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*Editor:*

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

*Business Manager:*

J. J. HARPELL, B.A.

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### SPECIAL CONTRIBUTORS

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

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

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

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

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

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

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

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

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### THE OLD YEAR AND THE NEW.

During the past twelve months the mining industries of Canada have not stood still. In the main there has been not inconsiderable expansion, more especially in Ontario and Alberta. But, quite as important as new growth, there has been a gradual strengthening of established enterprises. The adjustment of relations between mine operators and employees for definite periods, and the increasing use of arbitration in place of the wickedly wasteful strike have imparted a tone of stability to the mineral industries. In short, a firmer foundation has been laid for mining and metallurgy in the Dominion.

The financial depression, after reaching its zenith in December, has fortunately given way to easier conditions. At worst it was a transitory affliction. It has had the effect of weeding out unsound schemes. Although it has acted as a deterrent upon immediate development, it has also curtailed the efforts of stock-jobbers and promoters. Undoubtedly this is salutary. Therefore we may consider the scarcity of money as not altogether a hardship.

At any other period such a dehydration of stocks as has occurred within the last six months would have created a panic. But, in spite of the apparent imminence of a financial crisis, confidence in our ability to weather the storm has never been shaken. The tone of the press-writers has been uniformly optimistic and has been reflected by the country at large.

And this confidence is not founded upon fancy. It arises from a better knowledge of the vastness and availability of our material resources, from a growing faith in our own ability to use and conserve these resources and, not least, from the increasing sense of national unity and solidarity that is becoming a distinguishing mark of Canadians.

But the very vastness of Canada's natural wealth is at once cause of pride and of exceeding humility. We have but to look to the Mother Country to learn that we are yet in the first stages of development. And, glancing at other sister nations of the British Empire, we shall find many causes to blush at our sloth and inefficiency. Our southern neighbors may also be our instructors.

We take a good deal of pride in speaking of Canada as a "nation." But if Canada is to take her rightful place in the comity of nations she must be apt to learn. She must think and act imperially and not merely nationally.



### THE DOMINION.

During 1907 every mining Province of the Dominion held its own and three, at least, showed new promise.

Nova Scotia's gold industry is just about where it was in 1906. In coal mining there have been large new activities, but a slightly decreased production. The acquisition of the Lingan areas by the Dominion Iron & Steel Company, and the purchase of the Gowrie and Blockhouse coal mines and lands by the North Atlantic Collieries, are perhaps the most noteworthy developments. Owing to labor trouble at Springhill the Cumberland Coal & Railway Company was shut out of the market for some months. In attempting to fill the gap several smaller collieries were given a better grip on life. There is very little of moment transpiring in the mining of other minerals.

At Lepreaux and Bathurst, in the Province of New Brunswick, iron ore deposits are being opened up by the Dominion Iron & Steel Company and by the Drummond Mines Company respectively. The Bathurst ore bodies are of unusual promise. It is easily conceivable that New Brunswick may, within the next few years, begin the production of iron and steel.

Quebec counts upon largely increased asbestos output for 1908. The selling price has gone up and the industry is in excellent shape. Chrome ore mining is giving encouraging results. Mica, ochre, copper and iron ore are the objects of less attention. But graphite is engaging capital and molybdenite may soon follow. Whilst the year 1907 has outshone 1906, it will in turn be eclipsed by the present year.

The Ontario districts of Cobalt, Sudbury, Thunder Bay and Rainy River have all been the scenes of increased activity during 1907. Public interest of course is more or less centered in Cobalt. Yet there are indications of a revival of silver mining in Western Ontario. The price of silver is, naturally, the controlling factor in the situation. However, improvements in methods and machinery, together with transportation facilities, have very materially lowered the point where profits begin.

Cobalt is rapidly approaching the stage when costs will be reduced to a business-like level. The past year has been a period of profound change and transition. Market manipulation and fraudulent promotions are, so far as the camp is concerned, almost things of the past. The labor difficulties were met and overcome by concerted action on the part of the operators. But the issue of the struggle might have been different were it not that public sympathy was with the operators. The wave of depression, bringing with it scarcity of employment, also helped to decide the dispute in favor of the operators. At present Cobalt is taking life very seriously. The output of the camp has grown by leaps and bounds. Concentrators, stamp mills and excellent power equipments are rapidly coming into commission. Three or four smelters at various distances, but all in Ontario,

will gradually take care of a fair proportion of the ore. Cobalt is safely established.

The blowing-in of the Atikokan furnace at Port Arthur was a landmark of the past year. Other events that will influence the future of the Province were the visit of the American Institute of Mining Engineers and of several parties of British journalists. We may also class amongst the most important features of the year the inception of the anti-wildcat campaign by THE CANADIAN MINING JOURNAL. Public opinion has been aroused, Government assistance has not been sparingly given, and it is improbable that Ontario will again be the happy hunting ground of cheap fakirs.

Alberta, possessing at this moment twenty-eight producing coal mines, has merely touched the fringe of her limitless coal fields. The past year has witnessed active prospecting, development, and, lately, an extension of the market for the Province's output.

Saskatchewan owns and operates a coal mine of her own. Otherwise we hear very little about that Province's minerals.

British Columbia, whose estimated output shows a net increase of \$4,636,625 over 1906, has made huge gains in coal production. The estimated increase in value of her coal output is \$3,190,000—an almost startling figure when all conditions are considered. This increase will be even more marked during 1908, as the Crow's Nest Pass Coal Company is putting up equipment whereby its output will be doubled, and later in the year the C. P. R. coal mines at Hosmer will come into commission.

The increase in the value of the copper output was almost entirely due to the rise in price.

### MINERAL COLLECTIONS—AN ANNOUNCEMENT.

On another page of this issue we publish the conditions and terms of Mr. J. B. Tyrrell's prize, offered for the best collection of Ontario minerals made during the current year.

As the prize is open to all Canadians, it is to be hoped that active interest will be displayed in this competition. The reward in itself is a substantial incentive to students and others. But the winner of the "Tyrrell Prize" will have the added satisfaction of having increased his own knowledge of an important science. We are sure that the response to this generous offer will justify the donor in continuing it from year to year.

### THE YUKON—A CORRECTION.

In the *Engineering and Mining Journal* for January the 4th are two articles by Mr. J. B. Hutchins, which purport to give a review of the mining work in the Klondike during 1907. One is entitled "Klondike District" and the other "Gold Dredging in 1907." Both articles give very erroneous impressions of the work that



has been accomplished in that portion of Canada during the past year.

Mr. Hutchins was in the Klondike four or five years ago, and if he looked over the country at all he must know that there are very much more than 3,000 acres of so-called dredging ground. There is easily that extent of vacant ground in the flats of the Klondike valley alone, without counting the flats of its tributaries, such as Bonanza, Hunker and Bear Creeks, which will greatly extend these figures. Besides these areas there are extensive flats of gold-bearing gravel on Dominion Creek and its tributaries, which taken with those of the Klondike will raise the total number of acres to many times the area stated.

Part of this ground is acknowledged to be unfrozen, and therefore can be easily dredged. Mr. Hutchins, moreover, says in another place: "Were the alluvion of the Klondike Creeks unfrozen, dredging could be carried on at a large profit, for the other conditions are generally favorable to dredging. The gravel is fine, clean and of moderate depth. It generally rests on a favorable bed rock." But the text of his two elegiacs is contained in the sentence "the problem of dredging frozen ground is in a most discouraging state." One dredge is quoted as having given satisfactory returns, but three other powerful dredges from which returns were not available are stated to "have been very disappointing in return."

The dredge above spoken of is doubtless the large dredge which has been working for three seasons on the flats in the Klondike valley, near the mouth of Bear Creek. Nothing is said of the small Ridson dredge, which was working on and near Discovery claim on Bonanza Creek, and which has already extracted gold to the value of a million and a quarter dollars out of three worked-out mining claims.

The Bonanza basin dredge was working near the mouth of the Klondike River in 1906 with great success, as stated by Mr. McConnell, the Canadian Geologist, in the report of that year. But last year it was decided to alter this dredge, remove its steam boilers and machinery and replace them with electric motors. These alterations were not completed until the first of September, after which date it was operated with marked success until the 17th of October.

The three dredges referred to by Mr. Hutchins were located on the lower portion of the valley of Bonanza Creek. Nothing is known of the results obtained by them; but another dredge has been built near them by the same company that owns these three dredges, and it will be ready to begin operations next spring. Three more large dredges have also been built by the same company on Hunker Creek, and they too will be ready to begin work in the spring. These seven dredges are all to be operated from one central electric station, and it is yet much too early to say either that they have not or that they cannot be worked successfully.

Four other dredges also began operations on Forty Mile River, one in Canadian and three in American ter-

ritory, and, while no information has been made public as to the results so far obtained, even if they did not make much money this year it is but reasonable to give them a little time to become adapted to local conditions. It is well known that the Pioneer dredge of the Klondike, which finally proved so successful on Discovery Claim on Bonanza Creek, was at first an expensive experiment.

Besides the dredges above enumerated, which have been already installed, the N. A. T. & T. Company is preparing the ground in the valley of Miller Creek, in order to be able to put dredges on it in the near future, by stripping the moss and muck from off the gravel by the use of water under hydraulic pressure.

In this connection it would be interesting to know exactly where the thawing of ground by stripping it of its covering of moss and muck has proved a failure. For, in spite of Mr. Hutchins' statement, the exact reverse is the case, as was long ago shown by Messrs. McConnell and others who are thoroughly familiar with that country, and as may now be seen at many places in the Klondike. The thawing of gravel to a depth of 12 or 15 feet, such as seen in many of the open cuts which are often sunk to bed rocks in a very few weeks, cannot be correctly referred to as "progressive seasonal thawing," as Mr. Hutchins speaks of it.

Exactly what is meant by frozen gravel being below the level of "ground-water" is not clear, but the clean use of geological terms can hardly be looked for in an article where "Poverty Bar," which is a distinct terrace, is spoken of as a peneplain. For this latter term, which means a base-levelled plain of erosion, is about as far removed from a terrace as two physiographic features can be.

In regard to the length of the season for work the extraordinary statement is made that the average night temperature on the first of May and on the 15th of October is fifteen below zero F. People who believe this statement will doubtless be prepared to believe that the country is too cold either to mine or to live in.

No papers are more interesting to miners or investors in mines than careful reviews of the work of the year, and consequently none can do more harm than such papers as these, filled with inaccurate statements and backed by the name of a great mining paper such as the *Engineering and Mining Journal*.

### CANADIAN SILVER.

The shipment of a quarter of a million ounces of bar silver from the Trail refinery of the Consolidated Mining & Smelting Company to the Canadian Mint at Ottawa is a significant event.

Remembering the reports, industriously circulated some months ago, to the effect that no silver of sufficient purity for use in the Mint was produced in Canada, it is gratifying to note that the Trail silver is 999 fine. Thus,



not only does this metal meet the requirements of the Mint, but it is more than ordinarily free from alloys.

The Mint is now in operation, and we predict that not the least distinguishing feature of Canada's history in 1908 will be the fact that Canadian silver is being mined, smelted, refined and coined by Canadians in Canada.

### "HIGHLAND MARY."

In this season of annual returns and estimates it is hard to give up space to the admirable Mr. Law or to the retiring Russell. Yet, as many of our readers are awaiting news, a prapagraph must be spared.

Law now awaits jury trial. He is charged by the Crown with conspiring to defraud. His bail was fixed at \$20,000. As Assistant Crown Attorney Price pointed out, Law and his confreres have milked the country of about \$300,000. The evidence adduced in the preliminary Police Court hearing was of a nature so damaging that a much higher bail would not have been amiss.

Amongst other evidences of fraud was the sworn testimony of the mining engineer employed to superintend work on the "Blue Bell" claims. Law & Company publicly announced that Blue Bell assays ran from \$200 to \$20,000 to the ton. Their engineer swore that he had only made two assays that showed gold at all. One of these was reported as showing \$2.50 to the ton, and the other \$1.50 to the ton.

This instance is typical. It were profitless to mention others. One incident, however, is interesting. It developed during the conspiracy trial, that the "Ontario Mining News" owed its existence to Law & Company. On one occasion Russell took 10,000 copies of that sympathetic sheet to England with him.

So much then for the conspiracy case. Law & Company stand disgraced and dishonored.

The Companies' Act case is still dragging along. It served a very useful purpose in eliciting evidence sufficient to prompt the Crown to prosecute Law for fraud.

Russell, Law's very silent partner, is reported to be in Lima, Ohio.

### PROFESSIONAL SERVICES.

Enquiries reach this office every day from all parts of Canada as to the merits of particular mines. It is obviously out of the question for THE CANADIAN MINING JOURNAL to attempt to answer these questions.

To formulate a reliable opinion of a mine it is necessary to visit and inspect that mine. This costs money and can only be adequately done by a trained mining engineer.

The holders of small interests in mining properties are often unable or unwilling to stand the expense of engaging an engineer to get information for them. But, often also they are unable to get satisfactory information from the officials of the company.

When this is the case there is a remedy. If a group of shareholders, whose holdings represent at least one-fifth in value of the total stock, arrange to act together they can secure from the courts the right to have the mine examined and reported upon. The expense of engaging a properly qualified man will then fall lightly upon many shoulders; or may, under certain circumstances, be referred to the company itself.

THE CANADIAN MINING JOURNAL will be glad to assist and advise any persons who find themselves unable to obtain information. Finally, it is necessary first of all that these persons help themselves. But we shall willingly help persons interested in the same mine to come together.

### WARNING.

In the Toronto newspapers there has appeared of late a copious advertisement. One L. W. Spear invites the singed, but forgetful, public to join him in an effort to develop groups of mines in various districts.

We notice that Mr. J. F. Lennox, barrister, of Toronto, is vice-president. Mr. Lennox's name was associated with the Larder Lake Proprietary Gold Fields. Last autumn a number of this company's employees were met on the way out from Larder Lake. They claimed that they had not been paid for some months and that they had not been decently fed. The JOURNAL mentioned the circumstance at the time.

In cases like these a reputable officer of a company resigns or demands and receives an explanation.

Taking Mr. Lennox then as a sample of those associated in this scheme, Spear's Canadian Mines Development, we rise to remark that Mr. Lennox must clear his name of several smirches before he has any right to appeal to the public for money. For instance, he might tell us something of Silver Bird and its aerial flight.

Further, the mining proposition that needs a large fraction of a page of newspaper space where to spread its is already damned.

Referring again to the advertisement, we notice that the promoters of this co-operative plan recognize that guady language is no longer desirable. It would, mayhap, be as salt upon the wounds of those who have gone in for "permanent" investments of the Silver Bird variety. Realizing this, Mr. Spears delivers himself in tones dulcet and moderate, but insistent. His is an appeal to reason, not a play upon the sinful thirst for shekels. And yet we must (were we not requested to by Mr. Lennox and others last winter?) watch Silver Bird!

The possible investor must bear in mind the fact that in putting his money into heavily advertised mining schemes he is not merely purchasing problematical mining shares, but is buying an interest in a large advertising debit account, running up to thousands of dollars and chargeable in all cases, directly or indirectly, to capital outlay.



# PRESENT STATUS OF TECHNICAL EDUCATION IN NOVA SCOTIA.

BY F. H. SEXTON, DIRECTOR OF TECHNICAL EDUCATION FOR NOVA SCOTIA.

Technical education in Nova Scotia is at present only seven months old and has as yet created no history for itself. The alacrity with which many men have taken advantage of the simpler foundation courses offered this year in the Technical Schools established at Halifax, New Glasgow and Sydney augurs well for the future of this department of education. It was on April 25th, 1907, that the Provincial Legislature of Nova Scotia passed an "Act Relating to Technical Education." This made the people of this province the first in Canada to accept the conclusive lessons taught by Germany and other nations in the efficacy and necessity of this form of education to the material extent that they were willing to establish a system of technical instruction on a comprehensive basis which could be enlarged to meet future demands.

This Act provided for a technical college to be built in the capital city, which would be the capping stone of the system. In the words of the Act: "There shall be established at Halifax, an institution for the purpose of affording facilities for scientific research and instruction and professional training in civil mining, mechanical, chemical, metallurgical and electrical engineering, or any other departments which may from time to time be added.

In order to articulate the work of this institution most closely with the other colleges already existing in the province, a member from each of these colleges and one from Mount Allison University, New Brunswick, which draws its students to a great extent from Nova Scotia, are nominated to the Governing Board.

The plans for the main building of the Technical College have been completed and a cut of the front elevation is given on the cover of *THE JOURNAL*.

The building is designed in a free Renaissance style of architecture. It is to be constructed of Nova Scotia pressed brick and freestone. The central part of the structure is to be composed entirely of stone and by projecting from the main part of the building will serve to relieve the impression of flatness to which it might otherwise be prone. The building will consist of two stories and will be 170 feet by 48 feet, with two projecting wings in the rear, each 40 x 55. The Provincial Science Library, which now represents a handsome nucleus of valuable accessions and the Provincial Museum are to be given a home in this College. This arrangement will prove an advantage to all the departments, because it will give the Library and Museum a chance to expand into their full spheres of utility, and will place the scientific volumes of the former and the large number of mineralogical and geological specimens of the latter at close hand for purposes of instruction.

The plans for the building are finished and are shortly to be put out for tenders, so that construction may begin with the disappearance of frost in the spring.

Besides the full engineering courses in the Technical College, it is the present intention to hold a number of shorter courses in the different branches, which will be suitable for men in practical life, who wish to obtain a higher theoretical knowledge of the scientific basis of the profession in which they are employed, but who lack all the necessary preliminary knowledge to be regular

matriculants in the College, or who are prevented by one reason or another from giving up the full number of years required to obtain an engineering degree.

There are to be two laboratory buildings in the rear of the main building, one devoted to Mining and Metallurgy and the other to mechanical engineering, electrical engineering, hydraulics and strength of materials. The buildings are to be of the factory type of reinforced concrete and steel, so that they can be readily enlarged at any time.

Since the coal industry is the greatest one of which the province boasts, the mining laboratory is to be equipped for research and instruction in this branch of mining industry as well as metal mining. Almost all the mining engineering laboratories in America with a few notable exceptions have equipped themselves to carry out the operations connected with metal mining and ore dressing and have neglected the other branch of the industry. Research problems of such nature as are vital to the industrial progress of the province will be carried out in the various laboratories, and it is hoped that the closest relationship may exist between the industries and the Technical College.

The fees for tuition at this Government Institution will be nominal and everything will be done to encourage the poor boy who desires a higher scientific training, but who is prevented from going abroad to obtain it, on account of the attendant expense.

Under the Technical Education Act there is also provision for secondary education by continuing under the new Department of Technical Education the coal mining and engineering schools which have heretofore existed under the Department of Mines and also by establishing in industrial centres "Local Technical Schools."

The coal mining schools are conducted for coal miners and coal mining officials, who wish to acquire a greater knowledge of the science and art of coal mining and for those who wish to procure the Government certificates of competency for managers, under-ground managers and over-men. For educational purposes, the portions of the province which contain the collieries have been divided into five districts and an instructor is appointed who devotes his whole time to teaching coal mining and surveying in that district. Classes are held at almost every colliery centre and all instruction is absolutely free to the students. In the districts that are so large that the regular instructor cannot overtake the work, local assistants are appointed to aid him. At the present writing there are 18 coal mining schools in operation.

As the coal mines grow larger and deeper and call for more and more economical working in the face of increased engineering and commercial complexities, the educated miner will be more and more necessary to carry on the work successfully and to make the requisite provisions for guarding human life. These coal mining schools, which are being brought to a higher standard each year, will be a great boon to ambitious men by providing a practical education at their doors and will also serve in supplying educated mine officials to superintend the collieries.



The engineering schools, of which there are 15 at present, are instituted in every colliery centre where enough students make application to warrant the necessary expenditure. These schools are established for the purpose of instructing the men who operate the machinery about the collieries in the principles of steam and mechanical engineering, so that they may possess themselves of the theory of these branches and be enabled, if they wish, to obtain Government certificates of competency at 1st, 2nd, 3rd or 4th class stationary engineers.

