Prof Gwillim

INDEX

Canadian Mining Journal, Vol. 32.

JANUARY 1st, 1911 TO DECEMBER 31st, 1911

INDEX

CANADIAN MINING JOURNAL, VOL. 32

JANUARY 1, 1911, TO DECEMBER 31, 1911

*Illustrated. E. Editorial.

THE CANADIAN MINING JOURNAL

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The Canadian Mining Journal

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CONTENTS.

THE YEAR 1910.
A Review.

Twelve months ago to-day we ventured to predict a prosperous year for the mining industry of Canada. The year 1910 has come and gone, and with it came much profitable growth, and much encouragement for the future. Our confidence in Canada's ability to take a leading place amongst mineral producing nations has been strengthened. Every year brings us a substantial step nearer our goal of self-reliant nationhood. The chief industrial foundation-stone of that nationhood is the possession and proper use of varied mineral wealth. Although the mining industry has not yet received from our law makers and from our great transportation corporations the recognition that is its due, yet that recognition is measurably greater to-day than it was a year ago.

The pressing need of codifying the heterogeneous mass of mining laws that now encumbers us, has been taken in hand. For this advance, the executive officers of the Canadian Mining Institute are to be thanked. The Federal Government, also, has shown enlightenment in giving moral support and financial assistance to the movement. We pray that before another year has passed, the way shall have been cleared for the enactment of mining laws that will supersede the present anomalous and conflicting Federal and Provincial Acts, and that will insure fair treatment for the investor.

While, since our last annual review, we have witnessed a distinct change for the better in the attitude of our law makers towards mining, there is still little or no amelioration of transportation conditions. Our railway corporations are blind to the needs of the industry, and, consequently, blind to their own best interests. Carriage of low grade ores is unbelievably costly. Coal freight rates, more especially in the west, are not based upon a rational schedule, but are fixed at the highest possible figure that consumers will pay. In one instance in the east, an iniquitous freight rate is charged by a company owning a coal mine and operating its own railway. The high rate shuts a competing mine out of a part of its legitimate market. Many such instances could be adduced. Such commodities as talc, gypsum, pyrites, iron ore, ores of the precious metals, etc., etc., provide opportunities for like exactions. One reason for this situation is that what protests are made come from individual operators, and not from the mining fraternity as a whole. However, an increasingly effective "big stick" is at the disposal of the public; we refer to the Board of Railway Commissioners. This tribunal has rendered many decisions that bear directly upon the transportation of minerals

and mineral products. Several of its decisions, notably one in which the White Pass and Yukon Railway Company was involved, gave immediate relief to mines that had been struggling under the incubus of prohibitively high freight charges. Well-founded grievances will receive prompt consideration from the Board. These grievances exist; and many more should be laid before the Commissioners at once. The fact that nearly all our railways are amenable to the decisions of the Board appears not to be fully appreciated by mine operators.

Standing in bold relief among the official acts of the Federal Department of Mines is the belated, though welcome interest evinced in colliery rescue and salvage work. A much better start has been made in controlling the manufacture and use of explosives. Both of these official efforts will be absolutely wasted unless a simultaneous attempt be made to improve and standardize mine inspection. This, of course, refers especially to coal-mining. And in the Province of Alberta the Federal Government is responsible for a regrettable state of affairs. As at present the Dominion receives all the fees and royalties, and as inspection and salvage are left to the province, it is not to be wondered at that slackness obtains. In view of the recent loss of more than a score of lives in an Albertan colliery, the Government will be chargeable with criminal negligence if provision for modern inspection and salvage be not made without delay. This is absolutely the most vital question confronting the Federal Department of Mines, primarily because it involves the problem of saving human lives, and secondarily because it involves the prevention of enormous loss by underground fires. And the whole value of any measures adopted will depend upon those measures being complete. Rescue stations are of little use if inspection is not efficient and frequent. Prevention in the mine is not to be neglected merely because emergencies apparatus is installed above ground. Briefly, while the Federal Government's action in investigating explosives and in encouraging the use of rescue apparatus is most praiseworthy, it will lose significance unless it is rounded out in the directions alluded to above.

We have dwelt upon mining legislation, the relation of transportation to mining, and the duty of the Federal Government from a humanitarian point of view, because these three features command the interest of all concerned in the industry. While part of our remarks may not be directly pertinent to an annual review, yet there could be no more suitable time than the present for impressing our readers.

Without further delay let us glance at the mining progress made in each Province during 1910.

Nova Scotia.—Much has transpired in Nova Scotia during the past year. The event of greatest moment in mining circles was the amalgamation of those two great protagonists in the legal battle of two years ago, the Dominion Coal Company and the Dominion Iron and Steel Company. This union is already bearing fruit. Under the general management of Mr. M. J. Butler, formerly Deputy-Minister of Railways and Canals, a policy of expansion has been adopted. The recent acquisition of the Springhill collieries is the first important step. More details of the vast plan will come to light during 1911.

The coal outputs of the Dominion collieries have increased by nearly a million tons as compared with the previous year. The Nova Scotia Steel and Coal Company has shipped nearly thirty-five thousand tons more than during 1909. In fact, all but two of the collieries appear to have produced larger quantities of coal than ever before. The year, therefore, has been marked by progress in coal mining.

The output of pig iron and steel products also shows a pleasing enlargement. This was to be expected. At very few places in the world are fuel, ore, and flux assembled so cheaply as at the industrial ports of Cape Breton. At few places also are operating costs so carefully controlled.

Most helpful to coal mining has been the utter rout of the United Mine Workers of America. The men and methods employed by this foreign organization were unworthy of respect and unsuited to a country where civilized habits of thought and decent systems of government prevail.

The recent anti-reciprocity movement amongst the coal operators of the province was badly conceived and unskillfully executed. Whilst the opponents of reciprocal free trade with the United States in coal have strong cause to fear the removal of the present tariff, they have not yet succeeded in stating their case in a way that might appeal to the judicial mind. However, the question is a live one, and no doubt more will be heard of it presently.

Although, apparently, there has been more activity in gold mining during 1910 than throughout 1909, yet the total production will be slightly lower. The cause of this will be discussed at a later date. Suffice it to say that part of the work done during the past year will not bear fruit until well on in the coming year.

The output of gypsum will probably be larger than previously. Slowly, though surely, the idea of manufacturing plaster in Nova Scotia is gaining ground. Infusorial earth is again being worked and prepared for market. This enterprise, in which there are substantial profits, was dormant for some years. The quarrying of building and monumental stone shows little change.

The new tungsten district near Moose River, Halifax County, is being quietly and sanely developed. Everything indicates that a high grade ore will be obtainable in sufficient quantity to meet any probable demand for a long time to come.

In the main, Nova Scotia has improved her position as a mineral producer.

New Brunswick.—This Province continues loitering by the way. The Bathurst iron ore deposits are being rapidly exploited by the Canada Iron Corporation. No doubt these will become the backbone of a large industry. The quarrying of gypsum and limestone continues on about the same small scale as heretofore. The recently resuscitated antimony mine is apparently abandoned.

The outlook is brightened, however, by the successful development of the gas and oil region in the vicinity of Bathurst, and by the promised opening up of the extensive oil-shale deposits in the same region. The rumoured discovery of tungsten ore has not yet been corroborated.

Amongst the mineral possibilities of New Brunswick are copper, nickel, and manganese. None of these has been systematically examined. The Provincial Government is lamentably inert.

Quebec.—Inspired by the good fortune of her neighbour to the west, Quebec has bestirred herself to good effect. The appointment of a strong Commission to report upon the mining potentialities of the Chibougamau country, and the revision of the mining laws, were but an earnest of more radical improvements in the future. The Government's wisdom in selecting Mr. Theo. Denis for the post of Superintendent of Mines needs no further proof than the fact that he was the active cause of both the steps mentioned above. Incidentally, nothing has as yet been divulged officially as to the result of Chibougamau commission.

The principal mining industry of Quebec is, of course, asbestos mining. On January 1st, 1910, the aggregate capitalization of asbestos companies operating in the Province was reported to be more than thirty-five million dollars. The gross earning capacity of these companies at the same date was less than two and one-half million dollars. Mr. Denis, Superintendent of Mines, refers on another page in this issue to the overproduction that marked the past year. We are pleased to notice that he also alludes to the excellent condition of mines and mills, and that he expresses the conviction that, judging by the past, the present depression is only temporary. "From an annual production of a few tons thirty years ago," writes Mr. Denis, "the industry has grown to 65,000 tons, or more, and no one doubts that in a few months matters will have re-adjusted themselves, and the steady development will continue. On a smaller scale this has happened before, and periods of over-production and consequent depressions have been followed by periods of healthy growth."

The Weedon copper mine is a new producer. This is situated in Weedon Township. The Eustis copper mine has been a steady producer. Copper is being saved here from the mine water by precipitation with scrap iron. Copper mining, with the exception of these two mines, is not particularly active, although more prospecting is being done than heretofore.

The investigation of the alluvial gold deposits of Beauce County is the principal activity so far as this precious metal is concerned. A Montreal syndicate has obtained encouraging results and will commence operations next spring.

Graphite mining is looking up. The recent reorganization of the Buckingham Graphite Company,

Chrome ore mining has made no advance during the year. The mines and mills have been idle. The mica industry, also, has been sluggish. What orders are placed were filled from stock in hand. Iron ore mining, also, has preserved the even tenor of its way, the only room for expansion being limited by the investigation of titaniferous iron ores. The outputs of magnesite and of building material have increased.

Altogether the mineral products of the Province of Quebec have been augmented in value during 1910. During 1911 there should be an enlargement in the production of iron ore, copper ore, and asbestos.

Ontario.—The Province of Ontario has enjoyed a most prosperous year. Cobalt has more than held its own. This year's output of silver will probably exceed that of 1909 by twenty to twenty-five per cent. And Porcupine, appearing on the horizon at the psychological moment, has been accorded a better chance of rapid development than any other Ontario gold camp has ever had.

In Eastern Ontario much unobstrusive advance has been recorded. The introduction of cheap hydro-electric power has infused new life into several districts. Iron mining is active. Several old gold mines are being reopened. The production of talc is growing rapidly. Decorative marble, also, is being successfully quarried.

The output of nickel and copper from the Sudbury region has exceeded that of former years. The silver mines of Thunder Bay have been practically idle; but persistent efforts have been made to revivify several of the gold mines in the Lake of the Woods district.

The blast-furnaces of Ontario have had a busy year. Whilst the number of working iron mines is still very small, the outputs are increasing. The removal of the bounty does not appear to have affected the industry materially.

