or in wider and larger though more or less isolated patches. Many of these veins possess quite sharp and distinct boundaries, the gangue material showing very little, if any, connection or transition into the wall rock. In some instances also the vein along either or both boundaries breaks



easily and freely from the accompanying country rock, the ore body in such cases showing quite sharp and regular hanging and footwalls.

"In other and quite frequent cases precisely similar veins show a distinct and at times perfect gradation or passage into the surrounding diabase, such a transition being characteristic of either or both walls. Examples are not lacking, especially in the wider occurrences, where there is a pronounced commingling of the material of the vein and the parent plutonic rock. In such cases the vein may contain certain vague greenish spots or masses which have undoubtedly been derived from the diabase, and are now in a more or less altered and disintegrated condition, while the diabase in the more immediate vicinity is relatively more acid in composition with abundant quartz and patches and crystals of the same acid plagioclases characteristic of the vein. Moreover, the minerals which together make up the diabase show rather pronounced decomposition due to the same eruptive afteractions as a result of which the accompanying veins have been formed. The plagioclase (labradorite) has been largely converted to a pale yellowish green saussurite, while the original pyroxene has been replaced by an aggregate of chlorite, epidote, and calcite.

Mineralogical Composition of the Ore Bodies.

"The gangue of these veins in the simplest form of their development shows a fine to moderately coarse grained felspathic material varying in color from a pale pink to deep flesh red. At first sight most of these veins are remarkable chiefly for the prevailing absence or scarcity of quartz, although examples are not lacking of veins, evidently very clearly related, which contain this mineral as an abundant and occasionally predominant constituent. Dr. G. A. Young, of the Geological Survey, at the writer's suggestion, very kindly undertook to make a microscopical examination of this feldspathic material. In the three sections examined

by him, representing several of these veins from the western part of Tudhope and the central part of James Township, by far the largest proportion at least was plagioclase varying in composition from albite through oligoclase to andesine. This diagnosis was corroborated in part by a separation of the mineral constituents by means of a heavy solution. The plagioclase thus separated vared in specific gravity from 2.609 to 2.635. Some of this plagioclase (albite) had distinct recangular or lath-like outlines, showing twinning according to both the albite and percline laws, which in certain cases produced a fine "cross-hatched" structure usually considered characteristic of the appearance of microline between crossed nichols. Most of the grains are quite turbid. Another species of plagioclase (oligoclase) occurs in irregular, untwinned and clear grains, thus resembling quartz, but unlike quartz this mineral is readily fusible. Some of these veins contain a considerable admixture of quartz, this mineral often forming graphic intergrowths with the feldspars. In certain of these cases, the feldspar has acted as the host, but in others large grains of quartz were noticed containing only a few shred-like individuals of the plagioclase. Calcite is usually present and sometimes very abundant. This mineral frequently occurs in fairly large grains or in granular aggregates made up of several individuals disseminated through the more abundant felsdpathic material. It also occurs in more or less continuous vein-like areas or masses, anastomosing between and sometimes penetrating through both simple and composite individuals of feldspar. Portions of the vein where exposed to the action of the weather or percolating waters, frequently present a finely cavernous or sponke-like appearance, due to the etching and removal of the calcite, leaving small and irregular shaped miarolitic cavities lined with minute tabular crystals of feldspar. Oxidation of the iron sulphides usually present gives a prevailing pale brownish to an almost black color to these portions of the vein. Not infrequently barite, usually pale pink in color, and occasionally celestite occur with or replace altogether the calcite and feldspar.

"Some of these veins are therefore made up almost wholly of red feldspar, almost always a plagioclase near the acid end of the series, together with a very subordinate amount of calcite and a still smaller quantity of quartz. Other veins again are made up of an almost equal proportion of plagioclase and calcite and sometimes quartz, while still other veins present a finer grained feldspathic portion in the vicinity of the walls, with the whole mass of the interior made up of comparatively coarse grained calcite with sometimes a small proportion of quartz. The stages represented completely by these vein occurrences in these districts show a perfect and practically uninterrupted continuity during their consolidation from an original condition of hydro-igneous fusion characteristic of the magma from which the comparatively fine and even grained felspathic material is believed to have resulted, to conditions of igneo-aqueous solution which must have obtained in the viscous mass from which the latest calcite or quartzose segregations had solidified.

"Chalcopyrite is the most abundant and common of the metallic constituents, but bornite is also very frequently encountered, both of these sulphides often occurring side by side in the same vein. Covellite also occurs, but much less frequently. Galena is also very common, and usually carries silver in variable quantity. Many of the veins contain micaceous or specular iron ore (hematite), and some of them are entirely made up of this material, at least near the surface. Several veins were noticed made up of alternations of chalcopyrite and specular iron ore. Very frequently a vein containing specular iron ore is replaced at a depth sometimes of only a few feet by chalcopyrite, smaltite, and native silver. In the Hubert Lake area veins of magnetite have been found, similar to those of hematite in the Township of James. Malachite and azurite are both common. The cobalt minerals, either smaltite or cobaltite, are very prevalent usually in association with more or less niccolite. Erythrite (cobalt bloom), and annabergite (nickel bloom) are also frequently present as surface decomposition products. The smaltite-niccolite veins often contain the white bloom near the surface, which is formed by the reaction of these minerals upon one another when subject to weathering processes. Most of these veins will give assay values in silver varying from a fraction of an ounce to thirty ounces or even more per ton, although the material on which the trials were conducted showed no signs of the native metal.

"Silver is also of common occurrence in these veins, both in the native state and as argentite (sulphide of silver). As native silver it occurs in nuggets of various shapes and sizes, as well as in fine flakes and scales disseminated through any of the various gangue minerals, fledspar, calcite, barite, or quartz. Beautiful fern-like skeleton crystals of native silver are frequently found in certain cavities in these veins from which the enclosing calcite has been removed as a result of weathering. It would be unwise in this connection to give any detailed list of the many mining locations on which native silver has been discovered or to mention what are at present regarded as the more promising individual discoveries. It may be sufficient to say that several veins have been uncovered, varying in width from 4 to 8 inches, much of the material from which would average from 25 to 75 per cent. of native silver, while a large number of other veins have been proved to contain silver in such quantities as to merit further and quite extensive mining development work. The mode of occurrence and association of this silver in some of these veins bears a striking resemblance to that obtaining in the veins cutting the diabase in the vicinity of Kerr Lake near Cobalt. It seems therefore very reasonable to assume that many and possibly wider and richer veins will be revealed as a result of this season's mining operations, when conditions should be much more favorable for prospecting and development work.

"It may be well in this connection to mention and even to emphasize some of the points which should strengthen the opinion that the Montreal River mining district will become in the near future a permanent mining camp.

"1. The wide extent of country over which these mineral veins have already been found.

"2. The large number, width, continuity and well-mineralized character of many of the veins so far located.

"3. The very general presence of native silver in these veins.

"4. The great richness of some of the ore already secured, some of which compares favorably with the best found in the veins of Cobalt. The region is certainly one of great promise, and worthy of the most earnest and intelligent search.

Geological Association of the Ore Deposits.

"All of these veins occur in diabase or gabbro, a rock which represents the consolidation of a lava of basic composition which has been intruded in the form of laccoliths and dykes through rocks of Huronian, Keewatin and Laurentian ages. The rocks representative of the Huronian are conglomerates, slates, and arkoses or quartzites, very similar in structure and minalogical composition to rocks of the same geological age found in the neighborhood of Cobalt. No rocks of Keewatin age have been found in James Township, but extensive outcrops occur in the central and eastern portions of Tudhope Township.

"The Keewatin is intruded by certain granites and gniesses which are usually referred to as Laurentian. These two rocks form an igneous complex lying unconforambly beneath and furnishing the pebbles and other detrital material of which the basal conglomerates of the Lower Huronian are composed. These gneisses and granites cover large areas in the central and northern portions of the Township of Tudhope, also nearly the whole of the Township of Smyth and the northwest corner of James, and thence west and northwest to Hubert Lake and beyond.

"Smaller patches of granite are also exposed as a result of denudation in the southern part of James Township.