A general educational standard is required for entrance into the coal mining and engineering schools, and preparatory classes in mathematics and English composition are held in every locality where the coal mining and engineering schools exist. Thus no ambitious man who has to earn his livelihood is withheld from securing such a practical education as will enhance his position and secure promotion.

The proviso for "Local Technical Schools" in the Act reads as follows:—

N. S. Laws, Chap. 1, sec. 13: "The Governor-in-Council may from time to time establish, in such places as it may be deemed advisable, local technical schools to furnish industrial education of such character and extent as will most effectively meet the requirements of the population and industries of the locality."

These local technical schools are supported both by the province and the locality, each sharing nearly equally in the financial burden. This year three industrial centres, Halifax, Sydney and New Glasgow have responded with alacrity and have established schools of this character. In the three, the enrollment has exceeded 400 and the average attendance for the first two months is above 70 per cent. The classes offered this

year are as follows: Business English, Technical Arithmetic, Practical Algebra and Geometry, Mechanical Drawing, Machine Drawing, Architectural Drawing, Elementary Electricity and Magnetism, Mechanism, Surveying and Plotting, and Chemistry.

The courses are practically free, a deposit of \$2.00 to \$4.50 being required on entrance to any class, and this amount being refunded at the end of the term according to each student's attendance. The classes are open to everybody who has the necessary knowledge to enter the class which he desires to attend. It is hoped that there will be a goodly number next year from those receiving instruction in these foundation courses at present, who will wish to pursue their studies further and thus form a warranty for offering classes of more advanced grades.

Several other industrial centres than the ones named have intimated their desire of participating in the scheme of local technical schools, and next year a number of the progressive towns will have schools offering such practical instruction in mathematics, drawing, etc., as well be best suited for the men employed in the local industries.

Nova Scotia has provided for a system of Technical Education which can be expanded from the present working basis to supply practical and industrial and engineering instruction from the lowest to the highest grade. This will train the native born to operate native industries and to develop the natural resources of this section of Canada to the utmost. In putting the actual machinery of the system in operation, the Government is proceeding cautiously and conservatively, but it intends to provide for technical education throughout the province, where it can be so advantageously offered as to warrant the expense for its establishment.

## MINING IN QUEBEC IN 1907.

BY J. OBALSKI.

The mining industry in Quebec is characterized by its steady development and so far it has been free from the erratic movements which follow upon fresh discoveries.

For the study of this subject, we may divide the Province into two sections:—

1. The old settled districts of the Eastern Townships and the valley of the St. Lawrence and Ottawa Rivers.
2. The new districts in the North.

### I.

In the Eastern Townships the leading industry is asbestos, which has been flourishing so far. There are thirteen companies operating at Wolfestown, Black Lake, Thetford, East Broughton and Danville, which employ about 2,500 men, and have been producing regularly. The output for 1907 is expected to be 25 per cent. higher than in 1906. It should be added that the selling price has considerably increased, especially for the crude varieties; it now reaches close on \$300 per ton for the first class and \$200 for the second, while the price for fibre varies from \$15 to \$100, according to grade. The fibre is now in great demand owing to the new use made of it for the manufacture of boards, and this has led to the opening up of new mines and the erection of new mills at East Broughton, which district is mostly a fibre producer. A new mill has been started during the year and two others are in course of construction at

the same place. A mill has also been erected at Colraine, but it has been working only a few months.

In Bolton, near Eastman, a body of asbestos-bearing serpentine has been developed on quite a large scale, this district being an entirely new one.

There was practically nothing done in the Ottawa region, where a fine quality of asbestos—but rather scarce—exists.

The asbestos industry is now a permanent one; the mines are well equipped with proper plant, the result of twenty-five years of experience of men who have made that industry their career and have created it here.

The Shawinigan Power Company has established a main line carrying 50,000 volts, which divides its power among the various mines to the extent of over 6,000 horse-power.

The proximity of the railway makes the transportation question a very simple one, while labor is both plentiful and good.

Practically all the mines are yielding good returns to their operators.

The Chrome mines found in the serpentine belt in the Township of Colraine are now worked on more scientific methods. During the year diamond drilling has been resorted to for the purpose of proving the existence of ore bodies at a greater depth than the quarries previously worked, and, as a result of such



diamond drilling, the Black Lake Asbestos & Chrome Company is sinking a 300 foot shaft on this property.

Three companies have been operating for chrome, and the output will compare favorably with that of last year. Some parties, consisting of a few persons, have also been working on a small scale. The concentrating of the low grade material is now successfully effected by means of stamp milling, followed by the use of Wilfley tables. About 100 men are employed in this industry, and there are 45 stamps in all at the four mines, producing about 8,000 tons.

There is nothing special to report regarding the iron industry, which is represented by a charcoal blast furnace at Radnor and by two at Drummondville, all three using mostly bog ore.

Experiments are still being made in connection with the treatment of the magnetite sands of the Gulf of St. Lawrence, chiefly by means of electricity; but, so far, no definite result has been obtained.

The same remark applies to the treatment of titaniferous ore.

Ochre is worked at St. Malo, in the vicinity of Three Rivers, by three different parties, and is shipped in the calcined form to the amount of about 3,000 tons.

Low grade copper ore is shipped as usual from two mines at Capelton, near Sherbrooke. The ore is used for making sulphuric acid and some value is added by its contents in silver and copper. The Nichols Chemical Company uses some of the ore on the spot, the balance being shipped to the United States. The Eustis Company has its mine run by electricity and is operating a concentrating plant consisting of crushers, collars and Wilfley tables. The output is about 30,000 tons yearly.

Some other prospects have been carried on in connection with copper ore in the same district, among which may be mentioned the Ascot mine and a group of properties developed by Mr. A. O. Norton. The latter is quite important and will probably lead to the making of a valuable mine, as the ore found compares favorably with that got out at Capelton in about the same geological conditions.

Some prospecting for galena has been done at Gaspe Bay, and for galena and zinc blend on Calumet Island (Pontiac County), but so far no shipments have been made.

Practically nothing has been done in connection with the alluvial gold of the Eastern Townships, but the discovery of a small deposit of gold-bearing quartz in Marston, near Lake Megantic, is worth recording. It is the first time in the history of that district that gold has been found in quartz in apparently commercial quantity. Of course the discovery is a fresh one, and we do not know how the prospect will turn out, but it is presumed that further prospecting will be carried on next summer, which may also call attention to the valuable placers formerly worked in the Chaudiere valley and in Ditton.

In the Ottawa district the only activity manifested has been in connection with amber mica, the main producing mine of which has been that of Blackburn Brothers, near Perkins' mill in Templeton. A good many small producers are taking out some mica which is used by large concerns in Ottawa, which city remains the centre of that industry. Mica is shipped in the form of thumb-trimmed and split and is also prepared in large sheets under the name of "Micanite." The value of the material shipped may represent about \$200,000.

A company has also reopened two old white mica mines at Maisonneuve (Berthier County) and near Murray Bay (Charlevoix County), which also contain some

rare earths, but no output of any importance has yet been reported.

Several companies have been organized for working the graphite deposits of Buckingham, Calumet and St. Jovite. Mills have been erected or fitted up anew, and it is proposed to establish others, but the difficulty of concentration has retarded the development of this industry.

Little or no work has been done in connection with molybdenite, phosphate, feldspar or baryta.

In the Three Rivers district some wells have been bored for natural gas, which is conveyed by lines of pipes to that city and some of the neighboring villages.

The manufacture of Portland cement at Hull has been a success, and the output is to be increased still more.

The getting out and manufacture of building materials are progressing proportionately to the development of the country.

## II.

### THE DISTRICTS IN THE NORTH.

The new mining districts of the Province comprise the unsurveyed portion of the northern territory of the country of Pontiac, east of the Province of Ontario, and the Chibogomo region. Both are included in the Huronian belt running from Lakes Superior and Huron to Lake Mistassini.

The former region, owing to its proximity to Cobalt, led to the conception of great hopes which so far have been but slightly realized. In fact, the explorations of the Geological Survey and the Quebec Government as well as the many prospects carried on by private individuals, have led to the discovery of very little beyond the existence of rocks of that Huronian formation, in which, however, one must not despair of finding economic minerals. Up to now, a little gold-bearing quartz and copper ores have been found disseminated in quartz veins in the vicinity of Lake Opasatica and near the Ontario boundary. It is also worthy of note that the formation in which gold is found is comparable to that of Larder Lake.

In a westerly direction, molybdenite has been found at several points, amongst others on the Keewagama River, where it is fairly abundant and where bismuth also has been observed.

Further on, on the Harricanaw River and on the Bell River, a little copper has been found.

In the surveyed townships east of Lake Temiscamingue a little Cobalt ore has been discovered, but not as yet in commercial quantities and the presence of silver in it is not yet fully confirmed.

The Chibogomo district is more important, but, as it is situated 200 miles from a railway and is difficult of access, no operations can be carried on there until a railway is built. The last prospects have led to the discovery of considerable deposits of copper, of good grade, yielding values of gold, of mispickel iron gold-bearing quartz, of iron pyrite, of magnetic iron and of asbestos, the whole in commercial quantities. Moreover, a slate conglomerate formation, similar to that of Cobalt, has been found and, in some parts of the same, Cobalt bloom, which leads to the hope that other more important discoveries will be made.

The explorations of the Geological Survey, of the Quebec Government and of private companies have established the value of that district.

To sum up, the year 1907 has been a good one in the Province of Quebec and it is probable that the total output will be greater than last year's.



# MINERAL PRODUCTION OF BRITISH COLUMBIA IN 1907.

By E. JACOBS.\*

The official estimate of the approximate total mineral production of British Columbia for the year 1907 exhibits an increase over that of 1906 of \$758,437. The Provincial Mineralogist's published figures show production as under:—

	Quantity.	Value.
Gold, placer . . . . .		\$ 700,000
Gold, lode . . . . .oz.	199,770	4,129,246
<b>Total gold . . . . .</b>		<b>\$ 4,829,246</b>
Silver . . . . .oz.	2,940,190	1,852,320
Lead . . . . .lb.	48,309,660	2,318,864
Copper . . . . .lb.	38,392,264	7,678,453
<b>Total metalliferous . . . . .</b>		<b>\$16,678,883</b>
Coal (tons of 2,240 lbs) . . . . .	1,856,600	6,498,100
Coke (tons of 2,240 lbs) . . . . .	227,000	1,362,000
Other minerals (building materials, etc.) . . . . .		1,200,000
<b>Total production in 1907 . . . . .</b>		<b>\$25,738,983</b>

In arriving at the approximate value of the several metals as shown above, the average market prices for the year, as published in the *Engineering and Mining Journal*, have been taken, with a deduction of 5 per cent. off the price of silver and 10 per cent. off that of lead. For coal and coke what was considered a fair market value in British Columbia was taken. Accordingly the respective prices were as follows: Lode gold, \$20.67 per oz.; silver (net), 63 cents per oz.; lead (net), 4.8 cents per lb.; copper, 20 cents per lb.; coal, \$3.50 per long ton, and coke, \$6 per long ton.

For purposes of comparison the following table, showing production over a period of two years, is submitted:—

of that of 1906, the largest in the history of metal mining in the Province. As compared with 1906, though, there was a decrease of \$1,753,619. This loss was, however, more than compensated for in the considerable increase in the production of non-metalliferous minerals, chiefly coal, although coke contributed \$366,000 and building materials, etc., \$200,000, of this increase, the balance (\$1,946,000) representing the proportion from coal.

Taking the various minerals separately, as shown respectively in the tables of production, the following comments are made:—

### GOLD.

As already mentioned, the production of placer gold in 1907 was smaller than in any other year since 1898, and this notwithstanding that water conditions seemed, early in the season, to promise a favourable year for hydraulicking. It is possible that the revised figures, when the official returns shall all have been received, will prove the estimate now published to have been too low, yet while some gain may be made it is unlikely it will be sufficiently large to bring last season's production up to that of 1906. The districts which produce most placer gold in the Province are Cariboo and Cassiar. In the former Quesnel division had the assistance of a property taken over two years ago by a Guggenheim company which recovered about \$20,000 against nothing for 1906, while the Cariboo division was understood to have had several properties at work that had been idle several previous seasons, yet the preliminary advices record a total decrease of about \$150,000 in the total recovery throughout both divisions of this district. Atlin camp, for years the largest contributor of placed gold in British Columbia, is also reported to have made a smaller production than during any one of the three immediately preceding years—1904-1906—its decrease being shown as approximately \$100,000. The production of individual

Comparative Table Showing Quantity and Value of Mineral Products for Two Years, 1906-1907 (last year estimated).

	1906.		1907.	
	Quantity.	Value.	Quantity.	Value.
Gold, placer . . . . .oz.		\$ 948,400		\$ 700,000
Gold, lode . . . . .oz.	224,027	4,630,639	199,770	4,129,246
<b>Total gold . . . . .</b>		<b>\$ 5,579,039</b>		<b>\$ 4,829,246</b>
Silver . . . . .oz.	2,990,262	1,897,320	2,940,190	1,852,320
Lead, . . . . .lb.	52,408,217	2,667,578	48,309,660	2,318,864
Copper . . . . .lb.	42,990,488	8,288,565	38,392,264	7,678,453
<b>Total metalliferous . . . . .</b>		<b>\$18,432,502</b>		<b>\$16,678,883</b>
Coal (tons 2,240 lbs) . . . . .	1,517,303	4,551,909	1,856,600	6,498,100
Coke (tons 2,240 lbs.) . . . . .	199,227	996,135	227,000	1,362,000
Other minerals (building materials, etc.) . . . . .		1,000,000		1,200,000
<b>Total production . . . . .</b>		<b>\$24,980,546</b>		<b>\$25,738,983</b>

The approximate total value of the production of metalliferous minerals in 1907 was, with the exception

miners from Atlin creeks has been steadily becoming smaller for several years, yet it was expected that the operations of the Ruffner, Hamshaw, Guggenheim and other companies would have in the 1907 season more

\*Editor *British Columbia Mining Record*.



than made up for such loss. It is understood that the creek gravels suitable for hydraulicking are by no means exhausted, so that given favorable conditions for working them returns may be expected to show a substantial increase next season. Dredge mining in this camp has proved a failure, and has been abandoned for the time. Possibly it may be tried again later; if so it should be by men thoroughly experienced in that class of mining.

The \$500,000 decrease in the value of lode gold was due to the smaller production of the Boundary and West Kootenay districts, and chiefly owing to a suspension of mining and smelting operations during two to three months of the year. The bigger gold-quartz mines of the Province did not contribute nearly so large a proportion of the total as might reasonably have been looked for. In fact the only one that made anything like a fair showing was the Nickel Plate in the Lower Similkameen, with a production estimated at between \$400,000 and \$500,000. In Nelson mining division the Ymir mine made a poor showing as compared with its production of several years ago. On the other hand the Queen, Second Relief, Kootenay Belle and Arlington, all in the Salmo-Erie section of this division, together produced between \$200,000 and \$300,000, and the Fern and Granite, both within a few miles of Nelson, also added to the total. In the northern Lardeau, the Eva mine, near Camborne, was the only gold mine that made a production worthy of mention.

SILVER.

The production of silver was practically the same as that of 1906—not quite 3,000,000 oz. In round figures, West Kootenay produced about 1,300,000 oz., East Kootenay 950,000 oz., Boundary something like 600,000 oz., and the Coast district about 80,000 oz. While the decrease in quantity was not considerable, the expectation was that the change would be the other way, since in Lardeau district the Silver Cup mine made an appreciably large increase over its 1906 output, in Ainsworth several mines together did similarly, and in the Slocan and Whitewater in the camp of that name, and the Rambler-Cariboo, Standard, Hewitt, Vancouver group, and Arlington, among others, all made a higher production than in the year immediately preceding. These gains, however, were insufficient to offset the decreases in East Kootenay and the Boundary. It is pleasing to note that there is believed to have been a distinct improvement in the Slocan, which is a change for the better not generally known to have taken place.

(To be continued.)

**THE SIXTEENTH ANNUAL REPORT OF THE ONTARIO BUREAU OF MINES.**

(Continued from last issue.)

OIL AND GAS IN KENT.

The country in which lie the Romney and Tilbury oil fields is covered with drift. It is thus doubly unfortunate that full records of the data regarding underlying formations have not been kept during the sinking of the wells.

In 1905 the Bothwell field was producing some 6,000 barrels of oil per month. This was the first and for some time the only producer. In March, 1907, there were 150 wells drilled in Tilbury, of which only 4 were dry. On July 1st the number of producing wells was 235. There were also 33 dry holes and 26 new wells being drilled. In the Romney pool, at the same date, there were 47

wells, of which 24 were dry. The production of oil from the Tilbury and Romney field is given by the Imperial Oil Company of Sarnia, who purchase the entire flow, as follows:—

East Tilbury—

No. of bbls. of 35 gallons from Dec.,

1905, to end of June, 1906 . . . . .	4,000
July . . . . .	4,315
August . . . . .	13,897
September . . . . .	14,651
October . . . . .	23,679
November . . . . .	26,558
December . . . . .	28,101

1907.

January . . . . .	29,172
February . . . . .	26,098
March . . . . .	29,600
April . . . . .	31,055
May . . . . .	35,004
June . . . . .	35,654

Romney, 1907—

Bbls.

January . . . . .	2,871
February . . . . .	5,939
March . . . . .	11,104
April . . . . .	9,685
May . . . . .	5,534
June . . . . .	3,163

The Romney field is handicapped by lack of water for boilers. Also it has little natural gas. Gas is to be piped from Tilbury.

The total oil produced in Toronto in the first six months of 1907 was slightly more than 400,000 bbls. Of this the Tilbury and Romney fields produced more than half.

The Sarnia refinery has a capacity of 75,000 bbls. per month. It is worked to full capacity, and any falling off in Ontario's production is made good by importation from the United States.

In July last Tilbury crude oil brought the operator \$1.16 per bbl.; Romney oil, 84 cents per bbl. In addition to this there is a Government bounty of 52 1-2 cents per bbl. Including United States producers, the price per bbl. ranges from 28 cents to \$1.68 1-2. The latter figures includes bounty.

The color of the Tilbury oil in bulk is a dark green olive. In thin layers it assume a pale yellow shade. It is 38 degree to 41 degrees Beaumé.

The Romney oil, described by refiners as "dead," contains a high percentage of sulphur. A small quantity of naphtha is extracted from it and the balance is sold as fuel. It is about 28 degrees to 30 degrees Beaumé.

There are several important gas wells in East Tilbury and Raleigh. During May and June, 1907, the City of Chatham drew its whole suply of natural gas from one well on the David Halliday farm in the northwest part of lot 1, in the sixth concession of Raleigh. The well is 1,421 feet deep. Gas was struck at 1,417 feet. It is lined with 3 inch tubing, and packed with a dresser packed. It was closed in on September 16th, 1906. The gas is conveyed 10 miles to Chatham in a surface pipe 3 inches in diameter. This is to be replaced by a 6 inch pipe. The rock pressure of the gas is said to have decreased to 460 lbs. to the square inch, but when first measured it was 650 lbs. It is conveyed to the city at a pressure of 200 lbs., when it is reduced to 60 lbs. At the Chatham Gas Company's works it is further reduced to 6 ounces, at which pressure it is delivered to the consumers.



Another well on lot 14, Middle road north, East Tilbury, gives 500,000 cubic feet per day. This will be used to supplement the Chatham supply.

The Chatham prices per 1,000 cubic feet range from a maximum of 35 cents down to 12 cents, according to quantity used. For domestic lighting and cooking it is 35 cents. For heating it is 27 cents per 1,000 for the first 100,000 cubic feet. For the next 50,000 the price is reduced to 27 cents. For any quantity over 150,000 the rate is 17 cents. For gas engine power the minimum charge is \$37.50 per month on the assumption that not less than \$250,000 feet per month will be used, which is at the rate of 15 cents per 1,000. Used under boilers the rate is 12 cents per 1,000 for any quantity. Artificial gas was formerly sold in Chatham at \$2.50 per 1,000, with a discount of 30 per cent. for cash within 10 days. Nearly every farmer along the gas pipe line into Chatham now uses gas for lighting.