The yield of oil from Southeastern Ontario has continued to fall off, whilst the yield of natural gas has been larger than ever before.

In nearly all directions the mineral industries of Ontario have waxed stronger during 1910. The year has been marked by the continued utilization of natural water powers.

Alberta.—Alberta's output of coal for 1910 will exceed that of 1909 by a considerable amount. Many new coal prospects have been opened, and large areas have been staked in the western sections of the province. European, Canadian and American capital is flowing in. There is no doubt that Alberta will rapidly forge ahead in coal mining.

The snuffing out of twenty-four lives at the Bellevue colliery of the West Canada Coal Company marred the closing month of the year.

Closer and more efficient inspection of collieries is an absolute necessity in Alberta, as also is the removal of the administration of mining lands from the Department of the Interior at Ottawa.

British Columbia.—The annual returns of mineral production will show a fair net gain for British Columbia throughout 1910, and this, despite a falling off in lead, copper, and zinc. Serious fires checked the production of all three metals. In the case of copper, also, revision of the estimates made by the provincial mineralogist, which were based on assays of the ore instead of on actual smelter returns, contributed to pull down the annual total.

Gold, silver and coal were produced in larger quantities than those recorded for 1909. The outputs of coal from Vancouver Island and from Crow's Nest Pass were much enlarged.

The Portland Canal mining excitement subsided early in the summer. In some respects the district has been disappointing, but several genuinely encouraging mines are being worked by the best type of operators.

More attention is being paid to the Queen Charlotte Islands. Indeed, the west coast bids fair to grow into a very important mining region.

The Sheep Creek gold district has been the centre of sound work, and, incidentally, of some unnecessary stock manipulation.

Taken as a whole, the mining industry of British Columbia was never in healthier condition. The foundations are well laid for pronounced expansion in the future.

Yukon.—News from Yukon has not been plentiful this summer. It is evident, however, that the gold output has been larger than that of 1909. Quartz mining, also, has been conducted on a small scale. More will be heard of this branch of the industry.

GENERAL.

Technical Education.—The appointment of the Commission on Technical Education was, amongst the import events of the year. That commission has held sessions in several mining towns, and in its final report will be much matter relating to mining education. As noted last year, New Brunswick is now the only province that has made no adequate provision for the technical training of the rising generation.

Conservation of Natural Resources.—The Federal Conservation Commission has been carrying on a campaign of useful publicity. The unfortunate incidents that marked the Commission's first attempt to deal with mining problems have been practically forgotten. There is little danger of a repetition.

The fact that the mining engineer has always applied the principle of conservation has been overlooked.

There is, of course, a notable mission for the Commission to perform. So far as it educates the public up to the ideals of conservation, it is doing a noble work. But more pains should be taken to consult with leading mining men, and to secure the sympathy of the whole mining fraternity.

Legislation.—As pointed out above, mining legislation is engaging the full attention of a strong committee of the Canadian Mining Institute, acting in collaboration with the authorities at Ottawa. Progress has been made and it is hoped that before the year is over a draft of new mining statutes will have been completed.

In each of the provinces minor changes have been made in the mining laws. The changes and improvements in the Quebec law have been the most radical.

Departmental.—Both the Geological Survey and the Mines Branch have done good service for the country at large. The Survey is getting closer to the actual needs of the country. Its system of periodical press bulletins has been resumed. The Mines Branch, although showing a tendency to dissipate its energy on labours that are only of remote value to the country, has taken hold of problems touching the use and handling of explosives, and the introduction of breathing apparatus in ocal mining centres. Both branches need larger appropriations.

The Provincial Mines Departments of Nova Scotia, Quebec, Ontario, and British Columbia have been vigorous. Particular mention is due the British Columbia Department for the excellence of its reports. The Ontario Bureau of Mines is also to be commended in this respect.

Canadian Mining Institute.—The membership of the Institute has been added to considerably during 1910. West of Montreal the different branches are active. In Nova Scotia a branch is needed badly, as the Mining Society of that province shows no signs of life.

Generally, whilst the Institute has had none but local meetings since the annual dinner, it is quietly progressive, and is taking a leading part in the formulation of legislation.

There is to be no stir over the annual elections. For this we are sorry. An occasional difference of opinion is by no means an unmixed evil.

The Profession.—That the profession of mining engineering is playing a larger part in Canada is evidenced by the fact that never before have so many investors sought technical advice. Both Portland Canal and Porcupine are shining illustrations of this fact. Had it not been for the mining engineer, Porcupine would have been swamped with every variety of unmitigated fraud. We believe that the mining engineer is at last in a fair way to gain proper recognition.

* * *

For Canada and, quite incidentally, for ourselves the year 1910 has been a year of peace and prosperity. To all our readers we beg to extend the compliments of the season. May the New Year bring nothing but peace, progress, and profit!

RECIPROCITY IN COAL.

In our issue of November 15th there appeared an editorial upon the same vital subject that gives title to this. The former editorial has aroused the Maritime

Mining Record, Stellarton, N.S. It may be explained that the Record is a fortnightly that represents the coal mining interests of the Province. It is an open and perfervid opponent of reciprocity.

The Record's remarks concerning ourselves we shall willingly overlook. It has permitted its keen partizanship to cloud its judgment. In so far, however, as the Record represents eastern opinion, the opinion, at least of those who control the coal mining industry, and of a greater proportion of those whose livelihood depends upon that industry, it is entitled to a full hearing. Incidentally, discretion bids us have a care. The editor of the Record, a well-seasoned veteran, survivor of innumerable inky encounters, is not lightly to be challenged.

Apart, however, from the perilous pen of our maritime brother, we are deterred from entering into a war of words. This would only befog the real issue. That issue needs unbiased statement. The object of our former editorial was to emphasize this point.

We can assure the Record and the eastern operators that the CANADIAN MINING JOURNAL is strictly non-partizan. The reasonable claims of both the east and the west will have our instant support. But neither will find us a special advocate.

In more than one statement the Record is in error. For instance, when it asserts that we favour reciprocity, it is labouring under a complete eclipse of mental vision. The assertion, also, that the desire for reciprocity in coal is limited to "a score or so of American immigrants and a half score of small colliery operators in the west," was manifestly written in a moment of high excitement. It carries its own refutation.

One other misapprehension to which expression is given, is indicated in the last paragraph of our contemporary's interesting editorial. In this paragraph our suggestion that the whole matter be threshed out by the Canadian Mining Institute is vehemently damned; and the Institute is bluntly described as existing only for the benefit of the West. This is entirely erroneous. The Institute is a national body with international affiliations. It is the only national mining society in Canada. It is dominated by no sections or cliques. It is representative. The coal operators of Nova Scotia have always had more adequate representation in the Council of the Institute than the western operators have had. The Institute is not a tribunal; neither is it a star chamber. It is an organization whose only aim is to safeguard the mining industry of Canada. And its recommendations carry weight at Ottawa.

We regret, therefore, that our contemporary has so mistaken the spirit of our suggestion. The problem of reciprocity will be discussed at the annual meeting of the Canadian Mining Institute. It is fitting and necessary that it should be. And we sincerely trust that Nova Scotia's claim will be presented clearly, calmly, and without the accompaniment of fireworks. There are numerous aspects of the question that need investigation. We are of the opinion, for instance, that railway freight tariffs will provide food for thought. But the one essential is that the subject be approached with deliberation and courtesy.

We congratulate the believers in reciprocity on having so vigorous and so fearless an evangel and we merely suggest that smokeless powder can advantageously replace the older brand.

BANKS AND BUNKUM.

The Farmers Bank of Canada suspended payment on December 20th. One of the incidents that led to the suspension was the investment of the bank's funds in the Keeley mine, South Lorrain, Ontario. In the course of a lawsuit that was settled adversely to the Farmers Bank immediately before it closed its doors, the judge commented harshly upon the unwisdom of the management, and sweepingly condemned the policy of mining investment on the part of such financial institutions.

With the wisdom or unwisdom of the Farmers Bank we are not concerned. It is humanly probable that the management's chief mistake lay in getting caught. Its larger brothers are not without sin; but they have more substantial reserves. They can drop incidental millions in Mexico without batting an eye. They can finance trusts and combines and promotions to any extent with profit to themselves, merely because it is their fixed habit to make the public pay. They have all the machinery necessary. The Farmers Bank had neither the machinery nor the cash. Therefore, its sister institutions will quietly appropriate its assets at a singularly low valuation.

This, however, is a digression. We referred to the judicial condemnation of mining investment. That condemnation was uncalled for. An investment may be either good or bad. The bank's investment, if it was bad, was not so merely because it was a mining investment. Properly controlled mining investments are as sound and as profitable as any other. It implies sheer ignorance of facts to dispute this, and to sound a warning against mining investment *per se* for the sole reason that one particular venture has been badly managed, is illogical in the extreme.

It is obviously true that a chartered bank has no right to speculate in mining. Investment, however, is a totally different thing. The investment of money in developed ore reserves may not only be justifiable, but it may also be extremely profitable. But it must always be postulated that the investment be directed on proper banking principles, and that advances be made against ascertained physical assets.

It will be a happier day for Canada when more of our banks put their (or, rather, our) money into Canadian mines rather than into tropical indiscretions and awful amalgamations.

If, for instance, the caution that is exercised in real estate investment, obtained in what is popularly known as mining investment, then no one would have ground for complaint. That this is possible is proved by the fact that leading English, French, and German financial houses are heavily interested in mines. The attitude of Canadian banks is neither sane nor business-like.

A TRUE HERO.

To the roll of heroes must be added the name of Fred Alderson. Alderson was a fire-boss at Hosmer, B.C. When news of the coal-mine disaster at Bellevue reached Hosmer, Alderson was amongst the first to volunteer as one of the rescue party immediately formed. After assisting in bringing out two men, he returned alone to the mine to attempt to rescue a third. He was then overcome by afterdamp, and all efforts to resuscitate him were unavailing.

Particularly grievous circumstances surround the death of Alderson. He left a wife and four young children in England. As his services were voluntarily given, no one is liable for compensation. His friends and associates are collecting money for the bereaved family, but no collection of this kind can be adequate.

Alderson was the best type of intelligent, loyal and brave Englishman. He hesitated not one moment in laying down his life in the attempt to save his fellows. No nobler death can be hoped for.

The Government of Alberta should act without delay. Such occasions do not arise often. The Government's manifest duty is to provide handsomely for Alderson's family. We cannot believe that any discussion of this point will be considered necessary.

PORTLAND CANAL.