"The diabase or silver-bearing formation is the newest rock in the district, as it is intruded through all the other series, cutting even the arkoses and quartzites which are at the summit of the sedimentaries. The distribution of these several formations is well shown on the map of the Montreal River and Temagami Forest Reserve lately issued by the Bureau of Mines of Ontario, the necessary geological surveys having been made by Cyril W. Knight and his assistants during the past summer.

"All of the veins of economic importance so far discovered appear to be confined to this diabase, which is essentially similar in mineralogical composition and geological age to that in which some of the most productive silver veins of Cobalt are being mined. Occasional fissures, some of theme rather wide and continuous, were noticed in the conglomerate filled with calcite, quartz, and barite, and carrying galena, but the assay values of such material were disappointing. It is, however, reasonable to suppose that productive veins will yet be found, although extensive outcrops of the rock usually shows very little fissuring. Most of the hand specimens of the diabase which were given to Dr. Young for microscopical eaxmination were oellected in the vicinity of one or other of the mineral bearing veins and therefore doubtless show more advanced decomposition than would be the case had the material been secured from exposures farther removed from the influence of such eruptive afteractions.

"As a result of our prospecting work in the Township of James, we are now in possession of two mining locations, the S. E. ¼, North ½, Lot 9, Con. V., now known as M. R. 202, and the N. E. ¼, N. ½, Lot 12, Con. 4, known as M. R. 422."

In the next issue of the Canadian Mining Journal Dr. Barlow's reports on the same district and on the Miller Lake areas will be touched upon. Mr. D. B. Dowling's report on the Albertan coalfields examinted by him will receive attention.

BOOK REVIEWS

A Study of Ore Deposits for the Practical Miner, with Descriptions of Ore Minerals, Rock Minerals, and Rocks. By J. P. Wallace. Illustrated. $3.00 net prepaid. Hill Publishing Company, 505 Pearl Street, New York.

The title of this volume may fairly be expanded to something like this: "A Study of Ore Deposits for Miners and Prospectors Who Have Had no Technical Education." Possibly this suggested title best defines the object of Dr. Wallace's new work.

From readers of the Canadian Mining Journal there come constant inquiries as to the best book on the subject of ore deposits. Questions of this kind are peculiarly difficult to answer. There are dozens of good books on ore deposits. Most of these, however, are written from the standpoint of geology. Some of them are so thickly befogged with hypertechnical modern words that they are intelligible only to the specialist. Others of these books cover but single districts or one particular variety of deposits. Possibly these strictures apply with but little force to several of the more popular books that treat of ore deposits. But in general it will be conceded that a book covering the whole field in an elementary way and at the same time free from the fustian of the schools, has long been desired. Dr. Wallace, we believe, has shot near the mark, if not quite into the bull's-eye .

To define the purpose of the book it is best to quote from the author's foreword: "The book is written for the average miner, the prospector, and the mining public. It is eminently practical, of simple language, concise in treatment, and deals only with essentials. A knowledge of minerals, ores, and rocks is important to a correct understanding of ore deposits, for all are intimately associated. A brief description, therefore, of these is given. The structural features of ore deposits and the walls enclosing them, together with the form, origin, and manner of occurrence of deposits, have been given special attention. . . Descriptions of prominent mines of various type sand forms are presented chiefly to exemplify and enforce the principles herein set forth governing the depositoin and occurrence of ores."

Ore minerals are taken up in Part I. The physical properties of minerals are outlined succinctly, and then the minerals that constitute the ores and metals are dealt with in groups.

Part II. discusses the rock-forming minerals, rocks, and rock displacements. This section is lucid and comprehensive.

Part II., General Characters and Classes of Ore Deposits, sketches the principles of ore deposition, vein formation, ore bodies in general, etc.

Part IV. is a series of descriptions of ore deposits of many well-known and characteristic mines and workings the world over.

Part V. is a summary of the art and practice of mine valuation and prospecting.

The volume is designed, as has been noted above,

for the benefit of the non-technical reader, whether he be a miner, a prospector, or an investor. Undoubtedly it affords a clear and sufficient introduction to mining geology. Its freedom from technical polysyllables is a virtue.

Here a point may be raised. Both the selection of matter to be included in such a book and the rejection of material considered unsuitable or unnecessary are tasks bristling with difficulties. In one respect we think that Dr. Wallace's volume might have been improved. He has made no mention of chemical symbols and formulae. No doubt the non-technical reader fights shy of anything resembling chemical notation. Long, loose, and complicated equations are intelligible only to the expert. But it is decidedly necessary for any reader to acquire a knowledge at least of the symbols that represent the elements.

This may be taken, not as dispraise, but as alluding to a debatable point.

Finally, both author and publishers deserve large credit in bringing out a book that should and no doubt will form the connecting link between thousands of lay minds and a study of absorbinb interest and of immeasurable importance.

A Manual of Practical Assaying. By the late H. Van F. Furman, E.M. Revised by William D. Pardoe, A.M. 8vo., 497 pages. Illustrated. Cloth, $3.00. Sixth edition, revised and enlarged. John Wiley & Sons, New York; Chapman & Hall, Limited, London.

Since its first edition appeared in 1893, Furman's "Assaying" has been a deservedly popular manual both in the class-room and in the laboratory. It is among the best of the many books that attempt to cover completely or partly fire-assaying, gravimetric analysis, and volumetric analysis.

The primary importance of careful sampling, whether the chemist is dealing with ores or with metallurgical products, is recognized, and sixteen pages are taken up with descriptions of sampling methods and devices.

By intelligent preliminary examination of the material submitted, the assayer saves time and labor. Chapter III. recapitulates the principal determination blowpipe tests.

Chapter IV. takes up apparatus and operations. Crushing and other appliances are described in general terms, and the operations of weighing, filtering, etc., are touched upon. The absence of minute details as regards muffle furnaces, balances, etc., is to be commended. The chemist can always secure these in any of the numerous trade catalogues that are to be had for the asking. However, since several diagrams of muffle furnaces are used, it would be an improvement to replace the present cuts with more modern representations.

Chapter V. is a short classified description of re-agents, grouped under the heads of fluxes, solvents, precipitants, reducing re-agents, oxidizing re-agents, and indicators.

Part II., comprising 160 pages, outlines the analytical methods employed in determinations of the principal metallic and non-metallic elements. Special assays and analyses, such as the assay of base bullion and the analysis of gases and of water, form the subjects of this section.

The writing of chemical equations, the calculation of lead blast-furnace charges, and like operations, the preparation of pure gold and silver, the mechanical assay of gold and silver ores, etc., are among the chapter-subjects of Part IV. Useful tables of analytical results and factors are appended.

In this sixth edition the reviser has rewritten the chapters on zinc, water, and coal analyses, and has added chapters on the assay of telluride ores, tungsten, molybdenum, and vanadium.

The discrimination with which the limited space allowed for each topic has been used is evident in many pages. For instance, in the chapter on coal and coke the correction factor for loss of moisture in powdered coal, recommended in the Report of the Committee on Coal Analysis, is noted.

The chapter on copper needs re-writing. The statement that "the cyanide method is generally more accurate and preferable to the battery method" requires serious qualification.

On the whole, Furman's "Practical Assaying" is a book of distinctive merit. It is a book without which the library of the assayer and chemist can hardly be considered complete.

EXCHANGES.

The Engineering Magazine, January, 1909.—Mr. A. Selwyn-Brown continues in this number his study of the principal Australian gold fields. His article, "Metallurgical Practice in the Gold Fields of West Australia," has one particularly interesting section on wet crushing. A table in this section gives details of stamp-mill practice:—

	Ivanhoe.	Golden Horseshoe.	Oroya-Brownhill.	Lakeview Consols
Number of stamps.....	100	150	50	70
Monthly tonnage	19,000	23,000	11,000	11,000
Daily tonnage, per stamp.	6.35	5.50	7.35	5.50
Weight of stamp in lbs..	1,200	1,270	1,100	1,200
Drop in inches.....	7.5	8.0	7.75	80
Number of drops per min.	104	104	108	102

About 20 to 40 per cent. of the gold in the ore is saved by battery and plate amalgamation. Some of the mills, the Oroya-Brownhill, for instance, do not use plate amalgamation.