The Chatham Gas Company is preparing to purify the gas by removing the sulphuretted hydrogen.

Two other gas wells supply the adjacent country.

In the Romney field oil is struck at 300 feet. There are no gas wells proper. During the summer the largest oil producer was the Hornick Farm Oil Company, whose output was 100 bbls. per day.

*Handling the Oil in Tilbury.*—The oil is first piped from the different wells on a farm into one or two tanks.

Thence to a large central station; and then to the railway station tank at Merlin. Pipe lines have been installed to carry the oil from the wells to the central storage tanks and pumping station. The main tank is of steel and has a capacity of 3,840 bbls. Other tanks bring the total capacity up to 6,000 bbls. The oil is conveyed in two pipe lines, 4 inch and 2 inch, to Merlin, four and one-half miles, under 200 to 400 lbs. pressure. As much as 3,500 bbls. can be sent in ten hours. At Merlin the oil flows by gravity into the cars.

One farm there were nine producing wells. The power for pumping is supplied by a gas engine run by natural gas. The power plant is placed in a central position. Surface rods run to each well, at which a pump is placed. The pumps are run simultaneously by these rods. The local tanks usually have a capacity of 250 bbls.

Drilling is contracted for at rates of from 85 cents to \$1 per foot in Tilbury. Most of the wells are about 1,400 feet deep. Shooting with nitro-glycerine entails an additional cost of about \$175. The cost of lining brings the total outlay to about \$3,000. If the well proves a "duster" the casing is removed and the operator loses. Twenty-five days are usually taken to drill a well in Tilbury. In the Romney district the shallow wells are drilled with much less outlay.

(To be continued.)

## ONTARIO'S MINING PROGRESS IN THE LAST DECADE.

BY PHILLIPS THOMPSON.

In no respect has the industrial expansion of the Province of Ontario during the last decade been more apparent than in connection with its mining and metallurgical activities. Owing to the discovery of new mineral deposits and the investment of large amounts of capital in mining and metallic industries, the increase in production has been considerably greater than in any other department of industry. Especially is this true of the later portion of the period under consideration. In 1897 the total mineral output was valued at \$3,899,821, of which only \$1,038,089 was metallic. Up to that time, and for some years later by far the larger proportion of mineral production consisted of non-metallic items, including building stone, brick, lime, etc. In 1901 (however, the metallic output had increased to \$5,016,734, or 42 per cent. of the total production, and in 1905, for the first time, the metallic exceeded the non-metallic output, being \$10,201,010, out of a total production of \$17,854,296. This figure, which was the highest record in the history of Ontario mining, was considerably surpassed in 1906, with a metallic production of \$13,179,162 and a non-metallic output of \$9,042,646, making a total of \$22,221,808. Partial returns, covering the first nine months of 1907, indicate that the advance has been continuous.

With the exception of pig iron, silver holds the first place on the list of metals. Prior to the development of the Cobalt deposits its production had for some years been declining. A drop in the price of the metal resulted in the closing down of mines formerly large producers in the Port Arthur district. The output in 1902 had decreased to \$58,000 in value, and in 1903 to \$8,949. The discovery of the silver-cobalt nickel ores in the fall of 1903 in the course of construction work on the Temiskaming & Northern Ontario soon attracted widespread attention from mining men and capitalists, and a rush

of prospectors to the new camp took place during that and the following year. Practical mining operations were speedily set on foot, the output of the camp for 1904 being 158 tons of ore, yielding in addition to other values 206,875 ounces of silver, valued at \$111,887. This year witnessed the beginning of operations on the Nipissing, La Rose, McKinley-Darragh, Trethewey, Coniagas and other prominent mines. During 1905 the number of shipping mines was increased to 16. The total production of silver for the year was 2,473,452 ounces, valued at \$1,372,877. The output was entirely from the Cobalt field, with the exception of small quantities extracted from the residues of the Copper Cliff nickel mattes. This was more than doubled in 1906, the yield having risen to 5,357,830 ounces, valued at \$3,543,089, with additional values of cobalt 312 tons, \$30,819; nickel, 156 tons, and arsenic 1,558 tons. A great drawback to Cobalt mining operation has been the difficulty of obtaining satisfactory terms from the American smelters. At first they were paid for the subsidiary products, but latterly the smelting companies, alleging the refractory character of the ore, have as a rule refused to make any allowance for the nickel, cobalt and arsenic contents. Other difficulties arising out of fluctuations in the price of silver have occurred more recently as a result of which shipments have been to some extent kept back, with a view of obtaining better terms from Canadian smelters, now in course of construction. Many recent consignments have been sent to the smelter of the Canadian Copper Company at Copper Cliff, Ont., where the terms are regarded as comparatively favorable.

The season of 1907 was characterized by continued expansion and greater attention to systematic and thorough development work on the part of producing mines. Early operations were largely conducted by crude, primi-



tive methods, which proved remunerative when applied to rich deposits lying near the surface. As the camp assumed more of a permanent character and deeper levels were reached the installation of modern machinery was soon found to be necessary, and the past year has witnessed the introduction of first-class steam and electric plants, with the most approved machines, on a large scale. All the important mines are now well equipped in this respect. The difficulty and expense attendant upon these installations has been very considerable and has only been justified by the confirmation of the extent and value of the deposits. Exploration has been pushed farther afield and discoveries made up the Montreal River and in the Temagami forest reserve, which foreshadow a wide extension of the silver-producing area. At the close of the year the number of shipping mines was 24. Returns to the Bureau of Mines covering the nine months ending September 30th give the output of silver as 6,919,987 oz., valued at about \$4,312,000, which shows that notwithstanding a sharp decline in the price of the metal, the value of the entire year's output will mark a very substantial advance over the previous year's yield.

Iron and steel manufacture have made remarkable progress since 1897, consequent upon the discovery and utilization of large ore deposits and the development of the secondary processes of manufacture, stimulated largely by the heavy demands for railroad construction and the encouragement of the bounty system. In 1897 pig iron was produced to the amount of 24,001 tons, of the value of \$288,127. The ore from which it was made was all or nearly all imported. In 1900 the pig iron product had increased to 62,386 tons, valued at \$936,066. Iron ore was produced to the amount of 90,302 tons, value \$111,805, of which 22,887 tons were smelted in Ontario, the remainder being exported. The marked increase of the iron ore output in 1900—amounting to 73,391 tons in quantity and \$80,854 in value—was due to the opening of the Helen mine at Michipicoten. Markets were furnished for Canadian iron ore by the establishment of blast furnaces in Hamilton, Deseronto and Midland, and the progress of the mining industry was greatly stimulated. In 1901, 273,538 tons were produced, the greater proportion from the Helen mine. The quantity smelted in Ontario was 194,510 tons. The pig iron output was 116,370 tons, of the value of \$1,701,703. Steel, which appeared on the list for the first time in 1900, when the output of 2,819 tons was valued at \$46,380, increased in 1901 to 14,471 tons, worth \$347,280. The following year witnessed a still more notable expansion. The iron ore produced for 1902 was 359,288 tons, worth \$518,445, the pig iron product, 112,687 tons, value \$1,683,051, and the steel output, \$68,802 tons, valued at \$1,610,031. In 1905 iron ore was produced to the amount of 211,597 tons, value \$227,909, the pig iron output had increased to 256,704 tons, value \$3,909,527, and steel to 138,387 tons, value \$3,321,884. Latterly a good deal of fluctuation was occasioned by financial difficulties of the Lake Superior Corporation, controlling the Sault Ste. Marie industries, necessitating the temporary suspension of their mining and iron manufacturing operations. These having been overcome, productive activity has for some time been resumed. In 1906 the output of iron ore was 128,099 tons, worth \$301,032, and that of pig iron 275,558 tons, of the value of \$4,554,247. Returns of the quantities produced during the nine months of 1907, ending September 30th, are as follows: Iron ore, 141,719 tons; pig iron, 180,663 tons; steel, 120,077 tons. A noteworthy feature of the industry during 1907 is the

rapid development of the twin cities of Fort William and Port Arthur as an iron centre, owing to the opening of the blast furnaces of the Atikokan Iron Company at the latter point and the development of the extensive iron ore deposits of the Atikokan iron range as a source of supply. Another large deposit at Moose Mountain, north of Sudbury, is being developed by the Moose Mountain Iron Mining Company, Limited, access to it having been afforded by an extension of the Canadian Northern Railway. The establishment of large smelting works and subsidiary industries drawing their raw material from this source, either at Toronto or some other convenient point in Ontario, is in contemplation. Altogether the outlook for the rapid and steady growth of the iron mining industries and the various metallurgical branches dependent upon it is exceeding auspicious. The exhaustion of the American iron ore deposits will necessarily in the near future give increased value to Canadian ores and bring into the market many areas the working of which has hitherto been unprofitable.

The last two or three years have witnessed a marked expansion in the nickel-copper industry, the sole producers of the Sudbury district for some time having been the Canadian Copper Company and the Mond Nickel Company. The product is exported in the form of matte for treatment abroad. From an output of 14,034 tons of matte, with nickel values of \$359,651 and copper values \$200,067 in 1897, the yield had increased in 1905 to 17,388 tons of matte, produced by the Bessemer process, yielding value of \$3,354,934 nickel and \$688,993 copper. The nickel and copper values produced in 1906 were \$3,836,419 and \$998,548 respectively. Later returns appear to show that the figures for 1907 will at least equal these. The production of copper apart from nickel has been comparatively small of late, but it is hoped that with the resumption of activity at the old Bruce mines and application of modern methods of mining and treatment satisfactory results may shortly be obtained.

The production of gold, to which formerly a good deal of capital and enterprise was devoted, has not of late occupied so prominent a position among the mining industries of the Province. This is perhaps mainly due to the fact that much of the effort to develop gold mines was misdirected, even when honestly undertaken, and operations conducted on a scale and at a cost by no means warranted by the indications. Out of very many companies started with glowing anticipations, only a very few are still in the field. During the period under consideration the high water mark of production was reached in 1899, when 27,594 ounces of gold were produced, valued at \$424,568. Since that time the yield has fallen off, the value of the output being \$99,885 in 1905, and \$59,274 in 1906. During 1907 there was some activity in the Manitou Lake area, more especially in connection with the Laurentian mine. Recent discoveries of gold in the Larder Lake and Abitibi Lake areas and other points in Northern Ontario have resulted in many locations being taken up and the formation of numerous companies; but as yet little actual development has been done.

The output of zinc ore is small and fluctuating, the largest output being for 1899, when it was produced to the value of \$24,000. In 1906 the yield was 400 tons, valued at \$6,000, and the product for the first nine months of 1907 was about the same.

Mica takes an important place among the non-metallie products. The value of the output in 1898 was only \$6,000. It had increase to \$102,205 in 1903, but dropped



the following year to \$37,847. The yield for 1906 was 355 tons, valued at \$69,041. The industry was active during 1907 until the financial depression affected it adversely.

Talc first appeared on the list of mineral products in 1899, when the output was valued at \$500. Its production has never attained large proportions, the highest figure being 1,235 tons, valued at \$3,030, in 1906.

The production of graphite reached its highest point in 1900, when the yield was valued at \$27,030. It had decreased to \$9,825 in 1905, but the output of the following year was 1,772 tons, valued at \$15,000.

Corundum was added to the list of mining products in 1900, with a yield valued at \$6,000. Since then the output has been steadily increasing, the returns for 1906 showing a production of 2,914 tons, worth \$262,448.

## COAL MINING IN CAPE BRETON DURING 1907.

(BY OUR OWN CORRESPONDENT.)

In looking over the coal production of Cape Breton for 1907, it is seen that outputs on the whole have been smaller than in 1906, and on the face of things it would appear as if little or no advance had been made. It would be very inaccurate, however, to imagine that any slackening of production is to be looked for in the future or that the industrial prosperity of Cape Breton has suffered any setback. The exact converse is the truth, for 1907 has been a year of steady development with normal outputs. The boom days are gone, we hope forever gone, together with the feverish uncertainty and abnormal inflation that characterise such periods.

Work throughout the year has proceeded very steadily and there has been no disturbing feature of any moment. The number of accidents during the twelve months have been in about the same ratio to tonnage as in previous years, and Cape Breton probably occupies the proud position of producing more tonnage per accident than any other coal mining district in the World. It is a matter for congratulation that no one accident involving the loss of more than three lives has occurred during the year.

The coal trade was greatly hampered in the spring by exceptional storms and by heavy fields of drift ice, along the shores of the Island, which persisted until the middle of the month of June. At least a fortnight of March was lost time by reason of snow storms, and on the 7th March Cape Breton was visited with a blizzard of a severity that will be long remembered. The weather conditions of the spring were chiefly responsible for the lower outputs in 1907.

The scarcity of labor was perhaps not so pronounced as in 1906 and 1905, but nevertheless at many of the mines men were scarce. There was no scarcity of general laborers or surfacemen, on the contrary in fact, but miners and under-ground workers generally, were in great demand, particularly at the smaller and remoter collieries on the western side of the Island. In common with the rest of the world Cape Breton suffered from a marked decrease in the productive force of labor, and at every colliery the tonnage produced per man employed was lower than in any previous year. This same phenomenon, for phenomenon it is, has been noticed and commented upon in the United States, in Great Britain, in Germany and in Belgium, and whatever the reason may be it is a fact that the miner of to-day is producing less coal than he has done previously. Although the output in Cape Breton during 1907 fell below that of 1906, the number of men employed was greater in 1907 than in the year preceding.

Taking the collieries from East to West in order, we come first of all to the Port Morien Basin mine, known for many years as the Gowrie mine. The old Gowrie and Blockhouse Company has been acquired by the

North Atlantic Collieries Company, a corporation in which Mr. Ochiltree MacDonald and Mr. F. B. Pearson are prominently interested. The mine is at present producing about 200 tons a day, and it is expected next summer to raise this to 500 tons. The new company is making numerous improvements in plant and general layout and are spending a large amount of money on developments. At present about 200 men are employed in all.

The Broughton Colliery site, which lies back of Port Morien and the areas of the Dominion Coal Company, is quite deserted. The Broughton enterprise was ill starred, like almost every purely English mining company that has been operated in Cape Breton. English capital might yield better returns to the investors in Canadian enterprises if their engineers would take a little native advice. However this may be, Broughton Colliery is not likely to figure as a producer yet awhile.

A good deal has appeared in the press lately about the Cumberland areas, which lie in close proximity to those of the Broughton people. It is stated that the Dominion Iron & Steel Company have obtained an option on them, and will straightway proceed to develop them on a royalty basis. These areas have been only slightly prospected and very little is really known about them. The Steel Company have several drills at work on the ground at the present time. The district is a more or less troubled one, lying as it does between two anticlines, and considerable prospecting will be needed before any large expenditure is justified, so that it is not probable that any immediate development is to be looked for. The Steel Company have spent a lot of money during 1907 on prospecting, having put down bores in several places at the head of Lingan Bay, and in the more or less unexplored territory between that place and Kilkenny Lake, outside the supposed outcrop of the Mullins Seam.

The Dominion Coal Company's mines have passed an uneventful year, work having proceeded very steadily without any particular interruptions. The outputs for the various mines comparing 1906 with 1907, were as follows:—

No.		1906.	1907.
1	Phalen....	528,160	498,948
"	2 Phalen..	609,140	638,579
"	3 Phalen..	365,236	348,383
"	4 Phalen....	545,003	520,254
"	5 Phalen..	587,824	635,903
"	6 Phalen....	113,467	204,616
"	7 Hub....	146,412	4,483
"	8 Harbor....	229,636	224,097
"	9 Harbor....	380,320	363,873
"	10 Emery..	47,818	100,617
Total....		3,552,746	3,539,753



The outputs of the Phalen seams are about the same with the exception of the new mine at Big Glace Bay, No. 6, whose output is steadily increasing. It is expected that in the summer of 1908 this mine will be producing 1,000 tons per day.

The Hub Colliery was pumped out early in November and is again producing coal. It will be remembered that this mine got on fire in December 1906, and in order to extinguish the fire it was necessary to let in the Atlantic Ocean. Most of the year has been occupied in pumping out the workings and replacing the surface erections which were wiped out by the fire. The work of pumping out was slow owing mostly to the virulent manner in which the Hub pit water attacks metals. Several peculiar phenomena were noticed in pumping out this mine. When the sea water was allowed to flow into the workings the Bay was full of "lolly" ice which flowed in with the water. At water level this formed a substance like coarse sea salt, which was left in the roadways as the water receded. In the broiling days of the summer it was strange to see this reminder of the drift ice of the spring. This frozen substance absorbed enormous quantities of the carbonic oxide, which was formed by the smothered fire, making the task of removing it somewhat disagreeable to the workmen. As soon as the mass was disturbed by the shovel the carbonic oxide diffused itself into the atmosphere, making the lamps to burn brightly and giving the men more or less headache.

The mines on the Harbor Seam kept about the same production as in the previous year.

The new longwall mine on the Emery Seam produced about 100,000 tons in the year. A good many hindrances have been met with in opening out this mine, due chiefly to the difficulty of obtaining miners accustomed to longwall workings. This difficulty is now almost overcome, and during 1908, No. 10 will probably produce 150,000 tons. The Emery Seam is a hard bright coal, very suitable for household or steam purpose and will be very popular some day.

The Coal Company's new mine at Victoria has two slopes, each down about 300 feet. The Victoria seam at this point is about 6 feet 3 inches thick with an excellent analysis. The dip is about 1 in 4, and the face of the deeps is about half a mile from the sea, having 60 feet of cover at the present face. In the system of working to be adopted, advantage is to be taken of the grade in handling the coal underground. The rooms will be opened out to the rise, the full tubs being let down to the level by means of a gravity balance, which will at the same time haul the empty tub to the coal face. Small gathering haulage engines will be placed at the ends of the levels to convey the coal to the main haulage ropes. A small temporary plant is now installed, with boarding houses, etc., and about 75 men are working at the site. The railway from Grand Lake where the No. 12 branch will join the main line of the Sydney & Louisburg Railway is being rapidly graded, and will be completed in 1908.

During the year the Dominion Coal Company have made a good many additions to their plant and equipment. At No. 2 Colliery the Compressor House was enlarged and in addition to the compressors, now contains three 600 KW. generators, driven by 700 H.P. horizontal steam engines. This plant is intended to supply electric power to all the Glace Bay district collieries for pumping, screening, etc. A general scheme of electric pumping and haulage is being installed at the collieries for which the power is to be supplied from the No. 2 Power House.

Two new locomotives and a steam shovel have been added to the railway equipment, and a wrecking plant for assisting distressed shipping is now installed in a special building at Glace Bay.

Many advances in the way of safety have been made. Safety lamps are now in use in all the mines, and naked lights have very wisely abandoned altogether. The use of ordinary and compressed powder has been discontinued in dusty mines, and a high explosive is now used. The system of independent shotfiring is altogether done away with, and shots are now lighted by a responsible official. Unexpected inspections of the miners' clothing are made, and several men found with matches in their possession have been detected and punished. It is not by chance or altogether by reason of naturally safe mines that Cape Breton has been spared a disaster like those that have wrought such havoc in the States. Safety is the outcome of eternal vigilance, in which particular the present management of the Dominion Coal Company are not lacking.

A Rescue Building equipped with twenty Draegar breathing apparatus has been erected during the year, and a trained expert is now stationed there whose occupation it will be to train corps of men in the use of these apparatus. Their nature and use have been explained in the columns of the JOURNAL. In view of the recent explosions in the States and the futile attempts at rescue work there, the initiative of the Coal Company has been very abundantly justified.

The Nova Scotia Steel & Coal Company, like the Dominion Coal Company have a lessened annual output, but they have also like their neighbors been prosecuting necessary development work. The new mine at Point Aconi has commenced operations, and the branch line 2 1-2 miles connecting the colliery with the main line is also completed. No. 2 Colliery at Lloyds Cove, which was abandoned in 1904, is now being pumped out, and will be ready to hoist some time next spring.