Through the clear and forceful prelimanry report on the Portland Canal Mining Division, written by Mr. W. Fleet Robertson, we are enabled to give our readers a well-balanced idea of that much talked of camp. Mr. Robertson is satisfied that the camp has realized reasonable expectations so far as it has been developed. He deprecates strongly foolish attempts to circulate inflated reports.

An abstract of Mr. Robertson's report appears in this issue of the CANADIAN MINING JOURNAL.

BOOK REVIEWS.

RECORD OF THE FIRST SERIES (1908-09) OF THE BRITISH COAL DUST EXPERIMENTS CONDUCTED BY THE COMMITTEE APPOINTED BY THE MINING ASSOCIATION OF GREAT BRITAIN. 212 PAGES — ELABORATELY ILLUSTRATED WITH HALF-TONES, DIAGRAMS AND COLOURED PLATES. PRICE, $3.00 NET. PRINTED AND PUBLISHED BY THE COLLIERY GUARDIAN COMPANY, LIMITED, 30 FURNIVAL STREET, HOLBORN, LONDON, E.C.—1910.

This record of the coal-dust experiments carried out during 1908 and 1909 at the Altofts Experiments Station, is decidedly the most notable contribution to the literature of a subject that sorely needs attention. At no time could the appearance of such a volume be more timely than at present. The loss of nearly three score lives in a Canadian colliery has been followed by an awful coal mine disaster in Great Britain.

The magnificently illustrated volume before us is the first of a series. It presents the results of experiments dealing with the effect of dustless and stone dust zones upon explosions of a mixture of coal dust and air. Other investigations are not yet sufficiently advanced to warrant publicity. One definite result of the experiments under consideration is that the explosive nature of a mixture of coal dust and air in the absence of inflammable gas has been conclusively proved. The experiments were conducted in the absence of inflammable gas, and without permitted explosives.

The book is divided into two parts. Part I. covers the equipment used and the work done in determining the explosive nature of coal dust. In Part II. the mode of propagation of coal dust explosions is discussed.

A lucid summary of the work accomplished is appended, along with a synopsis of supplementary experiments with Welsh, Scotch, and South African coals.

The work herein described was begun and carried out by the Mining Association of Great Britain. A sum of £10,000 was raised by means of a levy on a tonnage basis, to which all the collieries in the association subscribed, Altofts, Yorkshire, was chosen as a suitably central location, and Mr. W. E. Garforth was placed in charge of the construction and operation or the gallery. The gallery was built on lines suggested by the same gentleman.

The gallery was constructed of second-hand boiler shells, principally made of wrought iron, 7-16 inch thick, but in some cases of steel. The main gallery was given a length of 600 feet; the return gallery a length of 295 feet. The main tube, or intake, is 7 feet 6 inches in diameter, and the return gallery 6 feet. The main tube is one straight length. The return is zig-zag in form, and 6 feet in diameter. Both are strengthened with hoops and chains. Full details of the construction are given in Part I., Chapter 2.

Suitable power equipment was also installed to run a "Siroceo" fan capable of passing 80,000 cubic feet of air per minute, with a water gauge of 3 inches. Many measuring and special devices were added, including a kinematograph.

Most interesting is the description of the expedients resorted to in conducting the coal dust experiments. These cannot be detailed here. But it is appropriate to remark that each step was conceived and completed with admirable care and thoroughness.

Chapter 3 of Part I. treats of the explosiveness of coal dust when raised as a cloud in air. Chapter 4 takes up fully the chemical analysis of coal dust. Then follows a description of the instruments used in measuring pressure, velocity, products of combustion and temperature. Next come chapters on experiments in checking explosions with stone dust, laboratory investigations and microscopical investigations.

The contents of Part II. have already been indicated.

The summary contains an outline of the objects and results of the coal dust experiments. Here, also, allu-

sion is made to the many important questions that are to be tackled in the future.

Three paragraphs are herewith quoted, one to define the object, one to define the results, and one to show the future direction, of the present enquiry.

"The main objects of this enquiry are (1) to demonstrate, as conclusively as possible, the danger that exists from the presence of fine coal dust in the roadways of mines; (2) to discover, if possible, an effective remedy as an alternative to watering; and (3) to investigate the chemical and physical phenomena that accompany coal dust explosions."

"The fact that coal dust, in the complete absence of fire-damp, is explosive when raised as a cloud in air and ignited, has, in the opinion of all who have witnessed the experiments, been definitely established. The information which the Royal Commission on Accidents in Mines desired . . . has thus been obtained, and the controversy which has existed for more than a quarter of a century has been finally set at rest."

"Of the many other questions, (to be attacked in the future), perhaps the most important are:

(a) The determination of the maximum and of the minimum quantity of coal dust that will allow explosion to be propagated; either in pure air or in air containing a small percentage of fire-damp.

(b) The testing of permitted explosives under various conditions.

(c) The determination of the minimum volume, intensity and duration of flame necessary to cause ignition of coal dust when raised as a cloud in air."

* * *

It is not hyperbole to state that the volume before us is the most important pronouncement upon certain phases of the coal dust problem that has ever been printed. In fact it is, so far as we are aware, the only final and authoritative exposition extant. Without doubt, no coal mine operator can afford not to study it carefully.

As regards the typography and general presswork it is difficult to speak too highly. The type is large; clear, and clean. The paper is of excellent quality. The photogravures and coloured plates are as near perfection as can be. The price is disproportionately low. Possibly this may account for the one incidental shortcoming, the flimsy binding.

Both the compilers and the publishers deserve praise for the standard that they have set.

PRACTICAL SHAFT SINKING, BY FRANCIS DONALDSON, M.E., CHIEF ENGINEER THE DRAVO CONTRACTING COMPANY, 143 PAGES, ILLUSTRATED WITH HALF-TONES AND DIAGRAMS. PRICE $2.00, NET. McGRAW-HILL BOOK COMPANY, 239 WEST 39TH STREET, NEW YORK, 6 BOUVERIE STREET, LONDON, E.C. 1910.

For Canadian operators no book could be more timely than this. At the present time hundreds of new shafts are being sunk in opening up new properties. It is not unusual to see painfully careless work done. This is needless and costly. A good shaft is cheaper than a bad one.

The ten chapters are headed thus:—

1. Some deep shafts—features of contracts for sinking—form of contract.

2. Plant required—boilers, hoisting engines, headframe, and bucket—air compressors.

3. Sinking through surface—soft ground—wooden sheeting—steel sheeting—caissons of steel, wood, or concrete.

4. Sinking through soft ground—pneumatic process—shield method.

5. Sinking in rock—arrangement of holes—tools and methods used in drilling—costs and speed.

6. The sinking-drum process—mammoth pump—the freezing process.

7. The Kind-Chaudron boring process—cementation of water-bearing fissures.

8. Lifting water—horizontal vs. vertical pumps——handling pumps in shaft—Cornish pumps.

9. Shaft linings.

10. Concrete linings—costs per linear foot for rectangular, elliptical, and quadrilateral shafts.

"Practical Shaft Sinking" is intended rather for the engineer in charge of very large operations, than for the small operator. For instance, in the section on cementation of water-bearing fissures, the use of core drills is advised for locating the fissures. This presupposes a class of work that the engineer is very rarely called upon to undertake. Hence the volume may fairly be placed in the category of specialized hand-books.

MORE RECENT CYANIDE PRACTICE, EDITED BY H. FOSTER BAIN, 424 PAGES, ILLUSTRATED. PRICE $2.00 POSTPAID. PUBLISHED BY THE MINING AND SCIENTIFIC PRESS, 667 HOWARD STREET, SAN FRANCISCO, AND THE MINING MAGAZINE, 819 SALISBURY HOUSE, LONDON, E.C. 1910.

Like its predecessor, "Recent Cyanide Practice," the volume before us is a compilation of articles culled from Mining and Scientific Press. "More Recent Cyanide Practice" not only supplements the former book, but also touches new fields.

As there are some dozens of contributors, there are, necessarily, conflicting views expressed. No effort has been made to smooth over these differences of opinion. Each article is given for what it is worth.

The articles are arranged logically, the first dealing with ore-crushing, sliming, tube-mill practice, and so on; and the rest touching successive phases of mill work. Filtering, agitation, assaying, testing, and kindred topics are discussed.

" More Recent Cyanide Practice" is by no means a complete handbook; it is a suggestive collection of practical data, of data that will help the millwright, the operator, the chemist, and the general reader.

COMPRESSED AIR PLANT—THE PRODUCTION, TRANSMISSION AND USE OF COMPRESSED AIR, WITH SPECIAL REFERENCE TO MINE SERVICE. BY ROBERT PEELE, PROFESSOR OF MINING IN THE SCHOOL OF MINES, COLUMBIA UNIVERSITY. SECOND EDITION—REVISED AND ENLARGED; 502 PAGES, ILLUSTRATED. PRICE $3.50 NET, PUBLISHED BY JOHN WILEY & SONS, NEW YORK, 1910.

"Compressed Air Plant" has already been reviewed in these columns (see page 505, Vol. 229, 1908) The second edition is larger and more complete. Attention is paid to the construction and operation of rock-drills, coal-cutting machines, and channeling machine. Chapter X. is a record of compressor tests made in Cobalt. The material of the chapter appeared first in the CANADIAN MINING JOURNAL February 15, 1910. Acknowledgement of this fact is omitted.

The increase in price—the former price was $3—is quite justified.

"Peele's Compressed Air" is now accepted as a standard work. The engineer who is armed with it and with another book reviewed in this issue, is fortified against all the slings and arrows of refractory compressors and inefficient drills.

COAL MINING IN CAPE BRETON DURING 1910.

(A Resume by our Glace Bay Correspondent.)

The year 1910 has been one of consistent progress and compares very favourably with the years before the labour troubles that have disturbed Nova Scotia so recently, and have not yet entirely disappeared. With the single exception of the Cumberland Coal & Railway Company, the outputs of all the Nova Scotian Coal Companies will equal the figures of 1907 and 1908.

The outstanding features of the year have been the "merger" of the Dominion Coal Company with the Dominion Iron & Steel Company, under the common control of the Dominion Steel Corporation, and the ending of the United Mine Workers' strike at Glace Bay. Early in the year the new management of the Dominion Coal Company announced that recognition of the United Mine Workers was against the policy of the company, who were, however, and always had been, perfectly willing to receive committees of their workmen. During the first quarter of the year several attempts were made to end the strike, but proved unsuccessful, owing to the insistence of the United Mine Workers upon formal recognition of their union. At the end of April the U.M.W. leaders abandoned their position, recognizing that it was an untenable one, and advised the strikers to return to work. They commenced to do this at the beginning of May, and by the end of that month places had been found for the majority of the men who had been on strike.