The "continuous" process of cyaniding is used principally. The finely ground ore is kept in contact with cyanide solution throughout the treatment. The battery water in the west-crushing plants carries from 0.003 to 0.007 per cent. potassium cyanide in solution. At a few mills bromide of potassium is added to the charge. Some of the ores treated by bromo-cyaniding yield 95 per cent. of their gold tent. Filter pressing for removing the used solution from the sand an dslime has replaced decantation.

Below water level in most of the fields the ores carry larger percentages of sulphides and concentration is resorted to. The concentrates are roasted, ground, and either amalgamated or cyanided.

Electro-chemical and Metallurgical Industry, January, 1909.—In an article comparing the electric furnace with the blast furnace, Mr. J. Harden, having established data that afford a fair basis of comparison, relegates the electric furnace, in its present stage of development, to localities where there are large deposits of

cheap iron ore and abundant water power. He indicates the desirability of keeping "some of those optimists a little nearer to the earth, who dream that the days of the good old blast furnace are doomed, and must give way to the more modern electric smelting."

The Mexican Mining Journal, January, 1909.—In summing up the prospects of the Mexican mining industry for the coming year, our contemporary speaks in part as follows: "The continued low price of silver is turning attention to the production of the base metals and to the treatment of the complex ores heretofore disregarded, and the opportunity in this line is enormous in Mexico. . . The prospects for the Mexican mining industry are bright, for it has as a basis the most extensively mineralized large area in the world, and the business is now largely in competent hands, backed by sufficient capital." Does not the Mexican Mining Journal make too large a claim for the extent of the mineralized area of Mexico? The vast mineralized area of the Rocky Mountains of British Columbia, Alberta, and the Yukon must be taken into consideration in any such assertion.

CORRESPONDENCE.

To the Editor of the Canadian Mining Journal:

Dear Sir,—I have just read again with a great deal of interest Mr. O. D. Skelton's paper in your issue of November 1st, on the taxation of mineral resources in Canada, and I wish to compliment the scholarly Queen's professor on his bright, clear, and solid resume of such a complicated question, and to express the hope that Mr. Skelton will favor us with other valuable papers on this subject, discussing more in detail its important and controverted phases. Of these I believe there are several that should be thoroughly threshed out, one by one, before the public and before our legislatures. If that were done, I feel that it would conduce to an entirely different public understanding of the whole question. Permit me to suggest below a few of these points:—

1. Are not mineral resources and mineral properties in Canada already bearing their just share of taxation, quite like other resources and properties, without the additional royalty tax imposed upon them, such, for instance, as in Ontario by the Supplementary Revenue Act, 1907?

2. If so, are not the extra special taxes, commonly called mining royalties, not only unfair, but very detrimental to the full growth and development of the vast untouched mineral resources of this great country, and therefore are not such taxes causing great loss and injury to the whole country?

3. If not so, and special taxes should be imposed, cannot a form be given to that tax (such, for instance, as the form of acreage tax) which would make of it an important factor in the great object to be attained, namely, a much fuller development of the mining resources and industry?

4. If a special tax is imposed, in whatever form, should it not bear on all mineral resources and properties alike, proportionately?

5. Should there be reserves, exceptions, and compromises in the selling of mineral lands or in the granting of mineral leases through which certain mineral resources and properties are finally taxed infinitely more than others, or become Government owned and operated mines?

6. Should mineral lands acquired in fee without reservations before the passing of a Supplementary Revenue Act, or any other Act imposing a special tax or royalty, be subject to these taxes or royalties?

7. Can export taxes be legally and properly imposed by Provincial Governments, such as the tax imposed on exported natural gas by the Ontario Government?

8. Should not the capitalization of mining companies be limited by the imposition of a heavy tax on their capitalibation, or by other means?

In another letter, Mr. Editor, I shall answer these questions one by one, openly and frankly, and I hope tha others will do likewise.

Nothing would help the solution of these most important problems of mining taxation and mining development so much as a thorough and open discussion in the pages of a technical journal such as yours, recognized as the official organ of the mining community all over the country.

Discussions on this subject in the meetings of the Canadian Mining Institute, or at other meetings, are very good, but they lack the deliberation, maturity, and calmness of written discussions in good technical papers.

Yours very truly,
EUGENE COSTE.

Toronto, Jan. 4th, 1909.

Burns' Steer.

The Editor, Canadian Mining Journal, Toronto:

Sir,—I heartily sympathize with the M.f.C (Man from Cobalt), who, in the Journal of December 1st, protests against your illustrated account of his awful experience with Burns' steer. It was once my good fortune to have a true and trusted friend who got in about as close quarters with a grizzly as the M.f.C. did with the steer. It certainly took away his nerve, and we tabooed the subject in his presence. In spite of this, "oft in the stilly night" the remembrance of the grizzly mix-up would recur to him. The result was that he took to drink, slighted a widow, and went rapidly on a downward career.

If the steer episode is not dropped the M.f.C. is apt to follow a similar course. You can see that he has read your article very closely, even noting the substitution of the word "led" for let. Of course this point would appeal strongly to him. It would curdle his blood to think of actually leading such an aimal out of the corral. That account of the Mexican bull fight which appeared in the newspaper of recent date should be kept from him. If this kind of thing continues he will lose all liking for the luscious steaks such as the Mint formally served.

Steers, when excited, have long been known to be the most dangerous of beasts. Did not Hannibal after crossing the Alps use his oxen to stampede the native inhabitants!

PRO BONO PUBLICO.

To the Editor Canadian Mining Journal:

Dear Sir,—In your issue of December 1st you state the desirability of the public receiving a "clear pronouncement" from some of us in the matter of the present boom in Cobalt transactions. By the light of my own experience I do not think the public is easily

reached in this matter through the publi presse One cannot expect a newspaper to condemn its own advertisements. In fact, I believe advertisers expect some protection in this matter.

Thus we are cut off from a contact with the participators of the boom, since mining journals are not much consulted by the speculative public. At a meeting of the Canadian Mining Institute at Toronto in March, 1907, when Cobalt was also much to the front, we were addressed by Sir Mortimer Clark. His speech was one of wise warning against the speculative condition of the mining market. It was very much apropos of the situation, and a following speaker said it ought to be published in every paper in Toronto next morning. It appeared in none of them.

Even if we could place a sane and honest statement before the speculative public it would be useless: the very people whom we seek to dissuade would turn on us for depressing the market inflation by which they hope to profit.

Why should the trainers of "future mining engineers" lecture to mining gamblers. Boom speculation is a curse to the mining industry, but it cannot be reached by academic admonition.

Please make a note of it that the present undesirable condition of Cobalt propositions is not due to "young graduates from mining schools."

We are often treated to stories of their inexperience and unfitness for mining undertakings, but these, it seems to me, are small evils compared with misrepresentation and amongst this misrepresentation mining school graduates are not likely to be found. Yours truly,

J. C. GWILLIM.

"MINERAL VEINS IN THE MONTREAL RIVER DISTRICT."

Under this title, in the last issue of the Canadian Mining Journal (December 15th, 1908), Mr. J. B. Tyrrell devotes much of his attention to discussion and, at times, adverse criticism, of some of the main statements included in my "Summary of Conclusions," which appeared at the end of the paper, "On the Origin of the Silver of James Township," read before the Canadian Mining Institute at its last annual meeting (Ottawa, March, 1908).[1]

I can only express regret that in Mr. Tyrrell's opinion this paper as "rather too technical in character and diction to be thoroughly enlightening to the ordinary prospector or miner," for my whole endeavor in its preparation was to avoid as far as possible all unnecessary technical expressions or descriptions. Previous to the appearance of Mr. Tyrrell's observation I had regarded my efforts in this direction as fairly successful, especially as many prospectors and miners had remarked that it was an unusually simple treatment for so technical a subject. At the same time I may be permitted to mention that I was not addressing the "ordinary prospector or miner," but an Institute, which is every year adding to its membership men of the highest technical training and experience.