Both the Nova Scotia Steel Company and the Dominion Coal Company have during 1907 built a good many workmen's houses, and both companies are selling these houses to their workmen on an easy instalment plan, which is being quite largely taken advantage of, the rate of interest being only 6 per cent., and the lot sold at a nominal figure. The Nova Scotia Steel Company have also installed an electrically driven haulage at their No. 5 Colliery. Electric power and electrically driven machinery is steadily increasing in favor in Cape Breton.

The production of the Nova Scotia Steel Company's collieries during the year, was as follows:—

No. 1	.....	256,161
" 3	.....	296,466
" 4	.....	3,128
" 5	.....	82,310
Total tons	.....	638,065

The output of the Inverness Railway & Coal Company will be in the neighborhood of 250,000 tons, and will be about 40,000 tons in advance of 1906.

The trial of "Steel vs. Coal" which took place at Sydney before Judge Longley at midsummer, added a little to the gaiety of the Canadian nation. All the readers of the JOURNAL are of course familiar with the circumstances, and know all about Judge Longley's buttonhole, the pyrotechnic cross-examination of Sir Wm. Van Horne and Mr. F. P. Jones' two days on the witness stand; with Mr. Nesbitt's slightly theatrical eloquence and Mr. Lovett's monotonous, and at the same time, incisive logic. The course of the appeal trial at



Halifax, in December, brought out very little that was not said at the first trial. The decision of the full bench is expected about the middle of January, and until the case is finally disposed of, comment on the merits of the points under dispute would be superfluous and unwise.

No industrial disputes have occurred in Cape Breton during the last twelve months. The P. W. A. took the aggressive during the spring of the year, and refused to work with non-unionists. Their action resulted in several days of idleness, but the ultimate result was that most of the non-unionists joined the Association.

The three years' agreement between the P.W.A. and the Dominion Coal Company expired with 1907, and the men refused the Coal Company's proffer of a renewal of the contract upon the old term. They have made a demand on all the coal operators of Nova Scotia for a 15 per cent. increase on day labor, for a minimum fixed rate of \$2.44 for all miners out of places, employed temporarily at other work, and for higher wages to all night shift men. The Dominion Coal Company announced on December 5th, that they would put a new schedule of rates into effect in the 6th of January. This schedule raises the price of workmen's coal from 90 cents, inclusive of hauling, to \$1.50 for runmine and \$1.00 for slack, exclusive of hauling; makes a cut of 4 1-2 cents in the pillar rate, and a few minor changes in the cutting rates. The whole of the gain to the company under these changes is to be applied in increasing the wages of the day laborer and loader, or in other words, the amount of money disbursed on the Coal Company's payrolls is to be more fairly distributed amongst its employees at the mines. The P.W.A. have applied to the Minister of Labor for a Board of Conciliation and Investigation under the Lemieux Act, and have appointed their representative in Dr. Arthur Kendall, M.P. Further developments will be awaited with interest, but no one thinks that any serious trouble will arise.

To sum up, we think it is safe to prophesy that from now on the coal production of Cape Breton will very steadily increase. Many of the older mines are becoming less productive, but new developments are under way to take their place. While many portions of the Dominion are feeling the pinch of poverty and financial tightness, Cape Breton is a place where work is plentiful and prosperity apparent. The revenues of Cape Breton are not dependent on the vagaries of the weather, and although we are very far East here, Cape Breton in many respects offers inducements that the much advertised West does not, particularly to the working miner.

### THE TYRRELL PRIZE.

FOR THE BEST COLLECTION OF ONTARIO MINERALS.

We are authorized by Mr. J. B. Tyrrell, mining engineer, to state that in order to encourage investigation into the mineral resources of the Province of Ontario, he will give a prize of \$100.00 in cash to any Canadian, not in the employ of a public institution or mineral dealer, who will personally make the best collection of minerals in the Province of Ontario during the year 1908.

The collection must consist of thirty or more mineral species.

Each specimen must be labelled with the exact locality from which it was obtained and the date on which it was collected. No specimen will be considered unless it is so labelled.

As far as possible all minerals must be correctly named.

A typewritten list of the specimens, with names of minerals and localities, in triplicate, along with a declaration stating that they were personally collected by the signer in the Province of Ontario in 1908 at the locality stated, must be sent in with each collection.

Prof. T. L. Walker, of Toronto University and Prof. W. Nicol, of Queen's University have kindly consented to examine the collections and award the prize, and the collections must be sent to them at some place which they will designate later, on or before the 1st of December, 1908. After the prize is awarded the collections may again be obtained by the owners.

### ONTARIO'S ESTIMATED OUTPUT—1907.

T. W. GIBSON, Deputy Minister of Mines.

The mining industry in Ontario reached high-water mark in 1907. Of silver and nickel, the two chief metallic products, the output was large. The Province is now contributing to the world's store of silver a quantity surpassed by three States of the American Union only. For the twelve months just closed the production of silver in Ontario may safely be estimated at not less than 9,000,000 ounces, practically the whole output being from the mines of Cobalt. The rise of this camp has been rapid; in 1904, which was the first year of production, some 206,875 ounces only were obtained. The whole yield down to the end of 1907 may be placed at about 22,000 tons of ore, containing 17,100,000 ounces of silver.

The production of the Sudbury nickel fields was on a scale similar to that of last year, when there were raised 10,776 tons of nickel and 5,260 tons of copper. In nickel Ontario easily leads the world, her only competitor, New Caledonia, having been left behind some years ago.

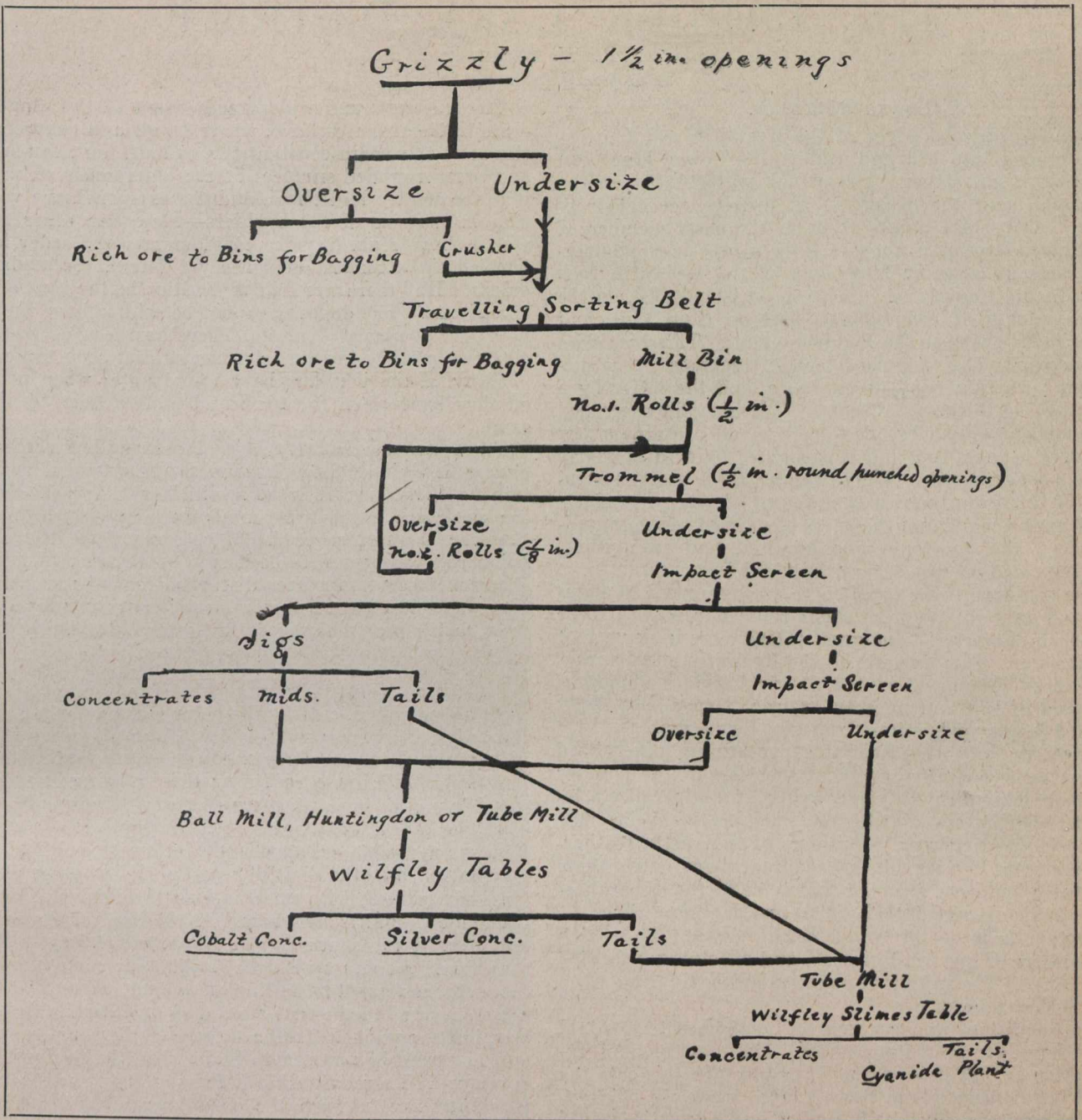
In iron ore the bulk of the tonnage still comes from the Helen mine, but the magnetite deposits of Moose Mountain, Bessemer, Atikokan, Wilbur and elsewhere are beginning to assume considerable importance. It is in every way likely that large shipments from all the points named will be made during 1908. The production of iron ore during the first nine months of 1907 was 141,719 tons. There are now seven iron furnaces in the Province, two having been added during the past year—one at Hamilton and one at Port Arthur.

There were important developments in the petroleum and natural gas fields of Ontario in 1907. The Tilbury East oil field is now producing nearly as much as Petrolea and Oil Springs, and the gas area of Tilbury and Romney is being steadily extended, especially towards the south. Other non-metallic products contribute to the general total, among them being salt, corundum, iron pyrites, feldspar and mica, most of which are produced chiefly in the eastern part of the Province.

The heavy fall in the prices of silver and copper will probably tend to keep down the production of these metals, especially the latter, in 1908. But despite temporary checks, the progress of mining in this Province, which has been most marked during the last few years, can hardly fail to continue at a similar, if not a greater rate.

Beginning January 1st, 1908, Mr. C. L. Rameau will be general manager of the West Canadian Collieries, Limited, with head office at Blairmore, Alberta. In future all communications should be addressed to Mr. Rameau.





**COBALT ORE TREATMENT.**

This flow sheet is gotten out to indicate the method which appears to the writer to be the most economical for handling the ores of Cobalt. In practice probably some of the mines would find it more advantageous to use several sets of jigs, in which case I would advocate single compartment jigs for No. 1, the tails being crushed in No. 2. Rolls and undersize from No. 1 trommel elevated back to the mill bin.

No. 1 tails and undersize from No. 1 impact screen through No. 2 rolls to No. 2 impact screen. Oversize to No. 2 jigs. Undersize either to table mill with tails or to No. 3 rolls—if a further set of jigs is found profitable. In such case No. 3 jigs would probably be of the four compartment type, giving separate concentrates of silver and cobalt. Mids to mill for tables and tails to tube mill for cyanide.

Such a system would have impact screens and jigs to handle products from 1-2 to 1-4, 1-4 to 1-8 and 1-8 to

1-16. The table mill should crush to 16 to 20 mesh, and the tube mill from 40 mesh up, the fineness being best determined after experiment with the ore handled. Tails would go to either tables or cyanide, depending on the cobalt and copper contents. Sliming the tails and using hot solutions and hot air agitation promotes the efficiency of the cyanide plant, and I believe that the multiplication of the jigs, which will decrease the capacity of the plant, will in most cases be unnecessary.

H. G. V. Adler.

Mr. W. A. Carlyle, of 62 London Wall, London, E.C., has been appointed consulting engineer to Le Roi Mining Company. Until last summer Mr. Carlyle was general manager of Rio Tinto Mining Company. Prior to this he was resident engineer at Rosslund of Le Roi mine. Mr. Carlyle is a graduate of McGill University.



## THE LARDER LAKE DISTRICT.\*

R. W. BROCK.

*(Continued from last issue).*

## LOWER HURONIAN.

On the upturned edges of the Keewatin and Laurentian, eroded into hill and valley, the Lower Huronian rocks were laid down. The actual contact between the Huronian and the Keewatin is usually concealed by drift. At certain points at least, the basal member of the Lower Huronian appears to be a breccia-conglomerate, carrying angular fragments of the Keewatin rock immediately underlying it, as seen on island CC<sup>3</sup>, on the small patches of conglomerate left on Gold Hill, and along the shore near the Reddick claims. This rock does not appear to have any considerable thickness. It is succeeded by a thin band of quartzite, and the latter by a considerable thickness of slate. This is again succeeded by quartzite, which becomes coarser and contains a few boulders near its top, and is succeeded by a thick coarse breccia-conglomerate. The thickness of the various members of this group varies at different places. The slates must have a maximum thickness of at least several hundred feet, the quartzites one hundred and twenty-five, and the conglomerate several hundred feet.

The boulders of the conglomerate are rounded to angular, and vary in size from small pebbles to masses 10 or 12 feet in diameter. The great majority are under a foot in diameter. They include all the Keewatin and Laurentian rocks recognized in the district, besides numerous boulders of red and of gray granite, jasper, and finely banded jasper-magnetite—Iron Ore formation.

Boulders of the Keewatin containing mineralized quartz veins cut off sharply at the edge of the boulder are not infrequent. These veins are mineralized by pyrite, galena, specularite, etc., just as the veins now found in the Keewatin. Boulders of the rusty weathering dolomite (?) with mineralized quartz are among these Keewatin boulders, showing that some of the mineralization of this district dates back to pre-Huronian times.

Certain beds of the conglomerate are apt to be rich in boulders of one kind of rock, and adjoining beds rich in another. The supply of boulders evidently came from alternating sources.

The conditions under which the conglomerate was laid down have not been deciphered. The most obvious explanation is that it is of glacial origin. In this case the basal conglomerate sometimes found, made up of fragments from the immediately underlying Keewatin, would represent uneroded and untransported remnants of the earlier Huronian beds, while the slates, quartzites, and upper conglomerate would represent more or less sorted glacial debris.

Some striated boulders of the conglomerate at Cobalt, found by A. P. Coleman,<sup>4</sup> have been taken by him as proof of the glacial origin of the Lower Huronian. The latter evidence, as pointed out by W. G. Miller, is not conclusive, as the rocks at Cobalt have been much disturbed, and some, if not all, of the striations to be seen on the boulders are to be accounted for by these movements, which have slickensided the boulders. Referring to the origin of the Cobalt conglomerate, Miller says:<sup>5</sup> "In the present state of our knowledge we have little warrant for claiming that the granite boulders, often two or three feet or more in diameter, and distant a couple of miles from exposures of the rock, indicate glacial conditions during Lower Huronian times, although we have no proof to the contrary."

The thickness and widespread extent of the conglomerate in Northern Ontario, where its general characteristics seem to remain constant throughout, the clean-swept and often rounded surfaces of the older rocks on which it is frequently laid down, and the extraordinary variation in the size of the boulders—these and other facts stated above regarding the conglomerate of Larder lake, furnish the strongest evidence yet found, for a glacial origin. But there are still difficulties in the way of its acceptance. The deposits cannot be said to have the appearance of glacial deposits. There has been no boulder clay recognized—the material has at least been re-sorted.

Many of the boulders have re-entrants; when polished they have often the form of boulders worn by river sand.

The Huronian is for the most part undisturbed and almost flat-lying. The slates might be expected to contain fossil remains, if animals with hard parts existed in the waters in which these muds were deposited. None, however, were discovered. Where examined, the Huronian rocks appeared to be barren of all trace of mineralization, except in places disturbed by later eruptions, where some quartz veins were occasionally developed. In the Cobalt district, however, the Lower Huronian is probably the chief mineral-bearing horizon.

## POST-LOWER HURONIAN.

At a few points, cutting the older rocks and the Lower Huronian, is an igneous rock which in places is a gabbro, in others a diabase. It is exposed on the north side of "A.A." island; on a reef near the east shore north of this island; on the east shore east of "R" island<sup>6</sup>; and at the head of Fitzpatrick's bay. In places it is a coarse feldspar-pyroxene or hornblende rock with red feldspar segregations like the diabase near Cobalt. At other places it is fine grained, with small lath-shaped feldspars and a pronounced ophitic structure. At the head of the southeast bay, at the south end of Fitzpatrick's bay, behind the cabin, its contact with the Lower Huronian conglomerate can be traced. The line of contact is irregular, the conglomerate is somewhat altered along it, while the diabase is finer grained, frozen tightly to the conglomerate, and in places becomes more basic with biotite distinctly developed. Its relationship here suggests a sheet of diabase intrusive between the conglomerate and the Keewatin. In other places it probably breaks up through the Huronian. On the little reef near the east shore north of Island "A.A." the diabase contains a segregation of epidote with a little quartz, calcite and copper pyrites.

Cutting the Keewatin and porphyry are dikes of basic rock, in which biotite, chlorite and hornblende are now prominent. It has little aplite stringers through it, which, however, may be segregations from its own magma.

Later than these dikes and cutting the Keewatin and Huronian, are dikes of a basic rock which probably represents a biotite-lamprophyre. The basic edge of the diabase resembles them somewhat, and they might possibly be intrusions of the diabase magma.

A line of disturbance of some kind extends northward from Larder City. The strike of the rock differs on either side of this line, and the conglomerate at Larder City, which contains similar boulders to the ordinary Huronian conglomerate is squeezed almost to a schist. The boulders are drawn out and flattened. The dikes

\*Sixteenth Annual Report of the Ontario Bureau of Mines.



which cut it also show signs of pressure. This probably is a fault line, but as most of the ground about here is drift-covered and muskeg, the exact cause of this disturbance was not ascertained.

#### GLACIAL.

The exposed rock surfaces are usually rounded, polished, fluted and striated, furnishing evidence of extensive glaciation. Glacial erratics, some very large, are scattered round. The direction of ice movement as recorded by striations averages about 169 degrees astronomic. The local variations from this are very slight. The erratic boulders are much more numerous in hollows and protected places, while those still left on the rock surfaces are generally large, suggesting that these surfaces have since been wave swept. Further evidence of this is afforded by the deposits of sand and gravel which cover large areas, and by deposits of Saugeen clay—a well stratified



Quartz vein (white) in Keewatin greenstone. The quartz contains a little scattered chalcocopyrite, galena, specularite, etc.

interbanded sand and clay in one-half inch to one inch bands.

The glaciation has cut away the weathered and rotted rock surfaces and scoured the pre-glacial valleys, sweeping away any of the old sands and gravels.

Boulder clay has for the most part been removed by the later water action, but at one or two protected points a little was believed to occur.

#### ORES.

In the limited time spent in the field only some of the claims could be visited. The claims which were considered locally to give the most promise, and to be typical of the camp were, however, seen. Most of the "showings" occurring in the band of rusty weather "dolomite," (?)

where seamed with quartz stringers, which is often the case near pegmatite or porphyry dikes, or in the Keewatin greenstone were mineralized with quartz near similar dikes. There are some well defined veins carrying a little pyrite or chalcocopyrite, a few specks of galena, and perhaps zinc blende, and in places a good deal of specularite. Sometimes the latter is in rosetted form. Some of the quartz veins are several feet wide, swelling out in places to large masses 10 or 12 feet in diameter. The quartz veins seen by the writer looked very lean; and where sampled ran nothing but a trace, except in picked specimens rich in sulphides, which might go a few dollars per ton in gold and silver. Mr. N. L. Bowen, who is continuing the geological mapping, reports, however, that since the writer's departure a well defined quartz vein has been found on one of the claims of the Chester-ville group, which furnishes good specimens of free gold.

On the Gold Hill claim, which has yielded some fine specimens showing free gold, the country rock is diorite (field name) cut by pegmatite. Stringers of quartz, with some feldspar, from six inches down, in width, traverse the greenstone in the neighborhood. The quartz is rather watery in appearance and holds a little copper pyrite, specularite and silicified inclusions of the country rock. A little pyrite is developed in the country rock near by, but very little in the quartz itself. Free gold occurs in places in the quartz, in the silicified inclusions of country rock and in the country rock near the stringers of quartz.