Beyond the ordinary accident rate, it is gratifying to relate that there have been no serious disasters in Cape Breton coal mines during the year. In February what might very easily have been a serious cage accident at No. 2 Colliery was averted by the successful operation of safety detaching hooks. In this accident several men were injured, but there was no loss of life. In March, two corps of trained men, with Draeger apparatus and accessories, were sent from the Nova Scotia Steel & Coal Company and the Dominion Coal Company to aid in fighting a mine fire at the Albion mine of the Acadia Coal Company, and they were able to afford valuable assistance.

The final report of the Eight-Hour-Day Commission was presented to the Nova Scotia Legislature at the spring session. The gist of the report, so far as it related to coal mining, was that the Commission were unable to report in favour of a shorter day, although it was stated that they would gladly have done so had the facts permitted. The report stated that a general and compulsory eight-hour law "would be at present a fatal blow to the industrial prospects of Nova Scotia."

Some rather extraordinary legislation was proposed arising out of the U.M.W. strike. One bill proposed to enact compulsory recognition of labour unions by employers of labour under penalty of fines, such fines to be collected by the union demanding recognition. It is needless to state that such a proposal did not become law.

The report of Mr. T. E. Forster, of Newcastle-on-Tyne, on the future methods to be pursued in the extraction of the submarine coal areas of the province was presented to the House, but no legislation in connection therewith was proposed.

The Government introduced a Workmen's Compensation Act, which followed closely the lines of the British Compensation Act. The proposed legislation met with opposition from the Colliery Relief Societies, and committees from these represented to the Government that the Compensation Act proposed would, in all probability, react disastrously upon the societies, which had been in satisfactory operation for some fifteen years. Acting upon the representations made by these committees, the Government exempted from the operation of the Compensation Act such steel works and collieries at which properly constituted relief societies were in existence, provided that such societies had the approval of the Government and were able to afford adequate relief to disabled members. The Relief Societies at the collieries of the Dominion Coal Company, hitherto existing as independent societies, amalgamated at the first of July into one large society, now known as the Dominion Coal Company Employees' Benefit Society. This organization is supported by a contribution of 50c. per man per month from the members, 50c. per month per member from the Coal Company, and a contribution from the Government of three-quarters of one cent per ton on all coal paying royalty. The Government's contribution amounts to about 12c. per month per man, thus the society has an income of, approximately, $1.12 per member per month. The relief paid is $6.00 per week for twenty-six weeks for disability to work, whether caused by accident or by sickness, followed by half pay for a further period of twenty-six weeks; then by $2.00 per week for two years. After which time, if the disability continues, a special grant may be made at the discretion of the society. At death, whether from natural causes or accident, a payment of $100.00 is made immediately to the dependents of the deceased, and an allowance of $8.00 per month for five years is made to the widow, with $3.00 per month for each child until it attains the age of fourteen years. In addition to these regular benefits, special grants may be made for loss of limbs, total disability or loss of eyesight. After four months operation, the total funds to the credit of this society amounted to $83,000. When circumstances will allow, it is proposed to inaugurate an old age pension scheme, for which purpose the sum of $25,000 has already been set aside. By the end of the year it is expected that the membership of the society will be over seven thousand. One of the chief reasons advanced by the Relief Societies in asking that no legislation should be enacted which would interfere with their continuance was that the greater proportion of the relief paid in the past had been for sickness. The experience of the old societies was that, while 35 per cent. of the moneys paid out in relief was for disability caused by accident, 55 per cent. was paid for disability resulting from sickness. In the operation of the new society, so far, the same thing has been observed, more particularly as the year 1910 has been remarkable for the large number of cases of infectious diseases which have occurred in the colliery districts. The consolidation of the funds of the branch societies into one central treasury has made it possible to obtain a higher interest rate on the accumulated funds than was previously possible, and it is expected that the cost of management will be also considerably reduced. The consolidation has further given greater stability and permanence to the societies, particularly at old collieries which before many years have passed will be abandoned by reason of exhaustion.

In August the Royal Commission appointed by the Federal Government to inquire into the status of technical education in Canada, visited Glace Bay and Sydney.

The sitting at Glace Bay was noteworthy by reason of the evidence given by colliery officials of all grades who had achieved their present positions largely through the facilities for technical education in mining afforded by the Nova Scotian Government.

At the end of 1909 the Coal Companies of Nova Scotia at whose works strikes of the United Mine Workers were in progress, were proceeded against at the instance of this union on a charge of conspiracy to raise the price of coal and increase the cost of mining. After a protracted trial, chiefly remarkable for the amusement which the statements of the witnesses afforded the public, the grand jury of the Supreme Court of Nova Scotia found "No Bill."

In September, the Federal Government called a conference of manufacturers of explosives, mine managers and others interested in the manufacture and use of explosives, to confer as to suitable legislation in connection therewith. The Canadian Government has obtained the services of Captain Desborough, of the Woolwich Arsenal Testing Station, and it is expected that a bill governing the manufacture and use of explosives in Canada will be drafted for presentation to Parliament during the winter. This is a matter which intimately concerns all interested in coal mines, and it may be observed in passing that the Nova Scotian regulations governing the use of explosives in mines are comprehensive and based on large experience.

The most marked development has taken place in the Lingan-Victoria field, worked by the Dominion Coal Company. No. 12 Colliery is now producing about 1,000 tons per day, and No. 14 Colliery (which is also on the Victoria seam) will be in a position by next spring to produce up to 800 tons daily. No. 15 Colliery (on the Lingan seam) is in the developing stage, and will have an output in the 1911 season of about 250 tons daily. The permanent bankhead and other colliery erections will be undertaken next year. The site of No. 16 Colliery (Lingan seam) is cleared and the work of development will be proceeded with at a rate which will bring this colliery to its average production in 1913. It is less than three years since the first openings were made in this district, and it now has a population approaching two thousand, and a monthly production of 30,000 tons of coal. A project is under consideration to extend the tram lines of the Cape Breton Electric Company to the new collieries, and give communication with Glace Bay and Sydney. The extension of the Dominion Coal Company's operations to this coalfield has resulted in a great increase in property values, and it will not be many years until the Lingan district will rival Glace Bay.

Considerable underground development work has been done at the new mine of the Dominion Steel Corporation at Birch Grove. This is situated on what are known as the Cumberland areas, lying immediately to the rear of the Dominion Coal Company's areas in the Glace Bay basin. As yet no permanent surface buildings have been erected.

An innovation in colliery practice in Nova Scotia which is likely to be largely followed is the exhaust steam turbine which has been installed at Dominion No. 2 Colliery. This turbo-generator unit consists of a Rateau impulse-type, five-stage, multi-cellular, low-pressure turbine directly connected with a Brown Boveri 1,000 k.w. alternator. The plant includes a barometric condenser with the necessary air pumps and centrifugal pumps for the condensing water. It is more than probable that a second turbo-unit will be installed side by side with the present one, as there is still a large amount of waste steam which it is possible to utilize. This is the first application of exhaust-steam turbines to colliery power requirements which has been made in Canada.

An automatic coal-handling plant for the large boiler house at Dominion No. 2 Colliery is to be installed shortly, the contract for this having been already let.

The Dominion Coal Company has decided to erect a modern coal washery having a capacity of 120 tons per hour. It is probable that the washer will be of the Baum type, but the contract is not let at the time of writing. No washer on this principle has as yet been erected on this side of the Atlantic.

THE MINING INDUSTRY IN THE PROVINCE OF QUEBEC DURING, 1910

(Written for the CANADIAN MINING JOURNAL, by Theo. DENIS, Superintendent of Mines for Quebec.)

The radical changes introduced in 1909 in the Quebec Mining Law have now been in force for over a year, and all the mining rights which were held under the old prospecting licenses were not renewed after their expiration on the first of January, 1910.

The results of the new provisions of the mining law have been very satisfactory, and although one year is too short a period from which to draw definite conclusions, it is gratifying to note that during 1910, prospecting in the Province of Quebec received a decided impetus, which, in a great measure, was stimulated by the changes in the Mining Law.

Figures of production for the year are not yet at hand, as returns from mining companies are received during January, but it may be said that everything points to an appreciable increase in the total figures, which in all likelihood will reach the $6,000,000 mark.

Asbestos.

Asbestos is, of course, the backbone of the Quebec mining industry. It is now ancient history that eighteen months ago some of the important mines at Thetford, Black Lake, were consolidated into two large syndicates with a capitalization of $25,000,000 and $5,000,000 respectively. It was claimed at the time of the promotion and organization of these mergers that very beneficial results could be derived from such a policy. Among these are economy in management and in the sales department, campaigns of publicity to extend the uses of asbestos and a consequent stimulation of the industry. Great stress was laid on the question of standardizing the grades of asbestos, which, up to the time of the merging had to be sold practically on samples, as each mine had a different grading of the various products of the mills. As a matter of fact, in 1909 some 35 names of

grades of "mill-stock" were used, to designate the various qualities produced by the different mills of the district, and this must have been rather bewildering to the buyer. A great improvement in the standardizing has since taken place; but, on the other hand, it must be owned that all the benefits derived from the consolidation of interests could just as well have been attained with a lower capitalization. A glance backward will show that on January 1st, 1910, the total capitalization of the asbestos companies which sent in returns of production was over thirty-five million dollars, whereas the total value of the products of the mines was slightly under two and a half million dollars.

The stimulus which asbestos mining received in 1910 was indeed very notable during the first seven months of the year. The mines were working night shifts, as well as day shifts, and the mills were producing actively. In some cases this activity was probably induced by the hope of making a creditable financial showing in spite of the heavy obligations always inherent to high capitalization. Unfortunately, the consumption of asbestos did not keep pace with the increase of production, the latter gradually creeping ahead of the former, and, as a result, the industry is at present going through a crisis, the severity of which, however, must not be exaggerated. Stocks on hand are very large, a great many mines have had to shut down altogether, and all the others have curtailed their production. The aim in view was certainly not attained, and the high pressure production did not result in high dividends.

That the present tightness of the asbestos market is only temporary is very patent by the past records. From an annual production of a few tons thirty years ago, the industry has grown to 65,000 tons or more, and no one doubts that in a few months matters will have readjusted themselves and the steady development will continue. On a smaller scale this has happened before, and periods of overproduction and consequent depressions have been followed by periods of healthy growth.