In regard to the form assumed by the diabase with which the mineral veins are associated, I can only refer Mr. Tyrrell to my statement that it "has been intruded in the form of sills or laccoliths and dykes through rocks of Huronian, Keewatin, and Laurentian ages."[2] I never made use of the term "batholitic" as descriptive of the mode of occurrence of this diabase, as would appear from the report of the discussion, which unfortunately was not revised by me. I can only repeat, therefore, and would make especial emphasis of the fact, that the diabase or gabbro represents the solidification on cooling of a lava which has been intruded through the neighboring rocks in the forms of sills, laccoliths, and dikes. I have never "forgotten this at times," nor has there been any "uncertainty in my mind on the point." I do not feel obliged to apologize for the use of the term "profound" in describing the fissuring to which the diabase has been subjected, but would explain that it was employed as a synonym for "widespread" or "extensive," expressive of my belief, not only of the persistency to very considerable depths of many of these veins, but also of their proved unbroken continuity over surprisingly long distances in a horizontal direction.

In this connection it may be well to state that in the present state of our knowledge it is difficult to make any very definite statement in regard to the exact thickness of these luccoliths at the various localities where they are exposed; for in nearly every instance a considerable part of the upper portion has been removed by erosion. In addition it is quite conceivable that such intrusive masses should show a considerable variation in thickness from point to point. From a rather critical examination of a large number of these occurrences, however, it may be stated that many of these intrusions must have originally been from 300 to 500 feet thick.

Mr. Tyrrell further says that "it is rather unfortunate that more exact descriptions of these veins are not given," and then proceeds to mention a rather unusual occurrence as illustrative of what he believes to be their prevailing complexity. It is to be deplored that Mr. Tyrrell has not taken advantage of this opportunity to add further to our information in this regard rather than indulge in vain regrets, for the descriptions of these veins already published in the paper mentioned are regarded by the author as fairly complete and representative of the majority of the occurrences that came under his notice.

In all magmas produced from natural causes, water is believed to be present in very considerable amount, so that as crystallization and solidification advances the residual magma or "mother liquor" (menstruum) approaches more nearly to the composition of a mass of fused feldspar together with a comparatively large amount of water. It is at this somewhat indefinite stage in the cooling of the diabase that the pegmatite (aplite) began to form. Mr. Tyrrell's description of "pegmatite" as an *"aqueous" rock is however not only unusual, but not strictly scientific, in spite of the fact that water has played an important role in its formation; for extreme cases, in which vein action is most pronounced, are now regarded as the products of igneo-aqueous solution.

I find myself in substantial agreement with Mr. Tyrrell "that the fissures in which the silver-bearing veins occur have been formed by the shrinking of the quartz-diabase or adjoining rock as it cooled or solidified," but can hardly follow him when he states that "in some cases they (the fissures) extended to the still molten interior or lower portion of the mass of the quartz-diabase and allowed this liquid rock to rise up through them and form narrow dykes. Surely Mr. Tyrrell cannot mean to describe these dikes or veins

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[1]Jour. Can. Min. Int., Vol. XI., 1908, pp. 256-273.
[2]Loc. cit. p. 267.

as made up of quartz-diabase, for the so-called "aplite" of the miners and prospectors differs very essentially from its parent rock both in mineralogical composition and structure.

He further states, "Thus the dikes were formed after the surrounding diabase had solidified but while it was still very hot." This, in my opinion, is only a portion of the truth; for while many of these veins or dikes are abruptly differentiated from the associated diabase, exhibiting perfectly sharp and, in some cases, "free" walls, others show a gradual transition from the vein material (pegmatite) into the surrounding diabase, which gradation can only be explained on the assumption of a commingling of material while both were in a fluid or, at most, a viscid condition and before complete solidification had taken place.

Not only the native silver, but also the characteristic sulphides and arsenides began to be introduced along with the first pegmatite (aplite) filling. These metallics did not wait for the reopening of the pegmatite and the introduction of more abundant calcite, for this latter mineral accompanied and overlapped the crystallization of the feldspar.

It is perfectly legitimate to speak of the more feldspathic types of these occurrences as either "dikes" or "veins," for the feldspar is just as much secondary and the gangue of the metallic minerals as even the calcite or quartz. The pegmatites not only "have a distinct significance in defining the positions of the most important fissures," but they are themselves the "ore bringers."

The use of the terms "dike" and "vein" as separate names in regard to pegmatite is misleading. The strict limitation of their meaning has led to certain misconceptions as to its manner of formation. I would prefer to make the two terms synonymous, or, better still, to use "vein" in both senses, for, accurately speaking, every "mineral vein" is intrusive into the surrounding country rock.

ALFRED E. BARLOW.

Montreal, Dec. 26th, 1908.

(NOTE.—Mr. Tyrrell's manuscript reads "igneous" but by some inadvertence, "aqueous" was substituted for it in the printed article.—Ed.)

INDUSTRIAL NOTES.

Air Compressors. Cotalogue No. 100 of the Thos. H. Dallett Co., Philadelphia.—Of massive construction and up-to-date design, the compressors made by this company are built to secure high efficiency. The present catalogue illustrates only the standard belt- and steam-driven compressors. The company designs and builds machines direct connected to motor, waterwheels, or gas engines. The frame of these machines is rigid, massive, graceful, and designed so as to place ample support under the main bearings. The air cylinders are made of a special, hard, close-grained iron. All steam cylinders are lagged with mineral wool and jacketed with planished sheet steel. Other features, too numerous to mention, mark the Dallett compressors as durable and serviceable machines.

Circular No. 1118, December, 1908, issued by the Canadian Westinghouse Company, Limited, Hamilton, Ontario, is devoted to that company's Type CCL Polyphase Induction Motors. Like all of the Westinghouse publications, the pamphlet before us is excellent in make-up and matter. The variety of electric motors available now is enormous. This circular presents, succinctly and clearly, an accurate idea of the merits of Westinghouse polyphase induction motors of the squirrel cage type. A particularly commendable and important feature of these motors is their absolute freedom from sparking. It is claimed for them that they can be used with entire safety in places surrounded by inflammable or explosive material.

Catalogue 67 D. The Jeffrey Manufacturing Company Columbus, Ohio. "Jeffrey Rubber Belt Conveying Machinery."—The science and practice of conveying ores, fuels, and other materials by means of rubber belts have made enormous strides in the last decade. The Jeffrey conveyors represent probably the last word of progress in this direction. Catalogue 67 D. illustrates belt conveyors for all sorts of materials—coal, gold ore, stone, slimes, asbestos ore, mill refuse, etc., etc. On page 3 a short list of order specifications is given. Mine operators should secure copies of this catalogue. It is profitable.

PERSONAL.

Mr. Alex. Gray, of Montreal, was in Toronto on Jan. 7th.

Mr. Chas. Fergie has taken temporary headquarters at the Windsor Hotel, Montreal.

A postponed meeting of the council of the Canadian Mining Institute was held in Toronto on Saturday, January 9th.

Mr. Broadbent, collector for the National Mineral Museum, has been detailed by the Geological Survey of Canada to collect British Columbian minerals for the Seattle Exposition next spring.

Mr. W. A. Carlyle, of London, England, at present consulting engineer to the Le Roi Mining Company, Rossland, B.C., has been offered the professorship of Metallurgy in the Royal School of Mines.

The annual meeting of the Mining Society of Nova Scotia will be held on March 3, 1909, at the rooms of the Society, 129 Hollis Street, Halifax, N.S. The annual dinner will be held during the session. Delegations from Ontario, Quebec and the United States are expected.