The claims on the silicified band of rusty weathering "dolomite" (?) that show values, have much the same characteristics. The "dolomite" (?) with its peculiar green serpentine mineral developed in bands, is seamed with reticulating quartz stringers from a few inches in width to microscopical dimensions. Some carbonate is often interbedded in the quartz or forms parallel bands with it. The country rock between stringers is frequently silicified to a quartzite-like material. The quartz contains a little pyrite and chalcocopyrite, a few specks of galena and perhaps a little specularite. The quartz stringers are sometimes predominantly parallel to the strike, sometimes predominantly across it, and sometimes quite irregularly distributed. While somewhat rusted on the surface, the oxidation does not usually extend an inch in depth, where the clear unoxidized quartz is encountered. It is sometimes milky white and sometimes somewhat rosy and watery. Through it in places is sprinkled free gold, usually in fine particles, but sometimes in grains the size of a pea or in little plate-like masses.

At the bottom of the two pits on the Knott claim of the Reddick group, about 14 feet below the surface, the gold seems to be as abundant in the fresh quartz in the bottom as near or on the surface. The gold has a fine color and is evidently of a high degree of purity. On the Harris-Maxwell claim a small branching dike of black trap-like material cuts the quartz. The gold occurs in the quartz particularly round galena and near the little black dike. It is also found near the quartz stringers in the silicified country rock.

On the Reddick claim two sets of quartz stringers occur, running for the most part across the strike. The older set dips about 60 degrees east, and consists of a blue watery barren quartz. The others, which have a vertical or slightly westward dip, are of white milky quartz, which carries some free gold. They are later than and cut the former set of stringers. These stringers end rather abruptly at the edge of this band against a soft grayish schist. The width of the band of silicified and



veined dolomitic rock is not easily determined, as edges are rarely exposed. On the Knott claim at least 100 feet in width is exposed, all veined in much the same way, and, it is claimed, showing gold values for the whole distance. On the Harris-Maxwell the width exposed is still greater, and gold may be obtained at points scattered over this whole exposure.



Gold-bearing quartz stringers in serpentinized and silicified dolomite (?).

A shipment from the Harris-Maxwell of 1,500 pounds was sent during the winter to the mill at the School of Mining, Kingston. It returned \$13.20 per ton. The hole from which this rock was said to have been taken was 6 or 8 feet across. It is claimed that the greenish silicified rock between the quartz stringers gave assay returns of \$8 per ton.

#### POSSIBILITIES.

Very little development work has been done, the two fourteen foot holes in the Knott claim representing the most extensive development in the camp. It has not yet been proved what "run of mine" might be expected from any place. Some of the stringers are quite rich, but they seem to be too small and irregular to be mined by themselves, and it would appear that the whole rock would have to be taken. Over what area such material could profitably be mined and what it would run, can only be satisfactorily determined by mill tests. Several of the companies have ordered small stamp mills, and parts of some of them reached the camp before the spring break-up. Since then it has been impossible to get the complete plants in or to send out trial shipments, so that no such tests have yet been possible. One small mill on the lake, run on the custom basis, could probably furnish all the companies the information necessary regarding what might be pay ground, the probably values to be expected, and whether it is desirable to erect a mill on their own properties.

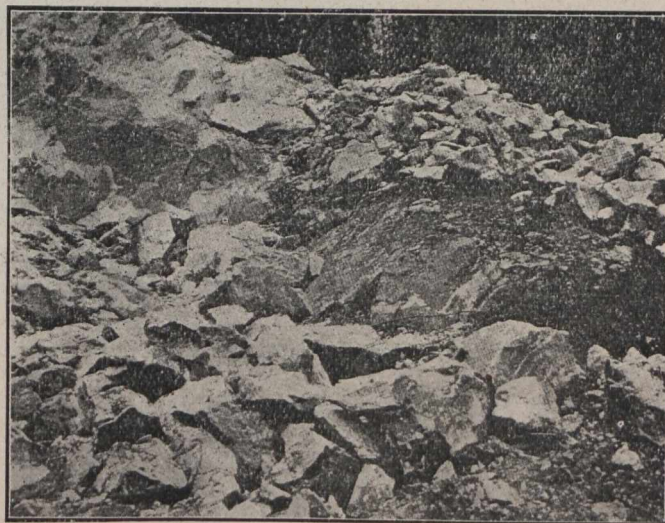
In many places this band of "dolomite" (?) rock contains very few quartz stringers, and often even when well-cut up by them and otherwise apparently quite promising, samples fairly taken will not yield values sufficiently high to warrant further attention. This rock, however, forms a long continuous band, a little north of the lake, and is exposed at several other places, so that there is a considerable area over which values might be found. On a few claims very fine samples of free gold, nicely disseminated through a considerable

extent of rock, have been found. Further prospecting may increase the number of gold "showings." From the character of the quartz and gold, fourteen feet below the surface, it looks as if gold might continue to exist in a free state for some depth. Though the stringers with gold are small and irregular, and therefore make a rich workable ore uncertain, there seems to be a reasonable chance that at some points by mining the whole rock, a large tonnage of low grade ore may be developed, with perhaps occasional rich bunches. If further work and mill tests prove this to be the case, a few dollars per ton is easily won gold (as the gold here so far seems to be), would constitute good pay ore. With a sufficient tonnage and perfect transportation facilities even three dollars per ton might be made to pay. There are some claims, therefore, that are worth exploitation along these lines.

As might be expected from the number of "snow-stakings," the majority of the claims have little present or prospective value.

The gold occurrence bears some resemblance to the Lake of the Woods and Rainy River, but here the stringers are for the most part independent of the schistosity, while in Northwest Ontario, the quartz lay between the bands of rock.

It will be noticed that the "showings" so far discovered are all in the Keewatin rocks, and that the main mineralization has been accomplished in pre-Huronian times. The undisturbed Lower Huronian is here, so far as could be seen, absolutely barren. Its only chance would seem to be for an old Huronian placer deposit in the conglomerate, which the mineralized fragments of Keewatin in the conglomerate might seem to suggest as possible. The fact that waste by erosion exceeded atmospheric weathering prior to the deposition of the Huronian, lessens the possibility of such concentration, and the uncertainty regarding the origin of the conglomerate makes it impossible to give a definite answer to the question.



Open cut on the Harris-Maxwell, from which a shipment of 1,500 lbs. was made to the School of Mining mill at Kingston, which yielded returns of \$13.20 per ton.

Where the Lower Huronian is disturbed by faulting and large intrusions of the later diabase, it might be mineralized. These are the conditions at Cobalt. The intrusions seen at Larder lake are small and the effects extremely local, but a small amount of mineralization has resulted. It is interesting to find cobalt bloom in a



calcite stringer on one of the Chesterville claims at the head of the northeast arm. On Wendigo lake, to the south of Larder lake, cobalt has also been found.

There is very little possibility of modern placers being encountered. The loose material and rotted rock surfaces have been removed by the heavy glaciation and scattered somewhere south. Since glacial times very little weathering and consequently very little concentration of gold in sands and gravels has taken place.

North of Larder lake to Abitibi, the geological conditions appear to be much the same. Gold has been found at Abitibi, and at points between these two lakes, so that a very large extent of territory exists in which to prospect for gold, with fair chance for success.

#### REFERENCES.

<sup>3</sup> See map of Larder lake.

<sup>4</sup> 19th Annual Meeting, Geological Society of America, New York, Dec., 1906.

<sup>5</sup> Rep. Bur. Min., 1905, Part II. See also Canada Mining Journal, No. 1, Vol. I.

<sup>6</sup> See map.

### A FILTER TUBE.

In a former paper on "A New Filter" "Journal American Chemical Society," Vol. xxvii., p. 287, and "The Chemical Engineer," Vol. ii., p. 39, the writer described an ash-free pulp filter made by acting on unwashed Swedish filter paper, in a ceresin vessel, with hydrochloric acid of 1.18 sp. gr., to which has been added a little hydrofluoric acid. The resulting pulp is stirred up with distilled water and is deposited under suction on filter-felt in a special filter tube. The filter is effective and rapid for most filtrations, and especially so in the case of barium sulphate, which is perfectly retained without a trace passing through, if the filter is well rammed down with the stamper shown in the sketch.

This method of filtration is very useful for the filtration of sulphides and other precipitates which are readily oxidizable and which should be filtered and washed with exclusion of air.

For large precipitates of iron and alumina the ordinary method of filtration is preferable.

The filter tube in present use is perhaps enough of an improvement on the form previously described to warrant this note. It consists of an ordinary carbon tube, one inch in internal diameter, provided with a device for supporting the filter and for pushing it out of the tube. This device is a glass tube passing through the stem of the filter tube and provided with a flattened and perforated bulb at the end as shown in the sketch. On this is a close fitting disc of piano or filtering felt on which the paper pulp is deposited. After filtering, the felt and pulp filter are pushed out of the tube and the filter is picked off with a brass forceps. If the tube is fairly uniform in diameter, and the end is neither flared or drawn in by heating in the flame, no precipitate will adhere to the sides. These tubes were made for me by Eimer & Amend of New York.

In many cases where rubber is not objectionable a home-made device is equally effective. The filter support is made of sheet rubber about 3-8 inch thick. Five small holes are made through it by use of a cork-borer. Another small hole is made in the centre in which is tightly fitted a glass rod small enough to pass through the stem of the filter tube and long enough to push out the filter.

For carbon filtration the tube is 3-4 inch in diameter and glass wool is used in place of the piano-felt, on which the finely divided, well ignited asbestos is deposited.

Perforated platinum and porcelain discs have been tried with no advantage over the device above described. In some cases it is preferable to use a disc of washed filter paper in place of the piano-felt, but filtration is slower.

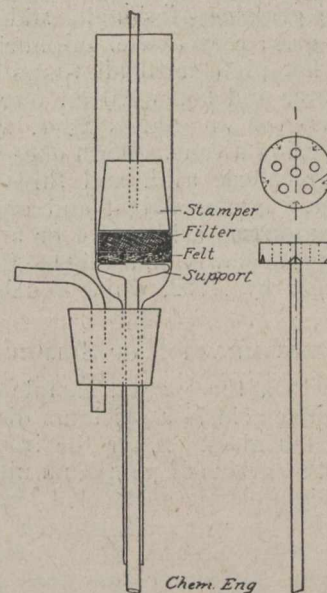


Diagram of Filter Tube.

Some of the advantages of this method of filtration, now in successful use in my laboratory for three years, are:—

First—Effective retention of fine precipitates like barium sulphate.

Second—Rapid filtration.

Third—Negligible ash.

Fourth—Filtration and washing with exclusion of air.

Fifth—More thorough washing, with less wash water, than by the ordinary method.

For further details the reader is referred to the former paper noted above.—*The Chemical Engineer*.

### MINING IN NEW MEXICO.

From figures recently published it is ascertained that New Mexico had, during 1906, 71 producing mines. The deep mines number 52, and placers 19. The total value of metals produced in 1906 was \$3,203,730. Of this gold to the amount of 14,174 fine ounces (\$293,019), and silver 491,127 fine ounces (\$329,055) were recorded.

The average value per ton of ore handled in 1906 was \$15.42, as compared with \$16.21 in 1905 and \$18.19 in 1904. The average value per ton in gold and silver for the silicious ores handled in 1906 was \$16.69, as compared with \$11.18 in 1905.

For the total tonnage of ore treated or sold from lode mines the following averages are given: 207,691 tons were treated. The average gold and silver recovered per tons was \$2.99. This was divided as follows:

Silicious ore, average recovery, gold and silver...	\$16.69
Copper ore, average recovery, gold and silver....	2.41
Lead ore, average recovery gold and silver.....	2.44
Zinc ore, average recovery gold and silver .....	0.05



## STANDARD METHODS FOR THE ANALYSIS OF IRON—AMERICAN FOUNDRYMEN'S ASSOCIATION.]

H. E. DILLER, Secretary.

### DETERMINATION OF SILICON.

"Weigh one gramme of sample, add 30 c. c. nitric acid (1.13 sp. gr.); then 5 c. c. sulphuric acid (conc.). Evaporate on hot plate until all fumes are driven off. Take up in water and boil until all ferrous sulphate is dissolved. Filter on an ashless filter, with or without suction pump, using a cone. Wash once with hot water, once with hydrochloric acid, and three or four times with hot water. Ignite, weigh, and evaporate with a few drops of sulphuric acid and 4 or 5 c. c. of hydrofluoric acid. Ignite slowly and weigh. Multiply the difference in weight by .4702, which equals the per cent. of silicon."

### DETERMINATION OF SULPHUR.

Dissolve slowly a three gram sample of drillings in concentrated nitric acid in a platinum dish covered with an inverted watch glass. After the iron is completely dissolved, add two grams of potassium nitrate, evaporate to dryness and ignite over an alcohol lamp at red heat. Add 50 c. c. of a one per cent. solution of sodium carbonate, boil for a few minutes, filter, using a little paper pulp in the filter if desired, and wash with a hot one per cent. sodium carbonate solution. Acidify the filtrate with hydrochloric acid, evaporate to dryness, take up with fifty c. c. of water and two c. c. of concentrated hydrochloric acid, filter, wash and after diluting the filtrate to about 100 c. c. boil and precipitate with barium chloride. Filter, wash well with hot water, ignite and weigh as barium sulphate, which contains 13.733 per cent. of sulphur.

### DETERMINATION OF PHOSPHOROUS.

Dissolve two grams sample in fifty c. c. nitric acid (sp. gr. 1.13), add 10 c. c. hydrochloric acid and evaporate to dryness. In case the sample contains a fairly high percentage of phosphorous it is better to use half the above quantities. Bake until free from acid, redissolving in twenty-five to thirty c. c. of concentrated hydrochloric acid, dilute to about sixty c. c., filter and wash.

To make the molybdate solution add one hundred grams molybdic acid to 250 c. c. water, and to this add 150 c. c. ammonia, then stir until all is dissolved and add 65 c. c. nitric acid (1.42 sp. gr.). Make another solution by adding 400 c. c. concentrated nitric acid to 1,100 c. c. water, and when the solutions are cool, pour the first slowly into the second with constant stirring and add a couple of drops of ammonium phosphate.

### DETERMINATION OF MANGANESE.

Dissolve one and one-tenth grains of drillings in twenty-five c. c. nitric acid (1.13 sp. gr.), filter into an Erlenmeyer flask and wash with thirty c. c. of the same acid. Then cool and add about one-half gram of bismuthate until a permanent pink color forms. Heat until the color has disappeared, with or without the precipitation of manganese dioxide, and then add either sulphurous acid or a solution of ferrous sulphate until the solution is clear. Heat until all nitrous oxide fumes have been driven off, cool to about 15 degrees C.; add an excess of sodium bismuthate—about one gram—and agitate for two or three minutes. Add fifty c. c. water con-

taining thirty c. c. nitric acid to the liter, filter on an asbestos filter into an Erlenmeyer flask, and wash with fifty to one hundred c. c. of the nitric acid solution. Run in an excess of ferrous sulphate and titrate back with potassium permanganate solution of equal strength. Each c. c. of No-10 ferrous sulphate used is equal to 0.10 per cent. of manganese.

### DETERMINATION OF TOTAL CARBON.

This determination requires considerable apparatus; so in view of putting as many obstacles out of the way of its general adoption in case of dispute your committee has left optional several points which were left to bring no chance of error into the method.

The train shall consist of a pre-heating furnace, containing copper oxide (Option No. 1) followed by caustic potash (1.20 sp. gr.), then calcium chloride, following which shall be the combustion furnace in which either a porcelain or platinum tube may be used (Option No. 2). The tube shall contain four or five inches of copper oxide between plugs of platinum gauze, the plug to the rear of the tube to be at about the point where the tube extends from the furnace. A roll of silver foil about two inches long shall be placed in the tube after the last plug of platinum gauze. The train after the combustion tube shall be anhydrous cupric sulphate, anhydrous cuprous chloride, calcium chloride, and the absorption bulb of potassium hydrate (sp. gr. 1.27) with prolong filled with calcium chloride. A calcium chloride tube attached to the aspirator bottle shall be connected to the prolong.

In this method a single potash bulb shall be used. A second bulb as sometimes used for a counterpoise, being more liable to introduce error than correct error in weight of the bulb in use, due to change of temperature or moisture of the atmosphere.

The operation shall be as follows: To one gram of well mixed drillings add 100 c. c. of potassium copper chloride solution and 7.5 c. c. of hydrochloric acid (conc.). As soon as dissolved as shown by the disappearance of all copper, filter on previously washed and ignited asbestos. Wash thoroughly the beaker in which the solution was made with 20 c. c. of dilute hydrochloric acid (1.1), pour this on the filter and wash the carbon out of the beaker by means of a wash bottle containing dilute hydrochloric acid (1.1) and then wash with warm water until the acid is washed out of the filter. Dry the carbon at a temperature between 95 and 100 degrees C.

Before using the apparatus a blank shall be run and if the bulb does not gain in weight more than 0.5 milligram, put the dried filler into the ignition tube and heat the preheating furnace and the part of the combustion furnace containing the copper oxide. After this is heated start the aspiration of oxygen or air at the rate of three bubbles per second, to show in the potash bulb. Continue slowly heating the combustion tube by turning on two burners at a time, and continue the combustion for thirty minutes if air is used; twenty minutes if oxygen is used. (The Shimer crucible is to be heated with a blast lamp for the same length of time.)

When the ignition is finished turn off the gas supply gradually so as to allow the combustion tube to cool off slowly and then shut off the oxygen supply and aspirate with air for ten minutes. Detach the potash bulb and prolong, close the ends with rubber caps and allow it to stand for five minutes, then weigh. The increase in weight multiplied by 0.27273 equals the percentage of carbon.



The potassium copper chloride shall be made by dissolving one pound of the salt in one liter of water and filtering through an asbestos filter.

Option No. 1.—While a pre-heater is greatly to be desired, as only a small percentage of laboratories at present use them, it was decided not to make the use of one essential to this method; subtraction of the weight of the blank to a great extent eliminating any error which might arise from not using a pre-heater.

Option No. 2.—The Shimer and similar crucibles are largely used as combustion furnaces and for this reason it was decided to make optional the use of either the tube furnace or one of the standard crucibles. In case the crucible is used it shall be followed by a copper tube ends cooled by water jackets. In the centre of the tube 3-16 inch inside diameter and ten inches long, with its shall be placed a disc of platinum gauze, and for three

or four inches in the side towards the crucible shall be silver foil, and for the same distance on the other side shall be copper oxide. The ends shall be plugged with glass wool, and the tube heated with a fish tail burner before the aspiration of air is started.

Evaporate to about twenty-five c. c., add twenty c. c. concentrated nitric acid, evaporate until a film begins to form, add thirty c. c. of nitric acid (sp. gr. 1.20) and again evaporate until a film begins to form. Dilute to about 150 c. c. with hot water and allow it to cool. When the solution is between 70 degrees and 80 degrees C. add fifty c. c. of molybdate solution. Agitate the solution a few minutes, then filter on a tared Gooch crucible having a paper disc at the bottom. Wash three times with a three per cent. nitrate acid solution and twice with alcohol. Dry at 100 degrees to 105 degrees C. to constant weight. The weight multiplied by 0.0163 equals the per cent. of phosphorous in a one gram sample.

## Briquetting of Fuels in British Columbia—Description of Pacific Coal Company's Plant at Bankhead, Alberta.

By G. J. MASHEK.

(Written for the "Canadian Mining Journal.")

The briquetting of coal dust and refuse from coal mines and breakers has not made much progress in North America, especially Canada, the reason being that very good quality of natural coal is still obtainable on the North American continent at a reasonable price, and also owing to the fact, that most of the briquetting experiments in years gone by have been done with European machinery, which has reached such a state of perfection in Europe that the briquetting of European coals has been a successful commercial undertaking.