From the technical standpoint the mines and mills are in splendid shape. Economies of all sorts have been introduced in all the branches of the industry.

The Bell mines have gone on steadily with their underground development work, and they now have a proved territory representing a large tonnage all blocked out. In depth, the mines of the district show no decrease whatever in the asbestos content of the rock and faith in the life of the deposits has been shown by the construction of new mills and the extension of old ones.

The Black Lake Consolidated has erected a new mill of a capacity of some 1,200 tons of rock a day, adopting the new Torrey Cyclones, which proved so satisfactory at Danville.

The Jacobs Asbestos Company, who re-opened the old Murphy mine in 1909, erected a large mill and both the mine and the mill are giving satisfactory results.

The Bell Asbestos Mines enlarged their mill, which has now a capacity of about 1,000 tons of rock a day.

The figures of shipment of asbestos will show a substantial increase over those of the previous year, in spite of the comparatively large stocks on hand.

Copper.

A new mine has been added to the list of shipping mines. This is the Weedon mine, situated on Lot 22, Range II., of Weedon Township. The deposit worked here was discovered by Mr. McDonald, a couple of years ago. After proving the existence of an important deposit of cupriferous sulphides, the Eastern Canada Smelting Company acquired the property and is now working it systematically.

The nature of the deposit greatly resembles the one successfully worked at the Eustis mine. But the copper contents of the Weedon ore shipped so far are higher than in the Eustis ore.

The slope of the Eustis mine has now attained a length of 3,000 feet and ore has been shipped steadily. It is interesting to note that the manager, Mr. Adsit, is now saving an appreciable amount of copper by passing the mine water over scrap iron.

The small copper smelter at Actonvale was completed and operations begun, but it is yet in the experimental stage. It consists in the main of a water jacketed furnace of a capacity of 80 tons a day, with the accessory apparatus, blower, forehearth boiler, etc. The original intention was to treat the large dumps of the old Actonvale mine, but this is low-grade and will require concentrating.

Mr. A. O. Norton went on with the development work at the Suffolk mine, but no shipments were effected.

The old Ascot mine, the Harrington mine, and the Hepburn mine also received attention, but on a small scale, and all the work done was of a prospecting nature.

Some work was also effected on copper deposits in the Beauce district, near St. Joseph, on veins containing an appreciable quantity of bornite and chalcopyrite.

Gold.

The alluvial deposits of the Beauce region have been the object of special attention on the part of a Montreal Syndicate, incorporated under the name of the Dominion Gold Fields Company. This syndicate, in the latter part of 1909, acquired the gold and silver mining rights of the de Lery estate over the whole of the Rigaud-Vaudreuil Seigniory, and immediately set to work to do systematic prospecting. During 1910 several series of bore holes, by means of Empire drills and a Keystone drill, were put down to test the gravel down to bed rock. The results have been very encouraging, and after testing the auriferous ground, on the Gilbert River, the Des Plantes River, and the Meules Creek, the company has decided for the present to concentrate operations on the last-named stream. Water for hydraulicking is obtained from Lake Fortin, a sheet of water 1¼ miles by ¾ mile, and is to be brought to the workings by a ditch 7 miles long, part of which is flumed. The tailings will be disposed of by an elevator and stacker 45 feet high, and the ground attacked by two monitors under a head of water of over 200 feet. The ditch is now practically finished, the elevator is being constructed by the New York Engineering Company, and it is expected that early next spring the plant will be in operation.

Graphite.

Three companies have been working the graphite deposits of the Buckingham district, and substantial shipments of the refined products are said to have been made. The success of the graphite industry in Canada resolves itself into a question of concentration. That the deposits of disseminated graphite are very extensive has been known for a number of years; during 1910 improvements have been introduced, and it is claimed that the question is satisfactorily solved and that the graphite industry is now on a more solid basis than ever before.

A new important deposit has been opened on lots 20 and 21, Range V., of the township of Buckingham, on what is known as the Stuart property. The ore has been exposed over a large surface, and is said to average 15 per cent. graphite of which 10 to 12 can be saved. The erection of a 200-ton mill is contemplated.

A new syndicate, "Graphite, Limited," is opening a deposit on Lots 16 and 17, Range VII., of the township of Amherst.

On the whole, the outlook of the graphite industry for 1911 is promising.

Chrome Iron Ore.

Practically nothing was done in chrome mining during 1910. All the mines and mills were closed down, and if any shipments were made it was from stocks on hand.

The chrome deposits of the serpentine belt are essentially concentrating propositions, and are at a disadvantage when competing with New Caledonia and Turkish ores. It is said that these can be delivered in New York at $14.00 and less per gross ton, or $12.50 per ton of 2,000 lbs., whereas under present conditions $15.00 for Canadian ore does not leave much margin for profit.

Mica.

The mica industry was very quiet throughout the year. During 1909 the prices had been unsatisfactory and large stocks had accumulated. The greater part of the shipments effected during 1910 was from the stocks.

Iron.

Nothing of note occurred in the iron industry. The furnace at Radnor Forges produced steadily, but as in past years the greater part of the ore used comes from Ontario.

Titaniferous Iron Ore.

The very large deposits of titaniferous iron ore of the province attracted a great deal of attention during the year. Numerous enquiries concerning these were received at the Bureau of Mines and several deposits were examined by American engineers. Experiments on mechanical elimination of the TiO_2 have been going on for some time in the United States, and some iron producers are willing to enter into contracts for ore of 50 per cent. iron and 20 per cent. TiO_2. Several thousand tons have been shipped from the St. Urbain deposits to titanium steel manufacturers.

Magnesite.

The Canadian Magnesite Company is working the deposit in the township of Grenville and production this year will be appreciably greater than in 1909. This magnesite is used in the manufacture of aerated waters and also in the manufacture of a flooring cement of high quality.

Building Materials.

The development of the building material industries is, of course, steadily increasing with the growth of population and expansion of the other industries. The output of the quarries of limestone, granite, and other stone will certainly show a substantial increase We note the opening of a new marble quarry at South Stukeley, which is now producing a beautiful ornamental stone. The marble quarries of Philipsburg have worked steadily throughout the year, and their stone finds a very good market both in Canada and in the United States.

The northern part of the Province of Quebec is beginning to attract a well deserved attention, more especially in the northwest parts of the province in the Temiskaming and Abittibi regions. The extensive patches of Huronian rocks, which will be made comparatively accessible by the Transcontinental Railway, will in all probability well repay thorough and systematic prospecting operations. A promising deposit of gold is being developed at Lake Opasatica. Large quantities of molybdenite are said to be available at Lake Kewagama and a great deal of development work was done on this deposit during the summer by a Quebec syndicate. On the whole, we may look forward to a substantial development and an expansion of the mining industry in both the settled parts of the Province of Quebec and in its "hinterland."

ONTARIO IN 1910

Written for the CANADIAN MINING JOURNAL by T. W. GIBSON, Deputy Minister of Mines.

The mining industry of Ontario continues to make rapid and steady progress. In money value at the point of production and in the form produced, the output of the mines and mineral works for 1910 was worth about 30 million dollars, while, if based upon the refined metals or products, the value would be increased by about 13 millions—say 43 millions in all. The aggregate for the whole of Canada on this basis in 1909 was 90 million dollars; consequently, Ontario is now turning out in value almost one-half the total production of the Dominion. As this province produces no coal—the output of which in Nova Scotia, British Columbia and Alberta amounts to about 24 or 25 million dollars per annum—it is apparent that in the production of metals Ontario easily takes first place among the provinces.

Silver.

In the list of Ontario metals silver and nickel are the chief, claiming the Cobalt and Sudbury districts as their respective places of production. The yield of silver from the Cobalt mines began in 1904 with 206,875 ounces; in 1910 it may be put down at not less than 27 million ounces. For the first nine months of the year the yield was 19,791,033 ounces, and, as the last quarter is expected to show a somewhat increased production, 27 million ounces may be accepted as a conservative estimate. For the seven years, 1904 to 1910 inclusive, Cobalt has added over 90 million ounces to the world's stock of silver. Ontario's annual production is now about three-eighths that of Mexico, and fully one-half that of the United States, the two leading silver-producing countries.

An analysis of the shipments for the first nine months of last year does not show that there has as yet been any serious diminution in the silver contents of the Cobalt ores. In 1904 the average of the shipments was 1,309 ounces per ton; in 1905, 1,143 ounces; in 1906, 1,013 ounces. During these first three years of the camp's existence, high-grade ores only were shipped, and the figures showing the average silver contents reflect this fact. In 1907 low-grade ores began to be sent out freely, and the average fell to 667 ounces per ton. Concentration plants came into use in 1908, and ore shipments that year averaged 736 ounces silver per ton, rising in 1909 to 809 ounces. The ore shipped during the first nine months of 1910 contained on an average 767 ounces. Shipments for this period were ore, 19,191 tons; concentrates 4,633 tons.

The list of producing mines remained much the same as in 1909. It included Nipissing, Crown Reserve, Kerr

Lake, La Rose, McKinley-Darragh-Savage, Coniagas, O'Brien, Temiskaming, Buffalo, Hudson Bay, Trethewey, etc. One feature of the year was the rise of Temiskaming.

In South Lorrain, Wettlaufer is attracting considerable attention, and in Gowganda, Millerett and Miller Lake-O'Brien, particularly the former, have shipped considerable high-grade material. Neither of these fields, however, has as yet shown the qualities of a Cobalt.

It is satisfactory to know that a large part of the Cobalt production is now treated in refining works within the boundaries of the province. At Deloro, Thorold and Copper Cliff well-equipped smelters are now turning out merchantable bars which go direct to the great silver marts of the world, principally London.

Nickel.

The second staple of the mining industry of Ontario is nickel, the output of which is increasing with much rapidity. Ten years ago the nickel mines yielded 3,540 tons of the metal; five years later this had risen to 9,503 tons, while in 1910 the output will be in the neighbourhood of 18,000 tons. It is curious that in the ores of both nickel and cobalt, the French penal island, New Caledonia, has until lately been the chief competitor of Ontario. The advantage in each has proved to be with this province, and the nickel and cobalt deposits of New Caledonia are now but little worked.