Tantalum is one of the world's rare materials that has been suddenly produced in commercial quantity in response to a demand for it. The name is said to have been given by Ekeberg, the Swedish discoverer, on account of tantalizing difficulties encountered in investigating it, and only recently has it been obtained in a state of purity. The mineral yielding it was a few years ago so hard to find that museums could not be supplied with specimens. Australia alone now furnishes more than 70 tons of tantalite a year—not a large supply, but enough for present needs, as a single pound of tantulum gives filaments for 25,000 lamps of 25 candle-power.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay, Jan. 4.—Naked Lights vs. Safety Lamps.—The verdicts of coroners' juries are things to be wondered at. The jury which sat on the victims of the recent Marianna explosion in the United States was referred to by the Engineering and Mining Journal as being composed of farmers, and described as "more than usually fatuous." Under the above caption we referred in the last issue of the Journal to the verdict on the men who were killed at Port Hood about a year ago. We now have to refer to the verdict which was given by a jury that sat at Chignecto Mines on Christmas Eve, 1908, which read as follows: "John H. Coleman and George Sawyer came to their death by suffocation in the mines of the Maritime Coal, Railway & Power Company, Joggins, on the 24th of December, 1908 We recommend that in future asbestos or other material be used by the company for bratticing when anyone has to pass with open lights." For pure unadulterated fatuity we think the Nova Scotion verdict will be hard to beat. The accident was caused by the ignition of bratticing by the lights carried by the men. In the last correspondence written in November we remarked as follows: "The foolishness of naked lights in coal mines, to our mind, needs no emphasis. A coal mine is a place where inflammable material is dug out, and the surroundings of men who work underground are such things as coal, wood, an inflammable dust capable of detonation, explosive gases, brattice cloth, and tub grease." In a recent official report to the British Home Office the statement is made that so long as open lights are used explosions and mine fires may be expected to occur with more or less regularity, and that the law in its present state is inadequate to forbid their use. Fortunately, our Nova Scotian law is adequate in this respect, and it may be that instead of ordering asbestos brattice cloth, the powers that be will remove the naked lights It would seem the simpler thing to do. Seriously speaking, the incident just referred to is only one of the constantly recurring reminders that naked lights in mines belong to the days of furnace ventilators, black powder and home-made squibs. That we should still be using naked lights in coal mines so many years after Davy is a reflection on our intelligence. We think it will be well within the mark to state that not a single mine explosion or mine fire would have ever taken place in Nova Scotia had the use of safety lamps been compulsory and the use of naked lights prohibited. That this attitude is not a peculiar one is evidenced by an article that recently appeared in the Maritime Mining Record, written by Mr. C. J. Coll, of the Acadia Coal Company. No one will question Mr. Coll's knowledge of his subject or his ability to pronounce on any matters connected with Nova Scotian mining. We are therefore glad to see that his condemnation of naked lights in coal mines is unqualified, and once more venture to repeat "that naked lights should be forbidden, and nothing but properly approved and tested types of safety lamps be used in every coal mine in the Dominion." Some responsible persons who should know better have recently expressed the opinion that mine explosions are "mysteries" and "acts of God." As was very properly pointed out by a conference of mine inspectors in the United States recently, such opinions merit the strongest condemnation, and are, moreover, hypocritical cant of the worst kind. Most mine explosions occur because "somebody blundered." The most stupid and inexcusable blunder is to continue the use of naked lights, and it is high time that governments should awake to a sense of their responsibility and make it impossible for anyone to make this blunder in the future—and keep out of prison.

A "Wildcat" in the Maritime Provinces.—Ontario is not the only land that breeds the wildcat. One of the wooliest of his tribe is now to be found in Nova Scotia. Dr. Hugo von Hagen, from New York City, is a wizard of finance of no mean order. He bought a property of some 7,000 odd acres at Adamsville, New Brunswick, for $5,000, and floated a company to operate the seams of coal that are supposed to be in it, with a capital of $3,500,000, and although no coal has as yet been mined, and so far as we can learn only three men are working on the property, the company is paying a monthly dividend! This same gentleman is carrying on a similar affair at Maccan, in Nova Scotia. It would not be amiss if the Attorney-Generals of the two provinces that have been favored by Mr. von Hagen's projects were to make a few inquiries into these truly remarkable mining companies. Mr. von Hagen in a circular to his shareholders states that he has obtained a contract to supply the German navy with coal—from New Brunswick, too!—and has also clased a contract for 500,000 tons with a large English coal broker. The German navy will cease to be the bugbear that it now is to our folks at home if it depends on Von Hagen's mines for fuel. Is it not about time that someone stopped the little game of this visitor from New York—the East Side, we presume?

The British Workmen's Compensation Act.—It was predicted that the operation of the Workmen's Compensation Act in England would eventually kill the provident societies that have been so great a help to the working classes in helping them in thrift and in providing for them in sickness. That that prediction was not without grounds is being daily proved by the reports of the friendly societies. One of the most important of these societies in England is the Independent Order of Druids, which has 71,000 members, nearly all drawn from the artisan and working classes. At the half-yearly meeting of this society held in Sheffield during November, some serious facts were ventilated. One of the delegates said the Compensation Act had a lot to answer for. "It made some of their members what they never should have been. When a man was drawnig his compensation, his club money, and sick pay, he was unfortunately very loath to start work again." Owing almost entirely to the increase in claims caused by the malingering which the Compensation Act is fostering, the claims upon the funds of the society showed an increase over the corresponding half year of over $55,000. We quote from the report: "Not only has the whole of the members' contributions been absorbed this half year, but in addition no less a sum that £2,221 13s 7d has been taken out of the money realized on our investments to pay the liabilities of the half year ending June 30th, 1908." It was admitted that the miners, because of the workings of the Compensation Act, were unprofitable members of the order, and a proposal to exclude them from membership received large support, but was not carried. A motion to reduce sick pay by one-third to members in receipt of compensation from employers was carried by 30,000 votes to 24,000. This meeting is typical of the half-yearly meetings of all these provident societies. All their reports tell the same story. For many years these self-sustained associations of workingmen for mutual help have been the pride and the mainstay of the better type of worker, but their gradual extinction is now assured. As the delegate we have quoted says, the "Compensation Act has a lot to answer for." And the end is not yet. The accumulating burden of this piece of legislation is only beginning to roll up. The Old Age Pension scheme in England is the necessary corollary of the Compensation Act, and it is to be followed by the Eight Hour Act for mines. Is it any wonder that we hear of unemployed and thriftless working classes in England, or that English capital looks abroad for investments? In all these recent enactments all volition and all onus is taken from the worker and placed on the shoulders of the capitalist and the state. So far,

the result is not enlivening. The House of Lords threw out the Licensing Bill, which proposed to limit the sale of liquor, but they passed the Eight Hour Act, thereby endorsing the cry of "less work and more booze," which finds favor with an ever-increasing number.

ONTARIO.

Cobalt.—The year 1908 has been a period of hard work, construction, development and largely increased production for Cobalt. When all returns have been secured it will be seen that the value of the year's shipmentss, notwithstanding the decreased price of silver, will be 50 per cent. greater than for 1907. There are now 30 shipping mines. Ten of these have been added to the list during the present year.

In point of tonnage La Rose stands first with 4,797.73 tons to its credit. Next comes Iipissing with 3,474.50 tons; then O'Brien, 3,439.08 tons. The McKinley-Darragh, Trethewey, and Drummond were next in tonage.

It is obvious, however, that many mines with small shipment records, the Coniagas, Crown, Reserve, Kerr Kake, and others made up in quality what they lacked in quantity.

The fact that the stock boom has switched past Cobalt and has taken its way up the Montreal River is a matter that pleases all resonsible operators. No boom is wished for here. It is not needed. Booms are too expensive. We have had our share.

September was the banner month. Its record of 3,049.14 tons beats all monthly figures up to date.

The rich finds on Crown Reserve and Temiscaming were the outstanding features of the year's operations. Along with these these may also be mentioned the excellent showing made by the Trethewey under the management of Suprintendent McNaughton.

Most of the old shippers preserved and improved their rank during the twelvemonth. There were, however, one or two casualties. Red Rock and Green-Meehan disappeared, and Foster dropped far behind.

Two custom concentrators are in operation and both are doing good work. The Northern Custom Concentrator has a capacity of 100 tons per day. The Nipissing Reduction Company is rated at 50 tons per day. Both these plants are milling the dumps and are effecting a good saving.

The Coniagas mill is working in better shape than ever before. The addition of twenty stamps has made a decided change in the practice obtaining here. The Cobalt Central mill is in continuous operation. Good reports come from the Buffalo mill. The new O'Brien mill will be completed before spring. It will embody many new features.