Many attempts have been made to briquette American coals with European machinery, but in all cases it has been a failure, principally owing to the fact, that this machinery has a small output; its first cost is high, and it requires a large amount of labor to operate it. Briquetting machinery to fill the requirements in this country must be practically automatic and must make a better and a more suitable size briquette than it is possible to produce with almost any European machinery. Its cost of operation and up-keep must also be low, and it must produce briquettes of suitable size. This is principally owing to the fact that briquettes in this country must compete against better natural coal than in Europe.

Briquetting of the breaker refuse and dust is only advisable on coals that are non-coking or have very slight coking qualities. Dust from coking coals can always be turned into coke at a lower cost than into briquettes.

With the increasing cost of production of prepared coal due to increasing wages, transportation and handling, and increasing population, the time when briquetting refuse coal mines in North America, especially in certain portions of British America, is a profitable undertaking has arrived.

The following is a description of a double unit briquetting plant put in by the Pacific Coal Company, at Bankhead, Alberta, to briquette the fines of Western anthracite coal, of which there are large deposits in the neighborhood of Bankhead. This coal is a free burning, fairly hard coal; but quite friable. In putting it through the breaker and preparing it for the market there is pro-

duced as much as 30 per cent. of fines below pea size, which was practically unmarketable, especially in view of the long railroad hauls to point of consumption. It was for this reason that a briquetting plant was installed after a long investigation into the subject by the officers and engineers of the company, both here and in Europe.

Figure 1, shows a general outline plan of the briquetting plant together with its location in regard to the breaker. This breaker was installed and operated some time before the briquetting plant was built. Description of the general operation of the plant is as follows:—

The coal from the mines is elevated to the top of the breaker, where it is cracked and screened with the sizes distributed to the proper bins. The dust falls into bins, beneath which is placed the dust scraper conveyor as shown. This conveys the dust from the breaker travelling over the trestle to the dust bin of the briquetting plant.

In the bottom of the briquette plant dust bin there are two drag conveyors which feed out the dust to two 36 x 16 crushing rolls. After a thorough examination and tests have been made of the character of this coal, standard mineral crushing rolls were decided to be the best pulverizers or crushers. While a large portion of the dust brought from the breaker will pass through fine enough mesh of screen for briquetting purposes there still will be pieces of coal probably running up to 1-2 inch size which have to be pulverized in order to avoid their being crushed in the briquetting press and producing defective briquettes.

In briquetting any fuel it is essential that the material be reduced to the proper and uniform mesh in order to make a hard briquette. Some coals can be briquetted considerably coarser than others. The best results obtained with this particular coal is, that all of it should pass through a 12 mesh screen.

The drag conveyor referred to above is operated by means of a variable speed counter-shaft so that the feed can be easily regulated. From the crushing rolls the







material drops to an elevator which elevates it to mixer No. 1 standing 10 feet above the ground.

This plant is a double unit plant run by two separate engines using only one hot melted pitch tank for feeding the mixers. There are six mixers to each unit. They are all practically alike with the exception of a slight difference in pitch and shape of the blades in the different mixers. These mixers were first designed to use fuel oil for heating, allowing the products of combustion to pass through the coal; but it was found, before this plant was contracted for, that the cost of fuel oil would be about 14 cents per gallon in Alberta. Therefore a coal burning furnace was installed instead.

Mixer No. 3 is shown in Fig. 2. With some change in the style and shape of the hardened steel blades, the other mixers are similar to this.

The pitch is delivered to this mixer by means of an atomizer as shown in Fig. 3. The object is to atomize the pitch into a vapour as it were, and have this vapour pass through the suspended material as it is kicked up by the mixer shaft with its blades, thereby coating each particle of the coal evenly.

If this theory had been correct there would have been no need of any additional mixers, as the coal would certainly then be in proper condition for briquetting. Early experiment with this apparatus brought out the fact that additional mixers are required after the pitch is introduced in order to make a thorough mixture, and one after another was added, until six mixers were placed in series. It was found advisable in plants erected in the United States to put in a type of pug mill blades in mixer No. 5, so as to break and spread out the balls formed by the pitch rolling in the dust.

Mixer No. 6 is only used for cooling the mixture, as it would be too hot to put in the briquetting press and make hard briquettes. In this mixer it is advisable to introduce a little hot water as the briquettes are in better shape when the mixture is slightly damp.

In order to make a good hard briquette of any coal it is absolutely necessary that the surface of the particles of coal dust be dry so as to allow the pitch to properly adhere to it. It may appear, if pitch is introduced into wet coal dust, that there is an adhesion, but it is so small that it makes briquettes weak and liable to disintegration in handling and during combustion, owing to steam being generated in the briquette.

It has been found by experience that if there are a sufficient number of mixers and the material is brought up to the proper temperature it is immaterial whether the pitch is atomized or just pumped in straight through a distributing pipe. In fact, in a plant running at a rate of about 12 tons per hour, the stream of steam from the atomizer enters the mixer with such force and in such

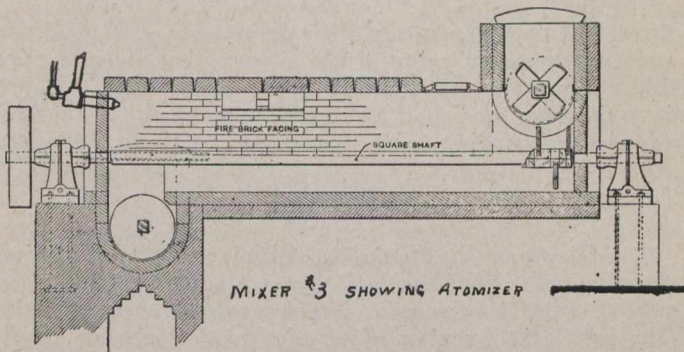


FIGURE 2.

It might be further said that these mixers are similar to concrete mixers. They are run at such a speed as to practically keep all the coal in suspension above the centre of the shaft of the mixer, and by passing the products of combustion directly in through the coal dust, the most efficient arrangements of imparting heat to coal are obtained. On account of the low specific heat of coal this step is necessary.

Mixers Nos. 1, 2 and 3, are used principally for drying and heating the dust, which must be brought up to a temperature of about 300 degrees F. At the lower end of mixer No. 3, the pitch is introduced. A section of

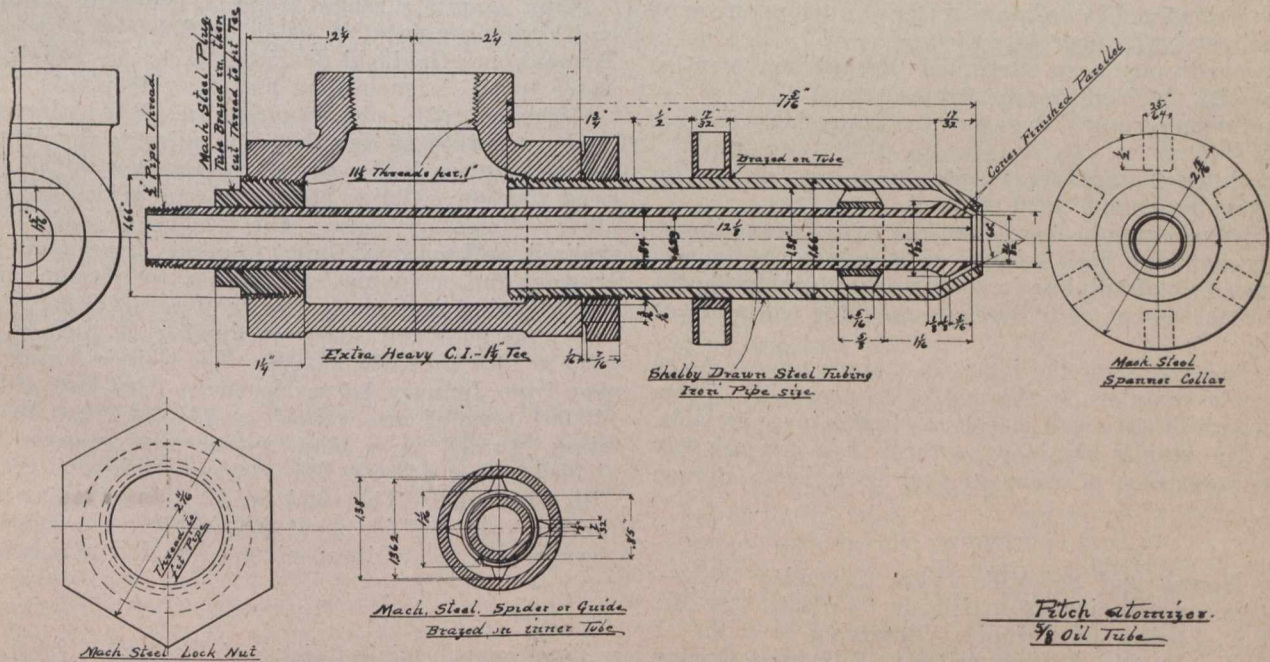


FIGURE 3.



volume that it has a tendency to blow back the coal dust and pile it up in a solid mass in the chamber, the mixer blades screwing it forward to the following one so that the need of atomizing in that case is entirely eliminated.

From No. 6 mixer the material drops into a continuous bucket elevator and is elevated to the top of the press hopper. This hopper has a capacity of about a half ton

of mixture, and the material rests directly on the press rolls. The press is a modification of the Belgian type with the exception that it is made considerably stronger. All parts under strain are of steel. The gearing is made of cast steel with manganese bronze pinions, all having cut teeth.

(To be continued)

## EXCHANGES.

*Economic Geology*, October-November, 1907.—An article of great interest in this number of *Economic Geology* is "The Weathering of Coal," by S. W. Parr and N. D. Hamilton. The writers conducted a series of experiments on small lots of nut, slack, broken lump and washed pea coal. The quantities used ranged from 10 to 20 pounds. It is pointed out that in storage plants with capacities of, say, 50,000 tons, deterioration of one per cent. means a loss of 500 tons. Also it is noted that deterioration would naturally occur at a higher rate in the small experimental lots than in commercial storage quantities.

The first series of tests was made as soon as possible after the mining of the coal. Here the writers lay great stress upon the prompt examination of samples to determine and record initial conditions.

The coal used was of small lump or nut size. Samples of one hundred pounds were subdivided in order to subject the same kind of coal to various conditions, as follows:—

(a) Outdoor exposure.

(b) Exposure to a dry atmosphere at a somewhat elevated temperature, ranging between 85 degrees and 120 degrees Fahr.

(c) Under the same conditions as (b), but to be drenched with water two or three times per week.

(d) Submerged in ordinary water at a temperature of approximately 70 degrees.

The conditions were continued through ten months. The results obtained are summarized thus:—

(a) Submerged coal does not lose appreciably in heat value.

(b) Outdoor exposure results in a loss of heating value varying from 2 to 10 per cent.

(c) Dry storage has no advantage over storage in the open except with high sulphur coals, where the disintegrating effect of sulphur in the process of oxidation facilitates the escape of hydrocarbons or the oxidation of the same.

(d) In most cases the losses in storage appear to be practically complete at the end of five months. From the seventh to the ninth month the loss is inappreciable.

(e) The results obtained conform in a general way to the experience of users of coal from large storage heaps.

The *Mining and Scientific Press*, December 28th.—This number contains an article on "Cobalt," by Mr. Frank C. Loring, of Toronto. Referring to value of shipments, etc., Mr. Loring writes as follows: "During 1907, up to October 1st, 10,300 tons of ore have been sold, for which possibly \$6,000,000 has been received, almost entirely for silver. The district is now shipping approximately 1,000,000 ounces silver per month, as well as large quantities of cobalt, for which little is paid . . . Transportation and treatment charges are

from \$15 to \$25 per ton, with deductions of 6 to 7 per cent. of the assay value of the silver. One smelter pays \$20 per ton for ore carrying 8 per cent. cobalt. If ore is sold solely for cobalt 35 to 50 cents is paid per pound of cobalt, according to the percentage, with no allowance for silver."

The *Engineering Magazine*, January, 1908.—"Mining Developments in Nevada," by A. Selwyn Brown, appears in the *Engineering Magazine* for January, 1908. The article is a review of physical, not financial, conditions in Nevada mining regions up to the end of the year 1907. Up until 1900 Nevada had been looked upon as purely a silver producing State. The flooding of the Comstock mines in the early eighties and the closing of other silver mines had sadly depressed the whole industry. The Tonopah gold mine, discovered in 1900 in a remote corner of Southeastern Nevada, was purchased in 1902 by Philadelphia capitalists. Throughout the period 1904-7 a steady rush of prospectors set in. In 1905 Goldfield, Bullfrog and Manhattan camps were the centres of investment and financial activity. The present stringency has disorganized the district badly. Mr. Selwyn Brown, however, does not view the situation uncheerfully.

Many mountain ranges trending generally southwest, and having an elevation of about 500 feet, traverse the Tonopah and Goldfield districts. Artesian wells supply water to the large milling and cyanide plants.

Geographically, volcanic action has played a large part in the structure of Nevada. The volcanic rhyolites, andesites and porphyries are most important to the miner. Lead and copper lodes, however, occur in limestones and other sedimentary rocks. The whole of Nevada is mineralized, and many different minerals are mined. Government and companies' returns do not correspond, but the following total is the result of careful compilation. The total gold and silver production of Nevada from 1850 to 1907 is \$1,033,350,000. The Goldfield mines this year from January 1st to November 23rd have shipped 112,081 tons of ore, valued at \$11,208,100. Tonopah mines, worked in a more conservative manner, have yielded about \$10,000,000. Other fields are credited with \$4,000,000. The total for Nevada silver and gold for the year will be about \$26,700,000. In nearly all Nevada ores the ratio of silver to gold is about two to one.

### TONOPAH.

The Tonopah mining district is comprised in an area of about seven miles square; the whole of which is mineralized. It is probable that future work will show that the vein systems successfully worked on Lone Mountain, 17 miles west of Tonopah, and at Ray, 12 miles north of Tonopah, are extensions of the Tonopah systems. On the six first discovered mines, the Tonopah, Montana,



Midway, Belmont, North Star, and Tonopah Extension, the principal development work has been done.

There are six formations overlying the lower ore-bearing formations. As shafts have to be sunk several thousand feet before cross-cutting for a vein, scientific acumen and business sagacity are called into play.

The Tonopah mine, in which the first discovery of mineral was made (May, 1900), was also the first successful mine. The vein outcropped for a short distance on the surface and was sufficiently rich to bear all expenses of shipping to smelters in California and Utah. The mine is now 1,000 feet deep. The lateral developments exceed five miles in length. Ore blocked out for stoping is valued at \$20,000,000. A milling plant within 12 miles treats 2,000 tons of this ore weekly.

On the Montana mine, where gold was next discovered, the vein is covered by several hundred feet of rhyolite. The shaft was located and sunk at a point accurately calculated to be on the line of strike of the vein eastward. The Montana ships 1,000 tons of ore weekly.

There are numerous other mines hardly developed to the producing point. Several are shipping, but in less quantities than the Montana.

The Tonopah is not a poor man's field. The ore-bearing andesite formations are covered by several hundred feet of rhyolite and other volcanic rocks, and shaft sinking is expensive. The veins are large, regular and uniformly rich at depth. Electric power is obtainable from the generating stations utilizing the hydraulic power of streams in the Sierra Nevada. A number of important mining centres are being developed near Tonopah.

#### GOLDFIELD.

Gold was accidentally discovered at a watering place in the desert 20 miles south of Tonopah in 1903. In 1905 gold to the value of \$3,500,000 was obtained from nine of the principal mines. Last year the production was \$10,000,000, and this year it is estimated at 127,000 tons of ore, valued at \$12,700,000. More than eighty important mines are in course of development. Many of the mines have been handled by lessees. Speculation in stocks has been most pronounced. Stock sales during 1907 totalled \$25,162,567.

#### BULLFROG.

Bullfrog goldfield is situated eighty miles directly southwest of Tonopah. Several important mines have been developed. Topographically it is similar to Tonopah and Goldfield.

The Western, Northern and Eastern fields are all active.

Nevada promises to become the leading gold-producing State before long.

The *Mining Journal* (London), December 21st, 1907.—Reviewing a St. Petersburg despatch, the *Mining Journal* takes up the question of exploiting Russia as a market for mining machinery and supplies. As a result of mining engineers resident in or visiting Russia the *Mining Journal* comes to the conclusion that if Russian conditions and idiosyncracies are carefully studied and responsible agents appointed who shall have an absolutely free hand, then the chances are excellent. A hint is given that the matter of "tips" must not be overlooked. The market for gold mining machinery in Russia is free. The highly primitive conditions under which gold is mined in Russia and the favorable light in which British manufacturers are regarded are indicative of a rapid extension of trade.

The *Chemical Engineer*, December, 1907.—A short article in this number outlines a process for making Portland cement from materials high in magnesia. Magnesia has heretofore been regarded as having a most deleterious effect upon cement. The possibility of using limestones high in magnesia will bring vast new fields into commercial prominence.

The process, for which a patent has been granted to Richard K. Meade, of Nazareth, Pa., consists in mixing with "cement rock" sufficient high magnesian limestone to bring the lime and magnesia in the mixture up to the proper ratio to the silica, iron oxide, and alumina. The mixture is then ground, burned, and a small percentage, preferably from 1 to 10 per cent. by weight of calcium chloride is added to the clinker and the mixture ground to the requisite fineness. Calcium chloride should be added in the proportion of 2 to 8 of magnesia.

Gypsum or plaster of paris may be added, if necessary, to regulate the set. Calcium chloride, however, is better. The calcium chloride combines with the free magnesium oxide in the cement when the latter is mixed with water, and forms with it an oxychloride compound of great cementing properties. The resulting mixture of Portland cement and oxychloride cement has greater strength and binding properties than Portland cement itself.

#### Personal and General.

Mr. George H. Dickson, of the International Coal & Coke Company, Coleman, Alberta, is in Toronto.

Mr. H. M. I. Weir, C.E., recently of Cobalt, passed through Toronto on his way to his home in Brantford.

Mr. Milton L. Hersey, of Montreal, visited Toronto on the 8th inst. Mr. Hersey has left for London, England, where he has been retained to give expert chemical evidence in an important case.

#### INDUSTRIAL NOTES.

Hearing of the important changes that the B. Greening Wire Company, Limited, of Hamilton and Montreal, had made in their premises lately, we thought it would be of sufficient interest to publish a cut of these buildings as they appear to-day. Anyone who has seen these works within the last few years prior to last May will recognize that a vast improvement has been made; in fact that a portion of the works altered would not be recognized. These premises now occupy portions of three separate blocks.