At the Sudbury mines, as is well known, the ore is a pyrrhotite carrying both nickel and copper, the former predominating. After being raised and crushed the ore is roasted in the open air and afterwards smelted in blast furnaces to a bessemer matte, containing say, eighty per cent. of nickel and copper. A considerable quantity of ore, however, is now smelted without preliminary roasting. The matte is exported to the United States and England where final separation of the metals takes place. The producers are the Canadian Copper Company and the Mond Nickel Company, the former being the larger concern. The principal deposits worked by the Canadian Copper Company are the Creighton and Crean Hill mines, the former being richer in nickel than in copper, the latter vice versa. The Mond Company has for years worked the ore bodies at Victoria Mines, but, latterly, has operated as well the Garson mine in the township of that name, and is contemplating the removal of its smelter to a point on the railway nearer that property. The outcrop of nickeliferous pyrrhotite in Dundonald Township, on the T. & N. O. Railway, which so much resembles the Sudbury ores, did not undergo any further development during 1910. It is said that the result of diamond drilling by the Canadian Copper Company did not prove the existence of large bodies of ore.

Gold.

There is ground for hope that the long record of disappointment in connection with gold mining in Ontario is about to be broken. The spectacular showings of free gold in the quartz outcrops at Porcupine have been worked to considerable extent during the past year, and further discoveries as well have been made. It is fortunate that some of the most promising finds passed into the control of capitalists well able to test them, as in the case of the Timmins and the Dome mines. At both, small experimental stamp mills are being replaced by larger plants. Now that nature and winter have given Porcupine passable roads, machinery and supplies are pouring into the camp, and next year will undoubtedly make or break its reputation as a gold producer.

The Ontario Government has intimated its intention of building a branch of the T. & N. O. Railway from the main line near Kelso into the new gold field, a distance of about 30 miles. The country is not rough and there are large areas of farming lands surrounding the mining camps. The gold at Porcupine is found in veins contained in Keewatin and Huronian rocks, the veins themselves being mostly composed of quartz, and also in some instances of ferruginous carbonate cut by quartz stringers. At Long Lake, on the Sault branch of the C.P.R., a promising gold prospect is being operated by the Canadian Exploration Company, of Montreal. The ore contains some arsenic.

Iron.

The mines producing iron ore, are, Helen mine at Michipicoten, Moose Mountain, Atikokan, and Bessemer, the last-named being in the County of Hastings. During the first nine months of 1910 the output was 121,488 tons. The blast furnaces at Port Arthur, Sault Ste. Marie, Midland, Hamilton and Deseronto during the same period produced 319,698 tons of pig iron, and the total production for the year will probably be 425,000 tons.

Copper.

The chief source of copper is the Sudbury pyrrhotite, and, to some extent, this metal is a by-product of nickel mining. For the first nine months of 1910 the matte product of the Sudbury furnaces contained 7,168 tons of copper, and the yield for the full year would, at this rate, be in the neighbourhood of 9,500 tons, which is 1,500 tons more than the output for 1909. There are deposits of chalcopyrite at Bruce Mines and elsewhere on the north shore of Lake Huron, and also on the north shore of Lake Superior, but at present these do not contribute largely to the production of copper.

Cobalt.

An interesting example of the disturbance of market conditions, caused by excessive production of any one useful commodity, is afforded by the present condition of the cobalt oxide industry. The enforced production of cobalt ore at the silver mines in the Cobalt district is now far beyond the world's capacity for consuming cobalt products, the principal of which is the oxide, mainly employed to give a beautiful blue colour in the china and enamelled ware trade. In consequence the price has fallen from $2.50 to 80 cents per pound, with the possibility of a further decline. It may be that the cheapness of cobalt will open up new uses for the metal or its compound. An alloy of cobalt and chromium has been invented and is said to be very suitable for the manufacture of cutlery.

Southwestern Ontario.

It must not be overlooked that the southwestern peninsula of Ontario is an important source of production for a number of useful mineral substances, including petroleum, natural gas, salt and gypsum. The output of crude petroleum has been declining for a number of years, and the downward curve continued during 1910. The yield in 1909 was 14,723,105 imperial gallons, while in 1910 the output will probably prove not to be in excess of 11,000,000 gallons. The decrease is apparent not only in the older oil fields of Petrolea and Oil Springs, but also, and even in a greater degree, in the new districts of Tilbury and Romney, and this, in despite of the bounty of 1 1-2 cents per gallon of crude petroleum, paid by the Dominion Government.

Natural gas wells are, on the contrary, yielding more freely than ever before, and the output which in 1909 was valued at $1,888,179 will probably be exceeded by the yield of 1910. The benefits of this cheap and most

efficient fuel are now being enjoyed by the villages, towns, and cities of Southwestern Ontario, and, to a considerable degree, by the farming population as well. The gas fields are confined to the counties lying on the north shore of Lake Erie.

The salt industry has its seat along the eastern shores of Lakes Huron and St. Clair, the Canadian Salt Company, of Windsor, being the largest producer. Brine is pumped and evaporated.

Water Power.

The abundance of water power in the mining districts of Ontario is a favourable feature, conducing to economy in the operation of mines. In the Cobalt camp generation of power from wood or coal has practically come to an end, and the mines and mining works are now almost wholly operated by means of electricity obtained from water power situated on the Montreal and Matabitchouan Rivers. The cost of power in this way has been reduced from $150 or $175 per horse power per annum to $50. A similar development has taken place in the nickel region. The Canadian Copper Company and the Mond Nickel Company have developed water powers, one on the Spanish and the other on the Vermillion River, and both now work their mines and operate their machinery by the electric current. The Helen mine is also being operated by electric power derived from the Michipicoten River. In the Porcupine gold camp there are falls within convenient distance capable of affording all the power which the camp will require. Similar conditions exist in the mining districts of Eastern Ontario, where mines of graphite and pyrites, cement works and, at least, one smelting plant are operated by electric power produced by falling water. In estimating the advantages of the mining regions of Ontario this feature should not be left out of account.

Minor industries, yet in the aggregate of considerable importance, based on such materials as corundum, mica, graphite, pyrite, talc, etc., do not exhaust the long and varied list of the mineral resources of this province. Clay for brick and tile-making is abundant; so is limestone for building purposes and the manufacture of lime, and many varieties of granite and sandstone are easily procurable. Beds of the most beautiful varieties of marble for decorative interiors have been located, and are now being worked in the County of Hastings.

BRITISH COLUMBIA.

By E. JACOBS, Victoria, B.C.

An estimate of the mineral production of British Columbia in 1910 gives a net increase in value of $1,550,665, as shown in the accompanying table. It will be seen, though, that this is chiefly due to a substantial increase in coal, for with the exception of gold and a small addition to last year's total of silver, there was a decrease in the other minerals, these including lead, copper, zinc, and coke. Speaking generally, there has been a check in the production of lead, copper, and zinc, of the metalliferous minerals. In the case of copper, though, the opinion may be expressed that it is more apparent than real, for there appear to be grounds for concluding that last year's copper returns supplied to the Department of Mines in one or two important instances gave the assay value of the ore rather than the quantity of copper actually recovered at the smeltery. On the contrary, it is believed the figures used in the estimate presented herewith show the copper recovered. The estimate for 1910 follows:

Gold, placer, oz..	24,100	$482,000	I. $5,000
Gold, lode, oz...	257,000	5,312,190	I. 388,100
Total gold, oz.	281,100	$5,794,190	I. $393,100
Silver, oz	2,500,000	1,282,500	I. 43,230
Lead, lb.	37,000,000	1,480,000	D. 229,259
Copper, lb.	39,000,000	4,972,500	D. 946,022
Zinc, lb.	4,000,000	184,000	D. 216,000
Total metalliferous		$13,713,190	D. $954,951
Coal, tons, 2240 lb.	2,799,000	9,796,500	I. 2,773,834
Coke, tons, 2240 lb.	214,000	1,284,000	D. 268,218
Building materials, etc....		1,200,000	.....
Total mineral production.		$25,993,690	I. $1,550,665

In making calculations, the Engineering and Mining Journal average prices of metals for eleven months, to December 1, have been taken approximately. Following the official custom in the province, deductions have been made of five per cent. off silver, and ten per cent. off lead. Only 85 per cent. of the value of the spelter in the zinc concentrate has been allowed for. The prices used are: For placer gold, $20 per oz.; lode gold, $20.67 per oz.; silver, 51.3 per oz.; lead, 4 cents per lb.; copper, 12.75 cents per lb.; zinc, 4.6 cents per lb. Coal is at $3.50 per long ton, and coke at $6, these being regarded as fair average prices for British Columbia. Taking the several minerals separately, the following comment is submitted:

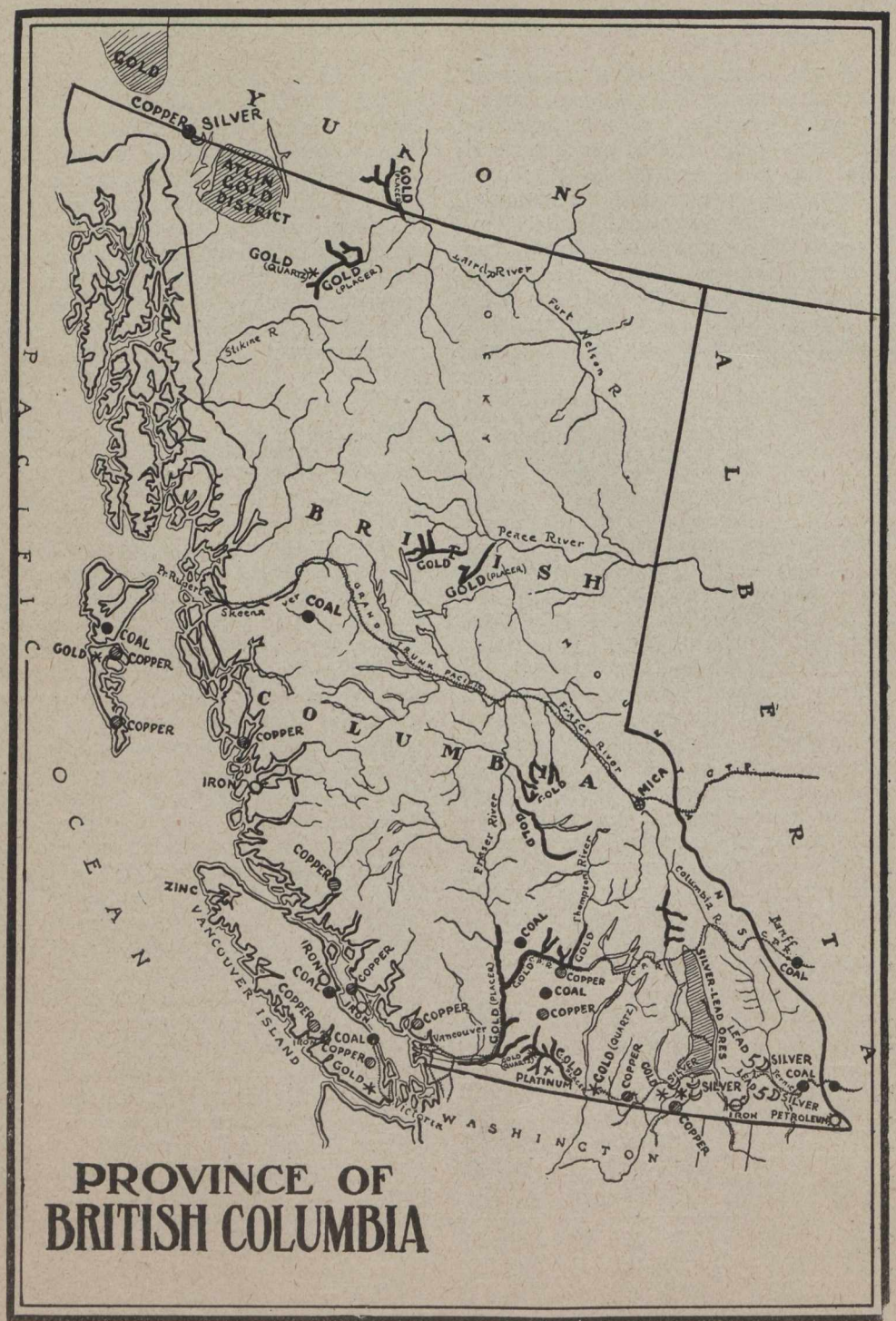
Gold.—The year's placer gold mining shows a small net increase. The season was not favourable for hydraulicking operations in Cariboo district, a shortage of water having prevented cleaning up at several of the larger mines, consequently only 10,100 oz. was recovered, as against 12,350 in 1909. Several small losses brought the total decrease up to 2,750 oz. Against this, however, Atlin, in Cassiar district, made a gain of 3,000 oz., so that there was a net increase of 250 oz., or $5,000 in the whole province.