In the life of the camp the Canadian Mining Institute has become a decidedly interesting factor. The periodical meetings are looked forward to with eagerness. The discussion all always profitable and sometimes white hot. They afford a useful vent for the airing of opinions and the setting of differences. Mr. A. A. Cole,, Mr. E. L. Fralick, and Mr. H. P. Davis have been among the most active in promoting the movement and adding to the membership of the Institute.

The unusual number of accidents that have been recorded during 1908 impresses one with the need of more rigid enforcement of the law. Inspector Corkill has recently closed down several mines for non-compliance with regulations. It is decidedly up to the superintendents to see that unnecessary risks are not taken. The employment of green men in positions of rsponsibility is one of the chief causes of disaster. A few convictions and good hard sentences would clear the atmosphere.

The Larder Lake country has not been attracting much attention lately, although a pocket of very rich ore was found on the Harris-Maxwell property early in the summer. Mr. Neil Macdonald has been conducting a mill test on the ore of that property, but with what result is not yet known.

From the table of returns [see Statistics and Returns] it will be seen that the silver production is almost 18,500,000 ounces. It will also be noticed that the greatest bulk of the high grade ore went to Copper Cliff, Deloro, the Balbach Company, and Perth Amboy. Thorold took 180 tons. This year, of course, Thorold will receive a much larger proportion. Denver took over 60 per cent. of the low grade ore.

Cobalt enters upon the new year with every confidence in her ability to increase her earning power, decrease her costs, and generally show the world at large that she is here to stay.

BRITISH COLUMBIA.

Grand Forks.—(Abstract of letter from Manager A. B. W. Hodges, of the Granby Consolidated Mining, Smelting & Power Co.)—At the mines there has been no specially large construction undertaken during the last year. All our new work—that is, the completion of the Victoria shaft and the crushing and conveying apparatus at the Curlew, was all finished, I think, before 1908, and since then we have done nothing special in construction, except ordinary development work and diamond drilling, and have maintained an output of over one million tons during the year.

At the smelter the total ore treated was 1,037,089 tons, producing 23,535,009 lbs. of copper, which is the largest year's production.

We have spent a great deal of money in new construction at the smelter, and the following new work has been done during the year: New ore and coke storage bunkers 1,000 feet long, each, have been installed, holding about 7,000 tons of ore and 4,000 tons of coke.

We intend enlarging our 8 blast furnaces from their present length of 18 feet to 22 feet by 33 inches wide, and one of these is already enlarged and in operation. We have also added two Connersville rotary blowers of 30,000 cubic feet per minute capacity each. These are operated as before by two 150 h.p. motors each. We have also built a new steel dust chamber at the back of the furnaces to replace the old brick one which was torn down. Have also enlarged the brick part of the flue from the steel flue dust chamber to the brick stack. Our blowing engine-room, which was of wood, has been completely torn away and a new thoroughly fireproof building has been installed in its place. The building is of steel and brick, with cement floors. This was made large enough to accommodate the two new blowers and also the new blowing engine.

The converter department has been materially enlarged by adding 80 feet in length to the main building, also enlarging the lining machinery, and we will also install three large converters 7 feet by 10½ feet. These will replace two of the old ones which we have in operation, and when the plant is complete we will have three large converters operated by electricity and one small one, which will give us a capacity of 36,000,000 lbs. a year.

We also installed a two-cylinder 40x40x42 electrically operated blowing engine, manufactured by the Nordberg Mfg. Co., of the latest style and type, of 10,000 cubic feet capacity per minute at 12 lbs. pressure.

At present we have a smelting caacity of about 3,000 tons a day, when all our furnaces are enlarged—about June next—we will have a smelting capacity of about 4,000 tons a day with the eight furnaces.

There are many improvements, such as water pipes, change of electric plant, etc., etc., which I have not mentioned in detail, but which had to be done to accommodate the increased capacity.

GENERAL MINING NEWS.

NOVA SCOTIA.

Glace Bay, N.S., Dec. 30.—It is reported on good authority that the North Atlantic Collieries Company at Port Morien and the company owning the Broughton areas will shortly join forces, and also that the coal lands owned by Manager Cowans, of Springhill, near Morien, will be taken over by the combined company. Manager Richardson, of the first-named organization, is at present in England, and it is expected that the deal will go through within the next six weeks.

New Glasgow.—The Nova Scotia Steel & Coal Company, Limited, during 1908 were able to make on their output tally sheet larger figures than ever hitherto shown for coal, ore, and some other of their operations. Where decreases had to be chalked up, they were so small as to be practically negligible. The generally quieter atmosphere of the past year was taken advantage of to prepare by improvements and extensions for the increased business which the company confidently expected 1909 and the following years to bring.

The coal resources of the Scotia Company, on the north side of Sydney Harbor exceed two hundred million tons, with five collieries completely equipped, the combined output of which during the coming year will be easily over 4,000 tons per day, which quantity they hope to be able to market, and, barring accident, will do so, if the transportation and manufacturing machinery of the Dominion is given full employment during 1909, which the vastly improved financial condition and constant growing needs of the country warrant us in assuming will be the case.

The business done during 1908 is partially shown by the following figures:—

	Tons.
Coal mined and shipped exceeded	725,000
Coke made	90,000
Iron ore mined	360,000
Limestone and dolomite quarried	51,000
Pig iron made	55,000
Steel ingots	52,000
Steel billets rolled at mills, New Glasgow	53,000
Steel bars, sheets, and forgings manufactured from New Glasgow	45,600

The slowing down from the high pressure of the previous year, carried with it opportunities which were taken advantage of to carry out some schemes of replacement and further betterment in connection with the New Glasgow plant, as well as that at Sydney Mines.

At Wabana the driving of the pair of slopes or tunnels to the submarine ore oreas of the company was prosecuted most vigorously and most successfully, and a few weeks ago these slopes passed through the boundary of the intervening ground between the land areas and the submarine areas of the company, and opened up one the latter a seam of ore equal in quality and purity greater in height than that worked on the surface. The submarine territory thus opened up, and from which we can immediately obtain considerable supplies of ore, is of very great extent, and the one seam alone on which we are now driving may be safely estimated to contain five hundred million tons of ore equal to the best Wabana has ever produced.

BRITISH COLUMBIA.

Quesnelle Forks, Dec. 24.—The property, which has been successfully worked in a small way for several years, has now been bonded to Messrs. L. D. Taylor and A. C. Hirschfield, of this city, for three years. Word has arrived from F. P. Miller, superintendent of the mine, that indications show that a good clean-up may be anticipated next season. Already a gang of men is at work building a retaining dam, and about ten more lengths of sluices will be added to those at present in place. With a plentiful supply of water now assured by the dam, the season's work will be considerably lengthened and the output increased.

SASKATCHEWAN.

Punnichy, Sask., Jan. 6.—Coal has been discovered in the Touchwood Hills, within five miles of the Grand Trunk Pacific. For the past three years, in fact ever since the Grand Trunk Pacific commenced grading through the Touchwood Hills, several men have interested themselves in the coal deposits in that region. As a result of their investigations, a company has been formed in Montreal, called the Saskatchewan Coal Land Prospecting & Developing Syndicate. Harry Wilson, of Montreal, is the syndicate's engineer.

The main vein is supposed to run through the Gordon Indian reserve. The Indians have surrendered all lands on which coal may be found to the Dominion Government, which has in turn leased the mining rights to the company. The samples show a good quality of lignite. The deposits extend northwest to the Grand Trunk Pacific between Touchwood and Punnichy stations.

ALBERTA.

Lethbridge, Alta., Dec. 24.—The first car of coal was shipped from the Royal mines over the new spur recently completed. It was billed to Regina. All shipments will now be made over this spur.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

Arrangements are being made by the coal owners of Fife and Clackmannan, Scotland, for the erection of a rescue station at Cowdenbeath. A team of men will be trained for rescue work at each of the pits.

The Institution of Gas Engineers has decided to endow a professorship of fuel and gas engineering at Leeds University as a memorial to the late Sir George Livesey.