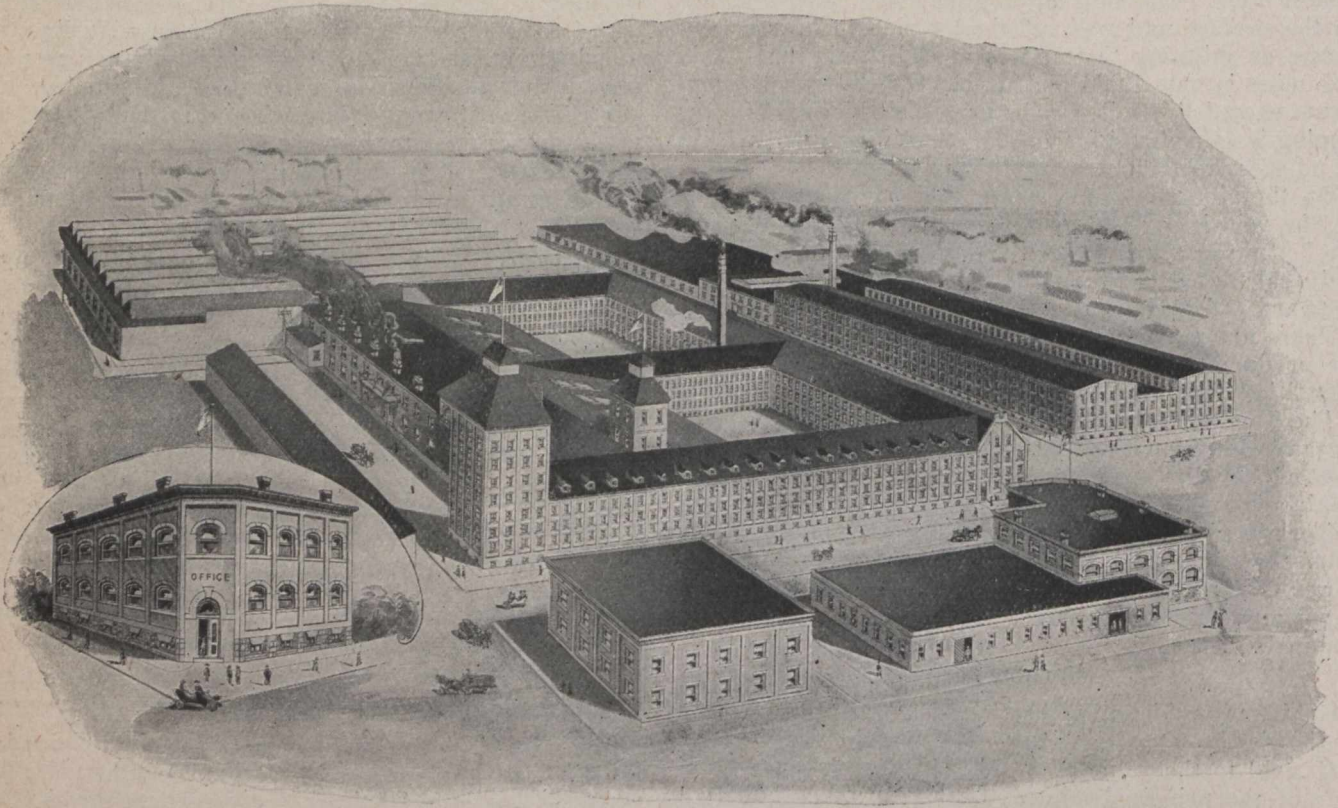
On the southwest corner of Queen and Peter streets the firm erected a new weaving mill 260 by 130 feet, and in order to get light to this large building they adopted the saw-toothed roof, making this one of the best factory buildings in Hamilton. Here are installed all the heavy looms from the Napier street weaving mill, together with several additions, amongst which are the additional screen cloth looms installed this year. It was the intention to remove the old screen cloth plant to this building, but the firm felt they could not afford the time, so that will remain where it is until after next season's trade, when it is the intention to take the temporary end out of the new weaving mill and build on an addition sufficient to accommodate all of the weaving plant. As stated above, the firm has added many new looms of practically all types, so that they are now in a position



to meet any demands that may be made upon them for all grades of wire cloth for years to come.

The old weaving mill on Napier street is to be added to the wire mill, as the increase in the weaving plant will require so much more wire. The space between the old weaving mill and the wire mill on Napier street has been built up and the cleaning room for the wire mill containing all modern improvements is installed here.

poses, car ventilators, etc. They make steel wire rope for passenger and freight elevators, derrick, and contractors' use, mining purposes and transmission of power, perforated sheet metals in brass, copper, steel and iron for grist mill machinery, burning purposes, grain cleaning machinery, etc. Cimped steel wire bonding for concrete work. They issue catalogues for the different branches of their business.



The firm report business quite brisk, especially in special weaving, to which they are devoting much time, attention and enterprise in installing looms to weave cloth of all degrees of weight and fineness of mesh.

Besides manufacture of wire this firm makes all kinds of wire cloth from the heaviest used for such as locomotive stacks, refuse burners for saw mills, to fine wire cloth for flour mills, office window blinds, mining pur-

Some years ago the firm found that its shipments to the Eastern Provinces were becoming so great that it was almost impossible to supply the demand from the head office, so a branch was opened at 422 and 424 St. Paul street, Montreal, under the management of J. H. Hanson. Still the trade increased, so that two years ago it was found necessary to take in the premises adjoining to provide room for the stock.

## SPECIAL CORRESPONDENCE

### NOVA SCOTIA.

GLACE BAY.—At their meeting in New Glasgow, on the 27th December, the Grand Council of the P. W. A. decided to ask the Minister of Labor to appoint a Board of Conciliation and Investigation, under the Lemieux Act, in the matter of the new schedule of rates that the Dominion Coal Company have announced their intention of putting into effect. The application to the Minister of Labor was despatched on the 31st December accompanied by a statutory declaration by the Grand Master and Grand Secretary of the P. W. A., that failing the appointment of a Board, a strike will take place if the Coal Company persists in paying the revised rates. To-day, the 3rd January, the Coal Company have posted notices at all their mines giving the new rates for mining and the new price for workmen's coal, which become effective on Monday, the 6th January. The new schedule gives an increase to every class of workmen employed at the mines

with the exception of the men working in pillars and the machine men in narrow work. This latter class is a particularly well paid one, as the leading work is usually given to good men. The new rate for pillars, although reduced, is still a good one, and there will not be any difficulty in getting men, because the pillar men will still be able to earn higher wages than his fellow in rooms. The Coal Company are making it very clear that they intend to stick to their original promise that the new schedule should involve no reduction in the aggregate wages, and the whole of the money gained by the company through the cut in the pillar rate and the increased price of workmen's coal is to be given back to other classes of men, namely day laborers, mechanics and loaders. Indeed the net result of the schedule will be an increased payroll for the mines as a whole. The Coal Company state very definitely that the pillar rate is one which they refuse to discuss. After careful investigation and consideration they have come to the



conclusion that it will be to the advantage of the rest of the workmen to reduce the pillar rate, and in this particular their policy is fixed. The increased price of house coal will be compensated for by the increases in the wages already referred to. No further developments are likely to occur until the matter has been considered by the Minister of Labor.

#### NEW BRUNSWICK.

ST. JOHN.—Those interested in the Minto coal mines—the richest of their kind in New Brunswick—have been favored with an exceptionally good year.

One difficulty, however, has been the scarcity of labor. Every available man has been employed and while the output has shown no very marked increase, it is larger than usual. The labor difficulty has been relieved to some extent by hard times in other places, and men are now more plentiful.

Each shaft has averaged from twelve to sixteen men during the past year, but the gangs could be increased to thirty-five or even forty, which would practically double the output, thus better enabling the operators to meet the demands, which at present they are unable to do.

Nine shafts have been in operation throughout the year, several of them having produced an average of some forty tons a day each.

A short time ago F. M. Tweedie succeeded in securing the John McDonald property and has completed a new shaft, which will be opened in the near future. G. H. King has also completed a new shaft, which will be opened up in a few days. The latter is on the Minto mine and addition of these two will make eleven shafts in operation and others will be added during the year.

When the price of coal advanced, last autumn, the operators gave a similar advance in wages to their employees. The men who formerly received from \$1.50 to \$2.50 per day are now averaging from \$1.75 to \$3.00 per day. At this point, it may be added that the high rate of wages, together with hard times have probably had their influence in bringing more laborers to the mines.

It is safe to say that the coal market was never better than at present. The run-of-mine brings \$2.50 per ton f.o.b. mine, which the operators regard as very satisfactory returns. The I. C. R. has taken a large quantity of the coal, and there is a brisk and steady demand for it from other quarters, so that the operators are unable to fill their orders; but they hope, during the present year to increase their output. It is much easier to send out the coal now, than it was a year or two ago, as many important improvements have been made on the N. B. Coal and Railway line. Throughout the year the service has been satisfactory and the road is at present in excellent condition.

The village of Minto is progressing. The population is increasing and a number of new buildings have been erected. G. H. King has completed six new dwellings, the Northfield Coal Company, of which Hon. James Barnes is manager, have put up eight or ten cottages, and three more have been erected by the Welton brothers.

The Rothwell Coal Company, recently completed a new shaft, which produces twenty tons of coal per day. It has also put up four dwelling houses and a small general store.

Considerable interest has been aroused by a mineral development near the town of Woodstock. The existence of iron ore has been known for some time, and it was once successfully worked, but it remained for a number of Carleton county people, headed by High Sheriff William A. Hayward, to demonstrate the fact that across the river, is a bed of rich copper, carrying gold and other metals.

Under the name of the Cobba-Sexton Mining Company, the parties referred to have already expended several thousand

dollars in developing their areas, and are much gratified with the assays submitted from various places.

A number of others have taken adjacent holdings. The first gold found in New Brunswick was taken from these mines.

The five granite concerns at St. George, viz., Tayte, Meating & Company, the Utopia Granite Company, O'Brien & Baldwin, Epps, Dodds & Company and the Bay of Fundy Granite Company, who manufacture red, grey and black granite for building and monumental purposes, have had an exceptionally prosperous year. The introduction of modern pneumatic and other up-to-date machinery has tended to lessen the cost of production and rough hand labor, and the manufacturers are thus in a better position to compete for work than in the past.

#### ONTARIO.

##### COBALT.

*Nipissing.*—Mr. Drummond, the manager of the Nipissing mine, is leaving Cobalt for Salt Lake City, where he will be located permanently. He will be succeeded in the management of the mine by Mr. Parks, his present assistant.

On December 16th, the Board of Directors of the Nipissing Mines, Limited, declared a quarterly dividend of three per cent., payable January 21st, 1908, to shareholders of record of December 27th, 1907. Transfer books closed on December 27th and remain closed until January 22nd, 1908.

*King Edward.*—Mr. McCaskill, the manager of the King Edward mine, has taken over the management of the Colonial as well. Mr. Coombs, the manager of the latter mine, has gone to New York.

*Cobalt Majestic.*—The recently organized Cobalt Majestic Silver Mining Company, has taken over all the property of the Abitibi & Cobalt Mines Company, which consists of 320 acres. They have also acquired control of the Empress Cobalt, and have purchased a claim in the Township of James.

*O'Brien.*—On January 7th, a three inch vein of native silver and argentite, carrying high values, was struck at the 100 foot level, in the East drift from the main shaft. This is a continuation of the main vein.

*Temiskaming.*—A new, very rich, but narrow, vein has been struck at the 200-foot level. This is thought to be the extension of the big vein.

Mr. Floyd Harman, the superintendant, has resigned.

*Silver Leaf.*—The shaft on what is known as the "New Vein" on the property, is now down 55 feet. The values are even better than at the surface. There are 5 pay streaks of from 2 to 6 inches in width of high grade ore.

A second car of ore is now ready for shipment, about 12 tons being No. 1 and the balance No. 2.

Returns have not yet been received from the car shipped in December.

*Buffalo.*—In illustration of the values in some of the rich Cobalt veins, a vein two inches wide, in the Buffalo mine, is yielding about \$300 per foot in the drift, 7 feet high. Figuring on two and one-half feet per day, two shifts would produce \$750 worth of ore at a cost of about \$12 per foot.

*Anima Nipissing Lake.*—The Rex Argentite Mining Company, organized by New York capitalists to operate in this section, have recently purchased through Capt. Jeffrey, late superintendent of La Rose mine, three 40 acre claims on the northeast arm of Lake Anima, Nipissing. A shaft has been sunk 30 feet on a vein which shows calcite, copper and iron on the surface. At 27 feet very good silver values were found. President Dougherty of the company, who inspected the property early in this month, has decided that the values discovered justify the installation of machinery and a plant will be brought in over the ice this winter. The property is situated about 9 miles west of Latchford.



In comparing the production of 1907 with 1906, there are many things to be taken into consideration. The strike caused a material reduction in shipments, and during the last 3 months of 1907 the drop in the price of silver and the difficulty in selling the ore has resulted in a curtailment of production and shipments. Mine managers are instructed to produce only sufficient ore to meet running expenses and pay dividends. Another factor in the reduction of tonnage is the fact that nearly all the large shippers are either concentrating their ore or have arranged to do so. This will naturally result in a great reduction in tonnage and a corresponding increase in value shipped. There are now six concentrating plants in the camp, either in operation, or well on the road to completion. Two of them are customs concentrators, which will handle the output of the mines not equipped with plants of their own. The total shipments from Cobalt in 1907, were 14,040 tons. La Rose mine heads the list with 2,853 tons, the Coniagas next with 2,399 tons and the Nipissing third with 2,394 tons. There were 25 shippers on the list in 1907, out of which 18 or 19 may be properly classified as shipping mines, which can be counted on as factors in the production of 1908. There are also a number of properties that have good prospects of becoming shippers, and at a conservative estimate there will be at least 25 or 30 shipping mines by 1908.

In 1904 Cobalt produced 158 tons, valued at \$136,217; in 1905 Cobalt produced 2,144 tons, valued at \$1,473,196; in 1906 Cobalt produced 5,129 tons, valued at \$3,900,000.

The shipments for each mine in 1907, are as follows:—

	Ore in lbs.
Buffalo .....	2,208,820
City of Cobalt .....	101,280
Coniagas .....	4,798,710
Cobalt Central .....	101,360
Colonial .....	74,250
Drummond .....	108,920
Foster .....	611,803
Green Meehan .....	196,780
Hudson Bay .....	243,170
Imperial Cobalt .....	37,530
Kerr Lake .....	644,800
King Edward (Watts) .....	62,250
La Rose .....	5,706,875
Mckinley-Darragh .....	1,407,935
Nova Scotia .....	493,000
Nipissing .....	1,407,935
O'Brien .....	2,666,360
Red Rock .....	91,443
Right of Way .....	258,220
Silver leaf .....	93,618
Silver Queen .....	957,157
Trethewey .....	1,710,438
Townsite .....	234,278
Temiskaming .....	430,611
University .....	61,383

Estimated value, \$5,650,000.

#### ALBERTA.

COLEMAN.—All the mines along the Crow's Nest Pass have been idle for the Christmas and New Year's holidays. Although large numbers of men were to be seen in the various camps, things were very quiet. Some of the mines complain that the men are inclined to take a few days longer than the regular holiday, but on the whole the men have reported for work fairly well. The Lille mine, near Frank has not resumed work since the holidays, and the Frank mine of the Canadian-American Coal & Coke Company is also shut down. There is a rumor that trade is dull, but up to the present the real reasons for the shut-down have not been officially announced.

TABER.—The three Boards of Conciliation held in connection with the labor troubles, at the Canada West Coal & Coke Company, the Duggan & Huntrods Company and the Domestic Coal Company, all of Taber, have reported to the Department of Labor, Ottawa.

Judge Stewart, of Calgary, was chairman of all three boards, and the main question at issue were the same in each case. About 250 men were affected. All the points in dispute have been amicably settled between the three companies and the United Mine Workers of America. The companies concede express recognition of the union and accept the check-off system, whereby the union dues are deducted from the workmen's wages and paid over to the union officials. There will be no change in the hours of labor and the companies will pay monthly by cheque.

There is now more trouble brewing at Taber between the Marsh mines and their employees. The men have given notice to terminate their agreement with the company and have asked an increase in wages.

So far no application has been made to have the matter arbitrated under the Lemieux Act, but it is stated that the company intend to apply to the Minister of Labor to have an Arbitration Board convened.

STRATHCONA.—As a result of the Conciliation Board meeting under the Lemieux Act to enquire into the dispute between the Stratheona Coal Company and their employees, the questions in dispute have been amicably settled. The miners will receive an 8-hour day and an increase of wages. The miners who are on contract work and are paid by the car, will now receive remuneration at the rate of about \$1.00 per ton for the coal they dig. The Board was composed of T. L. Otter, coal merchant, representing the operators, F. H. Sherman, president of the United Mine Workers, of America, representing the men and G. S. Montgomery, chairman.

EDMONTON.—General Manager M. H. McLeod, of the Canadian Northern Railway, states that there is no shortage of coal in the towns along the line east of Edmonton this winter. The Canadian Northern Railway Company are conducting experiments with a special design of smoke-stack for the use of lignite coal on their locomotives. At present this coal is forbidden by the Railway Commission to be used during the summer months.

These new smoke-stacks are designed with a view to spark prevention, as the lignite coal when burned in a locomotive fire-box gives off a great number of sparks, thus constituting a danger of prairie fire on some sections of the line.

It is expected that the Grand Trunk Pacific will have their line to Edmonton in operation next fall, but as this railway will be pushed right on the mountains it is not likely that they will use much of the lignite and semi-bituminous coal from the Edmonton field. As soon as the line is completed to the mountains, they will be in a position to obtain a good supply of high grade steam coal.

It is stated that bituminous coal fields of great extent have been discovered on Bear River, in Northern Cariboo, B.C. These are on the main line of the G.T.P. and are 100 miles north of Barkerville. Twenty claims of 640 acres each have been staked by Joseph Wandle and B. A. Lascelle.

This new coal field may yet prove to be of as much importance as the great Crow's Nest Pass coal field. There is also large coal deposits in the Yellow Head Pass, through which the Grand Trunk line runs when it leaves the prairie country.

CALGARY.—At a public meeting in Calgary the Hon. W. H. Cushing, Minister of Public Works, for the Province of Alberta, stated that in the session of the legislature, which opens in a few weeks time, measures providing for a legal working day of eight hours in coal mines, the payment of indemnities to miners injured in coal mine accidents or, in the event of death, compensation to their dependents, will be introduced. Mr. Cushing said:—



"The coal operators have already granted an eight-hour day to their employees. The effect of the proposed bill will be to give this arrangement legal status. The principal measure will provide for the compulsory payment of indemnity to coal miners injured while pursuing their ordinary avocation. In the event of death the compensation will be paid to the nearest relative. The bill will be modelled on an enactment which has worked well in practice in England. Our Government takes the view that the injured or survivors should not be compelled to fight long drawn-out legal battles in the courts in order to secure damages."

The measure will be a compulsory one.

Continuing, Mr. Cushing said, "I do not anticipate a fuel famine in the new provinces this winter, although the coal reserves are not large. The weather is exceptionally mild and the remainder of the winter promises to be favorable. This is based on former experiences. Why, at this time last year we had experienced over two months of inclement weather. There has been some talk of a shortage of cars for hauling the coal from the mines, but I don't know what truth there is in these reports. Thus far we have not had any complaints."

## GENERAL MINING NEWS

### NOVA SCOTIA.

**TOBROOK.**—At the Annapolis mines, Torbrook, No. 1 shaft is producing two hundred tons of iron ore per day. No. 2 shaft, a new one sunk on a rich hematite vein, is producing sixty tons of ore per day from development work only. The water power is to be harnessed at Nictaux Falls next summer.

### ONTARIO.

**OTTAWA.**—An order-in-council has been passed regarding the regulations governing the issue of leases to mine for coal within the Rocky Mountain park and substituting therefor new regulations. The duration of the leases is fixed at twenty years, but may be terminated by the consent of the Crown for non-fulfillment of conditions. The ground rent is fixed at one dollar per acre. It is provided that the lessee shall commence active mining within one year. In addition to rent, a royalty of five cents per ton will be collected, and default of payment, within thirty days shall be followed by the cancellation of the lease. The minimum leased to one person is 160 acres and the maximum 640 acres.

The Canadian branch of the Royal Mint was formerly opened on the afternoon of January 2nd. The first silver half-dollar was struck off and presented to Earl Grey, the Governor-General. The first copper coin was presented to Countess Grey. A distinguished gathering took part in the ceremonies. The officials of the mint are: Dr. Bonar, deputy master; Mr. A. H. W. Cleaves, superintendent; Mr. J. A. Cleaves, assistant superintendent; Henry Ewart, assistant to the superintendent; Mr. A. Pearson, chief assayer; Mr. C. N. Entwistle and Mr. William Groves, assistants; Mr. John Roe, chief clerk; Mr. P. S. Roe, chief of mechanical department. Visitors after January 13th will be shown through the mint by Mr. H. H. Seguin.

**COBALT.**—Inspector E. T. Corkill is investigating the recent fatalities due to dynamite explosions. The inquests in each case revealed carelessness on the part of the victims themselves.

It is reported that the last car of ore shipped from Trethewey will realize \$40,000.

The Foster Mining Company has a car of high grade ore and the Watts mine has two cars of good ore ready to be shipped.

Referring to a paragraph appearing in the last number of the CANADIAN MINING JOURNAL regarding the sampling of the ground in dispute between La Rose Mining Company and the Right of Way Mining Company, the engineers who made the examination were all Canadians. The excellent work performed was done by Messrs. J. B. Tyrrell, R. W. Brock, A. A. Cole, W. Askwith and A. Wilson.