In lode gold, the gain was 18,776 oz. Approximately one-half of this was made by the Hedley Gold Mining Company, operating the Nickel Plate mines, in the Similkameen, and the remainder coming in large part from mines in Sheep Creek camp, Nelson mining division, and in smaller degrees from Rossland mines. The British Columbia Copper Company's Wellington group mine—a new producer—also made an appreciably large addition to the year's lode gold production. There were not any decreases worth mentioning, the various mining divisions well maintaining their gold output. The outlook is favourable for a further increase in 1911.

Silver.—The quantity of silver produced was practically the same as in 1909. There were decreases in East and West Kootenay, chiefly in Ainsworth mining division, of the latter district, but these were compensated for by corresponding increases in the Slocan and Coast districts. Between 500,000 and 600,000 ounces of silver was recovered from copper-gold ores by smelteries; the greater part of the remainder came from galena ores. The recovery of silver at the Consolidated Mining and Smelting Company's lead and copper reduction

works at Trail was about 2,000,000 ounces, or four-fifths of the total of the province. For the first time, a Portland Canal mine contributed to the year's production.

Lead.—The decrease in this metal is about 7,000,000 pounds. The St Eugene mine, East Kootenay, was 8,500,000 pounds short of its 1909 production, but against this loss the Sullivan, in the same district, formerly idle, produced approximately that quantity. In Ainsworth division two of the larger mines were, together, 7,500,000 pounds short, in one case owing to the destruction of a concentrating mill by fire and the consequent loss of the greater part of the season's production. There were several gains in the Slocan—at the Richmond—Eureka, Van Roi, and Standard, notably at the last with an increase over 1909 of about 1,500,000 pounds. Summer fires cut down the production of silver, lead, and zinc at several important Slocan and Ainsworth division mines, destroying surface works at the mines and bridges and trestles along six or seven miles of railway, thereby practically stopping production for six months.



Copper.—Compared with the 1909 official figures, production in 1910 was less by about 6,600,000 pounds. A reason for much of this seeming loss has already been given. The proportions of production by districts were: Boundary, 31,500,000 pounds; Rossland, 3,600,000 pounds; Coast, 3,200,000 pounds, and the remainder from other parts. The Granby Company's output was reduced following a destructive fire at the mines, which

interfered with ore-shipping and necessitated blowing out several furnaces at the smeltery until fresh arrangements could be made for resuming the normal output. The British Columbia Copper Company made a gain of about 1,000,000 pounds. Both the Consolidated Company, at Trail, and the Tyee Copper Company, on Vancouver Island, also made increases in production of this metal.

Zinc.—The production of zinc was seriously checked by the forest fires already mentioned. The Whitewater mill, up to last July, produced much zinc concentrate, and in 1909 the Lucky Jim mine shipped 5,000 tons of crude ore averaging about 45 per cent. spelter. The latter mine was within a week of being ready to ship on a larger scale than formerly, when the destruction of the railway took away its transportation facilities. Shipments will be resumed next year. The Ruth has 450 tons zinc concentrate not yet shipped from its mill at Sandon, Slocan. The Van Roi produced until August, when its lease of a concentrating mill expired; it is now building its own mill on Four-Mile Creek, 2,000 feet from portal of mine tunnel No. 5. This property is in the Slocan Lake district.

Iron.—While there are deposits of iron ore in various parts of the province there has not been any production in recent years.

Coal and Coke.—The comparatively large net increase in coal was the result of a general enlargement of operations at the ten collieries that have passed the preliminary stage of production. This is evident from the following approximate figures of net production: Vancouver Island collieries (5), in 1910, 1,616,000 long tons; in 1909, 1,386,000 tons. Nicola Valley colliery, in 1910, 141,000 tons; in 1909, 62,000 tons. Crow's Nest Pass collieries (4) in 1910, 1,026,000 tons; in 1909, 558,000 tons. One new colliery, in Similkameen district, commenced producing and added to the total. There was, however, less coal made into coke, which accounts in small part for the increase in coal sold as such. The gross production of coal during the year under review was 3,119,000 long tons, as compared with 2,400,000 tons in 1909. The opening of several new fields, or extensions of fields already producing, is in progress. These are, respectively, the Upper Elk River and the Flathead fields, which are northerly and southerly extensions of the present Crow's Nest Pass field; about Princeton and Granite Creek, in the Similkameen; in Nicola Valley; in the Skeena district, through which the Grand Trunk Pacific Railway is being constructed; on Graham Island, of the Queen Charlotte group, and on Vancouver Island. Prospecting for coal is being carried on north of Kamloops along the route of the Canadian Northern new railway, and as well in Northern Cariboo.

Notes of Progress.—In Cariboo, the producing capacity of Mr. John Hopp's hydraulic placer gold mines was considerably increased, and the Quesnelle Hydraulic Gold Mining Co, of Philadelphia, Pennsylvania, made much progress with construction of its 17-mile ditch and flue. In Atlin, a small but rich gold-quartz mine was opened on Taku Arm of Tagish Lake. In East Kootenay, the Consolidated Company put in an ore-testing plant at the St. Eugene mill, and re-opened the Sullivan lead mine, while the Provincial Government established a mine-rescue station at Hosmer, Crow's Nest Pass. In Slocan, the Van Roi Mining Company made progress with building a concentrator, and at the Standard a big shoot of galena ore was developed. At Rossland, another valuable shoot of gold ore was found in the War Eagle, and Le Roi No. 2 Company opened an ore body on the 1,300-foot level. In the Boundary, the British Columbia Copper Company commenced shipping gold ore from its Wellington group mine, and increased the blast furnace capacity of its smeltery at Greenwood 50 per cent. In the Similkameen, the Hedley Gold Mining Company put in a larger power plant and added fine-grinding and more gold-saving appliances at its 40-stamp mill. On Vancouver Island, the Tyee Copper Company increased its custom ore smelting business, while the Canadian Collieries (Dunsmuir), Limited, made important additions to its plant. Up North, the Portland Canal Mining Company built and equipped a concentrator and commenced production at its mine.

MINING IN BRITISH COLUMBIA

Preliminary returns, obtained unofficially from nearly all the producing mining companies, appear to warrant the conclusion that, in value, the mineral production of British Columbia was higher in 1910 than in any previous year in its history. A carefully prepared estimate, based on the returns above mentioned, gives a total value of all minerals produced in the province in that year of nearly $26,000,000. If this estimate shall prove approximately correct—and it is believed it will—when the revised statistics shall be received by the Provincial Department of Mines, it will substantiate the present tentative claim that last year was a record year for British Columbia in point of total value of its mineral production, the highest previous total having been that of 1907, when official records gave $25,882,560 as the value for that year, in which the quantities of alluvial gold, silver, lead, and copper were larger, while in 1910 lode gold and coal were produced in such greater degree as to more than compensate for the excess in 1907 of the first-mentioned minerals.

In briefly reviewing the progress of production in 1910 the probable misleading tendency of comparisons of value rather than quantity is kept in mind, for since yearly average prices of these minerals the market value of which fluctuates, at times considerably, vary widely in the course of say five or ten years, it is manifest that comparisons of value may fail to exhibit the true condition of an industry in one year as compared with another. However, it happens that average prices for 1909 and 1910, respectively, differ but little, so that in this particular instance the unfairness to one year as compared with the other is unimportant.

The striking decreases in production last year as compared with 1909 were in lead and copper, and in smaller degree in zinc, which last, however, is not yet produced in the province in sufficiently large quantity to greatly affect the year's total of mineral production. The estimated quantity of lead produced in 1910 (37,000,000 pounds) compares unfavourably with that in 1909 (44,396,000 pounds). Again, copper, with an estimated total last year of 39,000,000 pounds, compares with 45,597,000 pounds on official record as the production of 1909. In regard to lead, the chief falling off, it must be frankly admitted, resulted from the practical exhaustion of the known ore bodies in the St.

Eugene mine, East Kootenay, heretofore the largest lead-producing mine in Canada. It is yet too soon to conclude that the present failure of supply will be permanent, for there is, in the St. Eugene group, much ground still unexplored; the present condition is, however, as here shown. On the other hand, the company owning the St. Eugene last year acquired possession of another lead mine, situated in the same division, which yielded sufficient lead to make good the shortage from the St. Eugene. Two mines, in another mining division, however, were also short in their production of lead—together 7,600,000 pounds, which comparatively large decrease was not made up by other mines in the province. In neither of these, though, is the ore exhausted, the stoppage of production for the time having been the result (so it is stated) of dissensions among some of the larger shareholders in the company owning it, and at the other of the destruction by forest fires last summer of the mine concentrating mill and numerous trestles and bridges of the railway that afforded the property transportation facilities. As to copper—the opinion may be expressed that the decrease is more apparent than real, for some copper producers who had previously shown in their annual returns to the Department of Mines the assay value of their ores, gave for 1910 the quantity of copper actually recovered at the smeltery. The material difference in the returns will be evident when it is remembered that one company having an ore production of 1,000,000 and losing five pounds of copper per ton of ore in the slag from the blast furnaces, would necessarily show a difference in production of 5,000,000 pounds of copper. It would seem, therefore, that the 1910 returns exhibit more nearly the actual quantity of copper recovered.