NORWAY.

The Evje nickel mines situated in the valley of Sotersdalen, which in 1907 produced 5,781 tons of nickel ore, have been sold to a company represented by Admiral Borresen and Director Sam. Eyde.

RUSSIA.

The Government has drafted a law for the progressive taxation of government land allotted to mines, with the object of preventing more land being taken up than can be profitably worked. A previous enactment framed with the same view was much more drastic, but its operation was suspended.

GERMANY.

As a result of the diamond discoveries in German Southwest Africa, the Colonial Office has instructed the Governor of the colony to impose an import duty of 10 marks per carat on diamonds. Negotiations are on foot for the organization of a German prospecting company to form the centre of the German African diamond trade.

AUSTRO-HUNGARY.

A terrible explosion of fire-damp occurred on December 16th in the Doman coal mines, near Resicza, Hungary. The bodies of 13 miners have been recovered.

A Swiss firm of boring contractors is prospecting for petroleum in Szemelnye Bartia, Saros County, Hungary, on territory that has been favorably reported on by geologists. Oil indications have been found at a depth of 430 metres.

AUSTRALASIA.

According to the annual report of the New Zealand Minister of Mines, the production of coal during 1907 was the highest yet attained. It amounted to 1,831,009 tons, exceeding the production of the previous year by 101,473 tons. Operations at the state collieries continue to be extended to meet increasing demands. The manufacture of briquets from the waste slack from the Seddonville state coal mine was commenced in 1907, producing fuel of a high quality, which is largely used on the government railways.

An Iron Bonus Bill has been passed by the Australian House of Representatives, and is now before the Senate and likely to become law. It provides for the payment of a bonus of 12s per ton on pig iron made from Australian ore, and puddled bar iron and steel made from Australian pig iron, and a bonus of 10 per cent. ad valorem on galvanized iron wire netting, wire, and small iron and steel tubes and pipes.

UNITED STATES.

Public rescue stations are to be established in the coal mining centres by the U. S. Geological Survey. They will be equipped with the latest life-saving apparatus, and be in charge of government engineers. The parent station at Pittsburg will take charge of the West Virginia and Pennsylvania districts.

The Mikado of Japan has purchased for $100,000 the largest antimony mine in America, situated in Alaska, in order to obtain material for smokeless powder and metals for making steel ships proof against barnacles.

The iron ore production of the Lake Superior region for 1908 approximated 26,000,000 tons, as against 42,165,000 tons for the preceding year. Of the total shipments 18,000,000 tons came from the two Minnesota ranges.

There has been a remarkable increase in the use of electric power for hoisting and pumping purposes in the Butte, Montana, mining district, which has much improved ventilation, especially in the deeper mines. In several instances the substitution of electricity for steam has reduced the temperature in the mines as much as 20 degrees.

MEXICO.

Silver mines all over Mexico are closing down owing to the low price of the metal, as only the highest grade mines can operate to a profit at the present cost of production. Owing to the closing of silver mines, the Oaxaco mining district is attracting much attention, as the values of the ore are largely in gold. Several recent strikes are bringing this district into prominence.

A deposit of sulphur has been discovered within 50 miles from Matamoras, in Tamaulipas. It is from 25 to 30 feet thick, overlaid by about 6 feet of soil and high in sulphur contents.

SOUTH AFRICA.

An amalgamation plan is under consideration embracing the Crown Reef, Robinson Central Deep, Crown Deep, South Rand, Langlaagte Deep, and Paarl Central companies. The merger when completed will render the new company the largest gold-producer in South Africa.

Oil fields are reported in the Zwartkops valley, where the geological conditions are analogous to those of the oil fields of Boryslan, in Galicia.

There is an increasing demand for cheap labor on the Rand. The number of Chinese has been decreased by 19,163 since January last year, and although this loss has been met by an increase of 21,078 in the number of natives employed, many more are required owing to the expansion of the mining industry. The mine owners are endeavoring to procure natives from Cape Colony, Natal, and Zululand.

COMPANY NOTES.

The directors of the Cobalt Central Mines Company have declared a quarterly dividend of 2 per cent. on the capital stock issue of the company, payable February 1st, 1909, to stockholders of record at 3 o'clock in the afternoon of January 15th, 1909.

The annual meeting of the Crown Reserve Mining Company will be held in the hall of the Sailors' Institute Building, No. 2 Place Royale, Montreal, on Wednesday, January 13th, 1909, at 11 o'clock a.m. The secretary has sent out proxies naming John Carson, W. I. Geer, J. G. Ross and J. T. R. Laurendeau for the powers of substitution to vote.

The British Canadian Asbestos Company, Limited, has declared an initial dividend of 1½ per cent. for the quarter, to be paid January 27th, to stockholders of record January 20th, 1909. This places the stock on a 6 per cent. dividend basis.

Bonds of this company to the amount of $700,000 have recently been placed in London through H. H. Melville, of New York and Boston, assisted by McCuaig Bros. & Co.

The company has a capital of $1,000,00, and an authorized issue of $1,500,000 of 5 per cent. bonds, of which $1,000,000 have been issued. The directors are the Hon. Robert Mackay, E. B. Greenshields, Wm. MacMaster of Montreal, Henry M. Whitney of Boston, Harry A. Berwind and Howard E. Mitchell of Philadelphia. The company owns 879 acres of land located at Black Lake, in the Province of Quebec.

Earnings of the company have been of a satisfactory character, and it is estimated that the earnings for the year will be equal to 12 per cent. on the capital stock.

At a meeting of Le Roi Rossland Mining Company the chairman stated that the profits for October and November amounted to £14,000. The policy being pursued was approved of by the shareholders, as the directors held in their favor proxies representing more than half of the capital. As to prospects of paying dividends, they said they were bound to go on developing for some time. The report was adopted.

The directors of the British Columbia Copper Company intend to resume the payment of dividends early during the coming year. The company declared its initial quarterly dividend of 25 cents per share and an extra disbursement of 15 cents a share, or a total of 40 cents a share on July 18th, 1907. The directors are in favor of paying 2 per cent. bi-monthly or 12 per cent. a year.

A dividend of 2 per cent. on the preferred shares of this company for the quarter ending December 31st, 1908, has been declared, payable on January 15th, 1909, to shareholders of record of December 31st, 1908. The transfer books for preferred shares will be closed from the 1st to the 5th of January, both days inclusive.

Kerr Lake declared a dividend of 4 per cent, or 20 cents a share, payable March 15th. Books close March 1, and re-open March 15th. In November a dividend of 3 per cent. was declared.

Gross earnings of the Dominion Iron & Steel Company for the twelve months of 1908 are shown in the following table:—

1905	$460,845 54
1906	1,406,305 78
1907	2,247,536 45
1908	2,613,815 66

Operations of the Dominion Iron & Steel Company during 1908 follow:—

Production—Ore mined, 556,000 tons; stone quarried, 304,000 tons; coal consumed, 840,000 tons; pig iron made, 263,000 tons; steel made, 279,000 tons; rails made, 153,500 tons; wire rods made, 41,500 tons; other steel products, 35,000 tons; sulphate ammonia, 3,000 tons; tar, gallons, 4,000,000.

Shipments—Pig iron, 18,000 tons; steel blooms, 32,500 tons; wire rods, 44,500 tons; steel rails, 50,000 tons; sulphate ammonia, 2,600 tons; granulated slag, 18,000 tons. Total, 265,600 tons. Tar, gallons, 4,500,000.

STATISTICS AND RETURNS.

DOMINION COAL COMPANY, LIMITED—OUTPUT 1908.

No. 1, 531,490 tons; No. 2, 697,860; No. 3, 341,059; No. 4, 418,839; No. 5, 641,794; No. 6, 220,120; No. 7, 126,580; No. 8, 196,082; No. 9, 345,665. Total, 3,519,489 tons.

Shipments from the collieries of the Cumberland Railway & Coal Company, Springhill, N.S., for the month of December, 1908, were 29,808 tons.

THE CROW'S NEST PASS COAL CO.'S OUTPUT, 1908.