### ALBERTA.

The work of reopening the Breckenridge & Lun Colliery, under lease to the Alberta Fuel Company, is making progress, and the

daily tonnage is about 100, and this is to be increased steadily. The colliery is equipped with a plant costing \$70,000, and the product is turned out in excellent shape.

The decision of the C.P.R. to permit its cars to run south of the international boundary when loaded with coal, will materially improve conditions in Alberta coal regions. It means that during the next five months the Lundbreck collieries will be occupied in supplying fuel to the district and that the output will be largely increased. Heretofore the markets south of the border have been compelled to depend upon foreign cars in transit westward to be loaded with lumber and other products for eastern shipment. The new policy will enable the Alberta mines to fill orders for coal that have been piling up for two months.

The Galbraith Coal Company's new plant has enabled the colliery to fill many orders for the Canadian market, and the pressure from that part is materially relaxed, although orders for more than 100 cars are unfilled. It is expected that by the end of December the bulk of the orders in hand will be filled.

On the Alberta Coal & Coke Company's property, south of the Galbraith areas, another of the parallel seams extensively developed on Galbraith ground has been opened. The Alberta Company now has seams 14 and 15 feet in thickness respectively, and at an interval of 180 feet. The coal is identical with that in the Galbraith seams—hard, clean and bright. The present openings are only 3,000 feet from the main line of the Crow's Nest Railroad, and it is planned to establish permanent workings at or near this point, which can be reached with a spur track having a slight gradient.

### BRITISH COLUMBIA.

**BARKERVILLE.**—The gold yield of Cariboo for 1907, is expected to show an increase of about one-third over the 1906 yield. During the hydraulicking season this year there was a heavy downfall. This together with the working of three properties, unworked in 1906, will explain the better results. The three properties were the Lowhu Creek, Forrest Rose and Nugget Gulch hydraulics.

The Bear hydraulic, on Cunningham will probably wash 500,000 cubic yards during 1908, and the Russian Creek hydraulic will become a producer.

**CRANBROOK.**—Placer ground on Perry Creek has recently been purchased by the Illinois Steel Company. The reported price is \$900,000 for nine-tenths, the former owners retaining one-tenth. A flume four-foot square in section conveys the water of Perry Creek a distance of four miles, whence it drops 600 feet at a sharp angle through cast-iron pipes. A pressure of 300 pounds is developed at the bottoms.

**PHOENIX.**—On December 28th there were from 75 to 100 men at work at the Granby mines. Applications have been received from possibly 250 others. According to Mr. O. B. Smith, the superintendent, full operations will be resumed in a few days,



as soon, that is, as the big 60-drill compressor is in running order. Shipments of ore were not expected to begin until after New Year's day.

The Venus mine in the White Horse district is said to have been bought by Mackenzie & Mann. It is a gold and silver property. The price reported is \$60,000.

On Christmas eve it was announced that the Grand Forks Smelters' Union No. 180 and Phoenix Miners' Union No. 8 had definitely accepted the new wage scale and had arranged to resume work at the Granby smelter and mines. The result of several conferences between Mr. Hodges, local manager of the Granby Company and the representatives of the men, was that the vote for the new scale was declared unanimous. Referendum votes in Phoenix had resulted favorably, in Grand Forks unfavorably.

ROSSLAND.—The Trail smelter has just completed a shipment of 250,000 ounces of silver to the new Canadian Mint, at Ottawa.

The Trail bar silver is 999 fine. This is beyond the most rigid requirements of the mint. The requirements of the mint will be about 1,000,000 ounces per annum. The Consolidated smelter can produce twice that amount.

VICTORIA.—In the absence of official reports the following notes on production are of interest.

The Wellington Colliery Company, on Vancouver Island, has produced about the same tonnage as during 1906, namely 800,000 tons of coal and 10,000 tons of coke. This year prices have been higher.

The Western Fuel Company, at Nanaimo, have probably an increased output over 1906 of 100,000 tons.

About 4,000 tons of lead (practically the amount produced in excess of Canadian requirements) has been exported in ore, principally to Europe.

The gold production of Atlin will be about the same as last year; that of Cariboo is less.

## MINING NEWS OF THE WORLD.

### GREAT BRITAIN.

A question has been raised as to the advantage of the hot blast in pyrite smelting. Since the invention of the hot blast in 1828 air has been supplied to iron smelting furnaces at a temperature varying from 570 degrees F. to 1,472 degrees F., with the result that the consumption of coke in the larger furnaces now used, has been reduced from about 8 tons per ton of iron produced to about 1 ton, 12 hundredweight. The undoubtedly beneficial results of the hot blast in iron smelting have led to its general adoption in other branches of metallurgy. In pyrite smelting it is generally regarded as necessary, but L. Parry, A.R.S.M., in a letter to the "London Mining Journal" adduces strong arguments against this view, contending that with the necessary skill as good running may be made with cold blast as with hot blast, even in partial pyrite smelting, and with probably better concentration. His views are supported by experience at Mount Lyell, Australia, where the hot blast has been abandoned.

It is stated that Messrs. Baldwins, Limited, of Stourport and South Wales, have secured a controlling interest in the Beaufort Tinsplate Works, Morriston, comprising nine mills, which employ about 400 hands. They are among the best situated in the Swansea district.

At the Carn Brea Tin mines, Cornwall, the lode recently cut into at the 125-foot level, north of former workings and west of the cross course, indicates great possibilities, as the upper levels are developed in unexplored ground. Forty tons of stuff averaged 72 pounds of tin.

George McCulloch, formerly chairman of the Broken Hill Proprietary Company, died in London December 12th. The accidental discovery of this famous Australian mine in 1883, when Mr. McCulloch was manager of a sheep station, was the beginning of his mining career, in the course of which he acquired a large fortune. He devoted much of his wealth to the accumulation of a fine art gallery.

### RUSSIA.

A Russian syndicate is boring for naphtha near Kerteh in South Russia. Four holes are being put down, one having reached a depth of 100 metres and naphtha is expected soon.

From the mines of the Magnesite Company in the Uphim Mountain district there were produced in 1906, 1,459,374 pounds of magnesite.

Attention is being drawn to the mineral wealth of Eastern Siberia, which abounds not only in iron deposits, but in timber and coal for fuel. There is magnetic ore at Mysoff, Baikal, and in

the upper Lena district, uematite iron deposits near Ilksin with 60 per cent. metal, as well as 57 per cent. iron pyrites about 300 versts from Irkutsk by water, in addition to other deposits of value. The great want of Eastern Siberia, the population of which has increased very rapidly, is a metallurgical industry.

The Statistical Bureau of the Council of Mine Owners of Southern Russia recently published data covering the first six months of 1907, from which it appears that the yield of pig iron amounted to 51 million poods an increase of 3 million poods over the corresponding period of the previous year and the output of semi-manufactured iron to 40 million poods, an increase of 4 million. The increase is explained by the fact that the Russian mine owners have begun to export to foreign markets. The number of workmen in all metallurgical enterprises was 51,264 men in June last as compared with 41,152 in June 1906.

### AUSTRIA-HUNGARY.

The Hungarian Government has decided to purchase a number of coal mines and has already acquired in the valley of Almas a coalfield 207 kilometres in area. In Croatia a mine producing 100,000 tons of coal and with a capacity for a much larger yield has been acquired and negotiations for the purchase of an extensive coal deposit at Ormos in the Borsod district are in progress.

### SPAIN.

A company is being organized in France to work the arsenic and gold mines of Carballino in the Province of Orense, the analysis of ore giving 40 per cent arsenic and 73 grammes of gold per ton. The ore will be shipped to Gonfreville, near Havre for treatment.

The law drafted by the Spanish Minister of Agriculture regarding mines, creates a commission of officials from the Finance Department, whose duty it will be to fix and publish yearly the value of minerals with a view to the tax of 3 per cent. The Government will also bring forward a scheme for the compulsory appropriation of mines.

### UNITED STATES.

The Nome Mining Company, of Nome, Alaska, intends to begin next June to operate a dredge of the capacity of 5,000 cubic yards per day, the largest in that part of Alaska.

The Elmore vacuum process is being tested experimentally at the works of the Empire Zinc Company, Canyon City, Colo. An Elmore plant has been installed at the Marion mine, Ilse, Colo., and the Union Copper Company is putting one in at its mine in



North Carolina. The process is likely to receive extensive trial in cases where it appears suited to the ore.

A large low grade vein has been discovered in the Montana Tonopah mine at Tonopah, Nevada, the 760-foot level. The ore-body is 30 feet in width and of milling grade. The discovery is regarded as likely to encourage other mine owners to make deep explorations.

The year 1906 witnessed a marked revival of the manganese industry. The output was 6,921 long tons, valued at \$88,132; an increase of 2,803 tons in quantity and \$51,918 in value over 1905.

More new mines were opened on the Mesabi iron range, Mich., last year than during any previous twelvemonth. The number added to the list was 21 making an approximate total of 120 on the range, of which, however, upwards of a score are not in operation. Seven of the new mines belong the U.S. Steel Corporation and four to the Republic Iron & Steel Company. Shipments of ore from the range during 1907 amounted approximately to 27,260,000 tons.

The Old Town mine, one of the early large producers of Gilpin County, Colo., which is credited with a total yield of gold to the value of \$1,787,000 above the 15th level, has been connected with the Newhouse Tunnel by a lateral of 4,300 feet and a shaft of 2,186 feet.

Mine owners of Pioche, Nev., cut wages on January 1st, the reductions in some cases amounting to 20 per cent.

SOUTH AFRICA.

Statistics issued by the Mines Department of the Transvaal give the value of the mineral output for October, exclusive of diamonds, as £2,439,513, made up as follows: Gold, £2,352,337; silver, £7,779; coal, £66,530; base metals, etc., £12,867. The total production for September was £2,375,338. The number of camps in operation on the Rand was 8,824, the same as the previous month. Three thousand Chinese had been repatriated during the month, their places being taken by colored labor. The number of employees was as follows:—Whites, 19,349; colored, 143,187; Chinese, 44,365.

The Witwatersrand Deep mine is adding 25 stamps to its present equipment, weighing 1,400 pounds each, which will increase its crushing capacity to about 450,000 tons per year. The New Kleinfontein Company will add 20 heavy stamps to its plant, the Ferreira Deep is erecting 40, and many other installations are in process or being arranged for, the total number of new stamps to be erected being 705.

What is regarded as one of the most important discoveries of copper in South Africa has been made in the Tete country, near the Zambesi. A mining concession 417 miles square has been secured by Messrs Lawley & Cleary. Native copper and ore carrying 30 per cent. copper have been found.

The gold output of Southern Rhodesia for October was 53,822 ounces. There were 1,107 stamps working and 132,078 tons were crushed.

A considerable amount of activity is being displayed by prospectors among the western reaches of the Orange River, towards Upington, Kermoes. A number of farms have been taken up for diamonds and copper.

AUSTRALASIA.

The gold output of New Zealand for November was 54,121 ounces, value £215,524, as against 41,375 ounces, value £161,161,983 for November 1906.

In the neighborhood of Barn Bluff, Tasmania, three immense ore bodies from 200 to 600 feet wide have been found. A low estimate of one of them gave 3,700,000 tons of payable ore containing copper, gold and silver. In another the ore assayed up to 20 per cent copper, 17 ounces silver and 4 dwts. gold. There is abundance of water power and timber in the neighborhood.

The Australian gold output for the 11 months ending with November, amounted to 2,883,935 ounces being a decrease of 284,243 ounces as compared with the corresponding period of 1906.

A syndicate with a capital of £35,000 has been formed to work a large area on the sea beach near Byron Bay, New South Wales, by dredging for gold and other minerals. The black sands will be treated with the Grill patent gold-saving machine, which is stated to have been successfully tested in Victoria.

At the London mine, Parkes, N. W. S., 90 per cent. of the gold is being recovered by the direct cyanide process.

CONGO FREE STATE.

Prospecting has revealed the existence of copper deposits throughout a zone extending 200 miles east and west and 50 miles north and south in Katanga district. A limited amount of development has revealed some two million tons of copper ore. Most of the deposits can be exploited by open cuts. The ore averages 13 per cent, metallic copper. Deposits of tin ore extend along the Lualaba River, below the Nsilo Falls for 175 miles, and explorations indicate the possibility of extracting a considerable quantity. The main drawback is the lack of transportation facilities.

STATISTICS AND RETURNS.

SYDNEY MINES, N.S.—A review of the operations of the Nova Scotia Steel & Coal Company, Limited, for the year just closed, shows a considerable increase in the volume of iron and steel produced and finished at the company's furnaces and mills. While the quantity of coal and ore mined was slightly less than that of the previous year, in accordance with the programme arranged early in the year, the output in all other branches shows considerable gains over any former year in the history of the company. The value of the aggregate output is also considerably higher.

Coal mined and shipped exceeded .....	680,000 tons
Coke made .....	90,000 tons
Iron ore mined .....	355,000 tons
Limestone and dolomite quarried .....	63,000 tons
Pig iron made .....	58,500 tons
Steel ingots .....	70,000 tons
Steel billets rolled at cogging mill, New Glasgow..	55,000 tons
Steel bars, sheets and forgings manufactured from New Glasgow .....	53,600 tons
Freight paid to the Interecolonial Railway, direct ...	264,500
Freight carried on the Sydney Mines Railway of the company .....	1,300,000 tons
Freight carried by steamers owned and chartered by the company .....	650,000 tons
Wages paid at Sydney Mines .....	\$1,385,000
Wages paid at New Glasgow .....	504,000
Wages paid elsewhere .....	270,000

The figures given above show, in most departments, very important increase over the previous year. In pig iron, about 18 per cent.; in steel ingots, about 35 per cent.; in plats, bars, and forgings, about 25 per cent.; coke, limestone and other products show increases of 10 per cent. to 12 per cent.

The plant and entire equipment of the company is to-day in a better position to handle an increased volume of business than at any time in the past.

1907 was marked in its early days by rapid recovery from the temporary depression caused in the previous autumn by the rupture of relations between the Steel Company and its near relative the Dominion Coal Company. An unusually boisterous winter retarded progress somewhat, but from March to December operations were vigorously pushed and a full force was kept constantly employed. The results will be best understood by studying the table



of production—the tonnage of raw materials converted into iron and steel.

	Ore in tons.
Iron ore mined .....	593,000
Limestone quarried .....	352,600
Coke produced .....	409,000
Pig iron produced .....	256,500
Steel ingots produced .....	270,600
Blooms produced .....	237,500
Billets produced .....	71,000
Rails produced .....	129,000
Rods produced .....	64,500
Sulphate ammonia .....	1,550
Tar .....	*4,378,000
Granulated slag .....	17,000

\* Gallons.

The most important additions to the company's plant were two Bessemer conveyors, with their accessory appliances.

The growing demand for power necessitated an increase in the quantity and efficiency of steam supply. This was obtained by the installation of several Babcock & Wilcox water tube boilers, and a system of superheaters.

The Nova Scotia Steel & Coal Company's coal output for 1907 will be approximately 650,000 tons, from three collieries, the new pit opened at Point Aconi, which was opened in June, adding only about 1,000 tons to the company's output for the year. A spur of railway 2 1-2 miles in length connecting this mine with the company's main line, was completed about a month ago. The work of pumping out No. 2 (Lloyd's Cove) Colliery begun on November 17th, is making excellent progress, and the water is being lowered at the rate of 30 to 40 feet per day. This colliery will be ready to produce probably in March next. It was abandoned in November, 1904.

In September last an electrically operated endless haulage system was installed in No. 5 Colliery. The new system is the latest and most approved in use, and is the only one of its kind in Cape Breton. No. 3 Colliery, which is the company's largest producer, was on single shift during the year, and to this fact is due the comparatively slight difference in the company's total output as compared with 1906.

The steel plant made an excellent showing in 1907 as compared with 1906, every department showing a large increase. The output of pig iron reached 59,000 tons, an increase of 10,000 tons over last year. The steel production was about 71,000 tons, being 20,000 tons more than was made last year. The coke output was also largely in excess of last year's record.

The output of the collieries of the Crow's Nest Pass Coal Company for the week ending January 3rd was 18,048 tons, a daily average of 3,609 tons.

The December output at the Nova Scotia Company's collieries totalled nearly 50,000 tons. The total amount of coal mined from the collieries during the twelve months just ended, was 638,065 tons, No. 3 Colliery being the biggest producer with an output of 296,466 tons; No. 1, with 256,161; No. 5, 82,310 tons, and No. 4, 3,128 tons.

A new blast furnace record was made at the works of the Dominion Iron & Steel Company on Thursday, 1,027 tons being the output for the day. This is about 25 tons better than the record announced a few days ago.

Cobalt ore statement for the week, December 28th, 1907 to January 4th, 1908:—

La Rose Mines, to New York, Jan. 1st, 1908, 48,190; La Rose Mines, to New York, Jan. 3rd, 1908, 56,720; total 105,910.

Townsite Mine, to Canadian Copper Company, Copper Cliff, Jan. 3rd, 1908, 45,100; Nipissing Mines, to New York, Jan. 4th, 1908, 54,410; total 204,420.

Cobalt ore statement for the week December 21st to 28th, 1907:—

King Edward Mine, to Willard P. Ward, New York, Dec. 23rd, 62,250; Trethewey Mine, to American Smelting & Refining Company, Perth Amboy, N.J., 62,000; total 124,250.

#### NOVA SCOTIA RETURNS.

Estimated returns of mineral production for 1907:—

Coal .....	\$13,875,000
Coke .....	1,925,000
Gold .....	265,000
Gypsum, limestone and other minerals ...	975,000
Stone and building materials .....	310,000
Pig iron .....	1,385,000
Steel .....	4,100,000
Steel rails, rods, etc., .....	8,150,000

Coal.—An authority upon Nova Scotia coal mining, the Hon. Robert Drummond, predicts an increase of half a million tons in the production of 1908 over 1907. The slight decrease of the total tonnage for 1907 as compared with the previous year is attributable to scarcity of unskilled labor, to the tardy opening of the shipping season and to the strike at Springhill.

The estimated coal production by countries, is as follows:—

	1906		1907	
	Tons.	Tons.	Tons.	Tons.
C. B. county .....	3,841,000	3,820,000	D.21,000	
Pictou county .....	593,000	642,000	I. 49,000	
Cumberland county .....	509,000	420,000	D.89,000	
Inverness county..	227,000	280,000	I. 53,000	
Total .....	5,170,000	5,162,000	D. 8,000	

Gold.—Close estimates of the production of gold for Nova Scotia for the calendar year just closed, put the figure at 13,500 ounces produced from 62,000 tons of quartz. This represents an average of \$4.14 for every ton crushed. To this total 24 mines contributed. Many of these mines, however, were not in continuous operation. The output is valued at \$265,000.

#### MARKET NOTES.

Silver.—December 19th, 53; December 20th, 53; December 21st, 52 1-2; December 23rd, 52 3-4; December 24th, 52 3-4; December 26th, 52 3-4; December 27th, 52 1-2; December 28th, 52 1-2; December 30th, 52 3-4; December 31st, 53 1-2.

December 31st, sterling exchange, 4.825.

Copper.—The copper market is steady, with a strong trend towards higher prices.

December 31st, New York.—Lake, 13 7-8 cents per lb.; electrolytic, 13 5-8; London, standard, £62 for spot.

Lead.—Prices moving up from low water mark. New York, 3.55 cents per lb.; London, £14 for spanish.

Tin.—Light transactions on firm market. New York, 27 1-4; London, £123 11s. for spot.

Quicksilver.—New York, \$46 per 75 lb. flask.

#### Industrial Paragraphs.

Circular No. 1,097 of the Canadian Westinghouse Company, describes their types K and KG motors. These direct-current series wound motors are for use on cranes, hoisting machinery and similar service.

The Coniagas mine has installed two Deister concentrating tables. These are giving particularly good service. Large installations have lately been made in the Western States. Mr. C. B. Fitch, of Fort Wayne, handles the Canadian business.