	Coal. tons.	Coke. tons.
January	93,364.14	23,787.14
February	89,609.07	19,897.07
March	81,708.05	21,713.16
April	70,444.00	19,022.15
May	64,701.16	16,110.15
June	96,212.16	26,407.00
July	99,138.07	31,742.00
August	70,366.18	17,646.18
September	76,610.01	22,778.11
October	84,774.08	24,255.00
November	78,976.05	21,582.09
December	78,323.00 (Est.)	25,000.00
Total	986,229.12	269,944.05
Total, 1907	981,939.00	231,368.00

Gold output at the Transvaal mines last month, as estimated by Kaffir houses in London, was 635,000 ounces, another high record. If this estimate is correct, December outturn of gold was 13,000 ounces greater than that of October, the previous record. Comparison of value of the month's output is:—

December, 1908	$13,495,000	December, 1907	$12,393,000
November, 1908	13,048,000	December, 1906	11,685,000
October, 1908	13,120,000	December, 1905	9,166,000
September, 1908	12,481,000	December, 1904	7,694,000
August, 1908	12,484,000	December, 1903	6,075,000

The record of silver prices in New York is as follows:—

Year.	High.	Low.
1908	58⅜	47⅜
1907	70⅛	53⅞
1906	71¾	62⅝
1905	65⅝	55
1904	62	63⅜
1903	61¾	47
1902	56½	47
1901	64	64¼
1900	65½	58⅞

The silver production of Mexico for the fiscal year, 1907-08, was 2,153,014 kilograms, valued at 85,466,904 pesos. Of gold Mexico produced 28,572 kilograms, valued at 38,096,661 pesos. The total value of the year's production of silver and gold was 124,543,565 pesos.

BRITISH COLUMBIA'S ORE SHIPMENTS.

Th total ore shipments from south-eastern British Columbia, for 1908, in small part estimated, are 2,066,892 tons. For 1907. the figures were 1,671,206 tons—455,586 tons increase, or 28.27 per cent.

The 1908 shipments were made up thus:—

Ore Shipments.

Boundary	1,476,147 tons.
Slocan-Kootenay	294,824 tons.
Rossland	295,921 tons.
	2,066,892 tons

Smelter Receipts.

Granby	1,049,671 tons
B C. Copper Co.	364,945 tons
Dominion Copper Co.	21,872 tons
Marysville	5,730 tons
Trail	332,562 tons
Le Roi	85,314 tons
	1,860,094 tons

*Includes shipments from City of Cobalt (Cobalt), 62 tons, and Nancy Helen (Cobalt), 72 tons.

The principal Boundary shippers were:—

Granby	1,049,671 tons
Mother Lode	302,069 tons
Oro Denoro	57,286 tons
Snowshoe	44,502 tons
Rawhide	10,740 tons
Brooklyn	6,800 tons
Sunset	3,802 tons

Chief among the Rossland shippers were:—

Centre Star	177,389 tons
Le Roi	76,967 tons
Le Roi No. 2	28,871
Le Roi No. 2, milled	11,270

The leading Slocan-Kootenay shippers were:—

Whitewater	1,047 tons
Whitewater Deep	1,027 tons
Whitewater Zinc (Okla.)	6,800 tons
Whitewater Zinc (Europe)	350 tons
Whitewater Deep, milled	30,600 tons
St. Eugene	25,000 tons
St. Eugene, milled	145,000 tons
Queen	1,063 tons
Queen, milled	11,850 tons
Blue Bell	2,152 tons
Blue Bell, milled	21,500 tons
Granite-Poorman, milled	10,800 tons

In concidering the appended table it is to be noted that progress is evident in the production of everything except

lead and placer gold. Although more copper was produced in 1908 than in 1907, yet the drop in price that that metal suffered caused the principal loss to the mining industry of British Columbia. Had the price of copper held steady, this year's total value of mineral production would have exceeded $26,000,000.

TABLE SHOWING AMOUNT AND VALUE OF MINERAL PRODUCTS FOR THE YEARS 1907 AND 1908.

Mineral.	1907.		1908.	
	Quantity.	Value.	Quantity.	Value.
Gold, placer, oz..	41,450	$828,000	34,100	$682,000
Gold, lode, oz. ..	196,179	4,055,020	256,000	5,291,520
Total gold, oz.	237,629	$4,883,020	290,100	$5,973,520
Silver, oz.	2,745,448	1,703,825	3,037,000	1,518,500
Lead, lb.	47,738,705	2,291,458	43,775,000	1,654,695
Copper, lb.	40,832,720	8,166,544	43,885,000	5,792,820
Zinc & iron, tons	2,856	50,600	10,000	280,000
T'l. metalliferous.		$17,095,447		$15,219,535
Coal, tons (2240 tons.	1,800,067	6,300,235	1,700,000	5,950,000
Coke, tons (2240 tons.	222,913	1,337,478	248,000	1,488,000
Building material, etc.		1,149,400		1,200,000
Total mineral production. . .		$25,882,560		23,857,535

COBALT ORE PRODUCTION.

Estimated Value for Three-Quarters of 1908, and for the Year 1908.

High Grade Ore—

Smelter.	Cars.	Tons per Car.	Total Tons.	Ozs. per ton of Ore.	Total Ozs.
Deloro	36	30	1,080	2,500	2,700,000
Thorold	6	30	180	2,000	360,000
Copper Cliff....	130	30	3,900	2,000	7,800,000
Perth Amboy...	27	30	810	2,000	1,620,000
Balbach	30	30	900	2,000	1,800,000
Toronto	2	30	60	2,000	120,000
	231		6,930		14,400,000

Low Grade Ore—

Carnegie	59	30	1,770	150	265,000
Chrome	63	30	1,890	200	378,000
Trail	3	30	90	200	18,000
Denver	212	30	6,360	150	954,000
*Swansea	8	20	160	†	32,000
*Germany	7	20	140	†	28,000
Low Grade.....	352		10,410		1,675,000
High Grade	231		6,930		14,400,000
Total.....	583		17,340		16,075,000
		Three-quarters of Year.....			$ 8,037,500
		Year, pro rata			10,716,666

*Silver at 50c. per oz. Ores of cobalt.

†$2,000 for one car

COBALT ORE SHIPMENTS BY MINES FOR YEAR 1908.

Buffalo	536.90	Tons.
City of Cobalt.....	711.04	"
Chambers-Ferland	233.89	"
Coniagas	610.25	"
Cobalt Central	276.79	"
Crown Reserve	652.75	"
Silver Queen	885.69	"
Casey Cobalt	10.00	"
Cobalt Lake	225.97	"
Drummond	1164.72	"
Foster	191.20	"
Kerr Lake	659.96	"
King Edward	322.19	"
La Rose	4797.73	"
McKinley-Darragh	1809.39	"
Nipissing	3474.50	"
Nova Scotia	237.95	"
Nancy Helen	301.32	"
O'Brien	3439.09	"
Peterson Lake	40.67	"
Provincial	75.84	"
Right-of-Way	750.04	"
Silver Bar	58.00	"
Silver Cliff	160.43	"
Silver Leaf	197.03	"
Temiskaming	794.61	"
Temiskaming & Hudson Bay....	1094.23	"
Townsite	177.71	"
Trethewey	1309.91	"

Total, 24,079.80 tons for 1908.

SILVER PRICES.

1908.	New York. cents.	London. pence.
December 26.....	49¼	—
" 28.....	49¾	22 15-16
" 29.....	49¾	22 15-16
" 30.....	50⅛	23⅛
" 31.....	50¼	23 3-16
1909.		
January 2.....	50¼	23 3-16
" 4.....	50¼	23 3-16
" 5.....	50½	23 5-16
" 6.....	50⅝	23⅜

The average price of silver for the year 1908 was 52.871 cents per ounce.

The monthly averages, New York, were as follows:—

1908.	Average Price of Silver per ounce.
January	55.678 cents
February	56.011 "
March	55.365 "
April	54.500 "
May	52.795 "
June	53.663 "
July	53.115 "
August	51.688 "
September	51.720 "
October	51.431 "
November	49.720 "
December	48.769 "