While there was last year an increase of nearly $400,000 in the value of the gold production, this amount is not important enough to call for comment, other than mention of the fact that of this increase $86,000 came from Rossland lode mines, and $190,000 from the Nickel Plate mine, Hedley, Similkameen. The increase in the production of coal is specially noteworthy, though, for the total value of coal and coke for 1910—$11,080,000—was $2,505,000 greater than that for 1909. In this connection, prices used in calculating value are not subject to fluctuation, so the comparison may be taken to indicate correctly increase in quantity of coal produced. Of the net increase—approximately 792,000 tons, after deducting that made into coke—some 468,000 tons is to the credit of four collieries in the Crow's Nest Pass district, Southeast Kootenay, and 324,000 tons to that of six collieries in the Coast district, five of which are on Vancouver Island. The year's gross production of coal, including that made into coke, was approximately 3,119,000 tons (2,240 pounds) as compared with 2,400,000 tons in 1909.

In passing, mention will be made of the fact that several mining companies operating in British Columbia paid dividends in 1910 to their respective shareholders. These were: The Hedley Gold Mining Company, four quarterly dividends at the rate of 12 per cent. per annum, on its issued stock, $1,200,000, total of these payments for year, $144,000; Le Roi No. 2, Ltd, three dividends each of two shillings per share on 120,000 shares, total of these payments £36,000; the Hastings (British Columbia) Exploration Syndicate, Ltd., one dividend of sixpence per share, total of this payment being £1,509 7s. 6d.; the Crow's Nest Pass Coal Company, two dividends, each of one per cent., total amount paid $124,253, and the Granby Consolidated Mining, Smelting and Power Company, one dividend of one per cent., amounting to nearly $150,000. The last mentioned company had at the close of its last fiscal year on June 30th, 1910, about $1,000,000 in cash and unsold copper, but this available credit was held in case it should be required for purchase of new mines, which is the policy of the directors at present. Among others, the Consolidated Mining and Smelting Company of Canada made a net profit in its fiscal year, ended June 30 last, of $309,945, bringing its Profit and Loss account credit balance up to $671,011. and the British Columbia Copper Company's last fiscal year's profit was $204,973, making a total credit of $474,704. Both companies have since made additional profits out of their later operations. As they are adding to their mining property holdings as favourable opportunities to do so are found, and are extending their smelting works, they can not also distribute their profits among their shareholders.

As giving much promise of enlarged operations in the early future, the activity of the larger companies especially is worthy of note. The Consolidated Mining and Smelting Company of Canada, which has large lead and copper smelting works, also an electrolytic lead refinery, at Trail, West Kootenay, in 1910 smelted 445,000 tons of ore and produced gold, silver, lead, and copper of a total value of $5,543,000. This company supplies practically all the refined pig lead used in Canada for the manufacture of lead pipe, shot, white lead, and other lead manufactured products, and as well exports lead to the Orient and Australia. Refined gold and silver are sold to the branch at Ottawa of the Royal Mint, gold to the United States Assay Office, Seattle, State of Washington, and silver to China. Incidentally it will here be stated that in 1910 about 58,000 ounces of gold was sent from British Columbia to the United States Assay Office, Seattle, and this, notwithstanding that there is in Vancouver, B.C., a Dominion of Canada Assay Office.

The Granby Consolidated M. S. & P. Co. smelted about 1,100,000 tons of low-grade copper ore, from its own mines, in 1910. The average of metals recovered from 1,178,853 tons of ore, during this company's last fiscal year, was, per ton: Copper, 18.70 pounds; gold, 0.0370 ounces, and silver, 0.2281 oz. The cost per ton of ore, exclusive of the cost of marketing the product, was $2.50. The British Columbia Copper Co. smelted approximately 456,000 tons, which contained 25,640 ounces gold, 85900 ounces silver, and 7,351,000 pounds copper. Both these companies have large and modernly equipped copper smelteries, with copper converter departments. The blast furnace capacity of the former is 4,000 to 4,500 tons of ore per diem, and of the latter a maximum of 2,600 tons.

The Hedley Gold Mining Company has lately added much new plant, including improved gold-saving appliances, to its 40-stamp mill, and has materially increased its gold-producing capacity.

If space were available much of interest might be added concerning the development of the coal resources of the province, in connection with which there is more activity in new fields, as well as old, than at any previous time. Some idea of the vastness of the coal resources of the province may be given by mentioning that Mr. D. B. Dowling, of the Geological Survey of Canada, in his last-published report (Geological Survey Publication No. 1035, p 33) estimates one coal field only (of the six or eight known fields in British Columbia) to contain 36,600,000,000 tons of coal, as follows:

Elk River Field (Crow's Nest Pass), Southeast Kootenay.

Southern portion, estimated area, 230 square miles; workable seams, 22; workable coal, 22,600,000,000 tons.

Northern portion, estimated area, 140 square miles; workable seams, large number; workable coal, 14,000,000,000 tons.

In conclusion, a few general facts will be stated. The Dominion Department of Mines, every year, sends several parties to do topographical and geological work in the province, and afterwards publishes valuable reports illustrated by sketches and maps. The Provincial Department of Mines, similarly makes investigations and issues official bulletins and an annual report. Dominion officials are now making elaborate investigations and experiments in connection with the reduction of zinc ores of which there is, in British Columbia, a very large tonnage available, awaiting the provision of low-cost smelting or other reduction facilities, to admit of the utilization of these ores at a profit. Mr. F. W. Harbord, London, and Mr. W. R. Ingalls, New York, are engaged in an advisory capacity in connection with these important investigations. Advances in the metallurgy of other minerals are being made. New mining fields are being exploited. More railways are in course of construction, thus opening to industrial activity districts previously lacking necessary transportation facilities. Last, outside capital is being interested with assurance of being given a "fair run for its money."

PORTLAND CANAL MINING DIVISION

(Notes from Preliminary Report by Wm. Fleet Robertson, Provincial Mineralogist.)

The Portland Canal mining division came into legal existence by Order in Council on August 1st, 1910, with the mining recorder's office in the town of Stewart, at the head of Portland Canal. The notice appearing in the Official Gazette of July 21st, 1910, gives the official description of the boundaries of the new division, which may, however, be summarized as "the drainage area of all streams, in British Columbia, flowing into the Portland Canal."

While the history of mining in the district only began this fall, prospecting has been going on steadily and quietly for ten or twelve years, and the district has been twice visited by the provincial assayer, whose reports have been published by this department—the last in 1909—so that the writer confined his attention this season to seeing what had been done on the more developed claims and on those which report credited with more nearly approaching the production stage. The time available for the inspection was limited, and the season at which it had to be made—in October—was so late in the year that many of the claims at higher altitudes were covered with snow, while on others work had been temporarily abandoned for the winter, so that, but comparatively few of the many claims recorded and partially developed could be inspected; consequently this preliminary report must be taken, not as a complete review of the camp, but as an impression gained from a short visit and the inspection of a few claims.

The Portland Canal camp cannot, as yet, be taken as proven, for, although some prospecting has been going on for years, the great majority of the claims have been staked within the past couple of years, and consequently have not and could not have had sufficient development done on them to prove their value. Only two or three of the older claims have done serious development, and of these, at least one property has shown by such that ore is present in quantity and quality sufficient to justify its being called a mine, and to guarantee extraction from present development for at least two years. On other properties where the actual development is slight, the work done by nature has exposed such an amount of mineral as to give considerable hope for future development.

The camp contains a large number of properties from the prospect workings of which exceptionally high assays have been obtained, giving rise to unwarranted hopes and statements which cannot be borne out on a strict examination. The camp justifies reasonable expectations for the development done, without exaggeration by well-intending though injudicious friends whose wild statements nearly "killed with kindness" the best endeavours of legitimate workers.

Portland Inlet, and its inner extension, known as Portland Canal, form a great continuous fiord or arm of the sea, extending from the Pacific Ocean, at Dixon entrance, in a northerly direction for about 110 miles, and so almost penetrating the Coast range of mountains—a granite range which follows the entire coast-line of British Columbia, and extends northwards into Alaska. This is the only arm of the sea so cutting the mountain range, although the range is cut elsewhere by certain rivers flowing westward from the interior, notably the Stikine, Skeena and Fraser Rivers, the latter two having already been utilized as railway locations.

The Portland Canal for its entire length forms the International boundary—the land to the westward belonging to Alaska, while that to the east is in British Columbia. From the head of the canal this boundary-line follows northerly along the summit of the range of mountains between the Bear and Salmon Rivers for a distance of about ten miles, to Mount Dolly; thence striking in a northwesterly direction, crosses the Salmon River some 14 miles from its mouth, leaving the watershed of Bear River and of the headquarters of Salmon River in British Columbia, while the lower part of Salmon River is in Alaska.

The importance of this arm, from a mining point of view, is that it gives deep seawater navigation to, and so renders easily accessible, a district in which granites of the Coast range came in contact with the sedimentary formations lying to the eastward and farther inland. This region of contact extends for the whole length of the Coast range and, from its geological features, forms a zone of probable mineralization, as has been repeatedly pointed out in these reports and is here again emphasized.

The geology of the Bear River district may be generalized as follows, subject to certain exceptions and variations which will be fully demonstrated in the detailed map and report of Mr. R. G. McConnell, of the Geological Survey, who, with a party, spent the summer of 1910 in making a detailed geological study of the field.

The earth-cleft referred to as forming the valley of Bear River was probably accompanied by considerable movement, and, although the line of the cleft is covered by the valley filling, its effect is noted in the contrasting

geological formation of the east and west sides of the valley.

The west side of the valley is essentially and fundamentally of plutonic and volcanic origin, granites on the lower part of the valley, changing to a dark igneous rock— probably a diabase—farther up the river and showing in the wash from the higher elevations, not visited, fragments of volcanic agglomerates.

This igneous mass has been but little cut by dykes, but the diabase is seamed in all directions by small stringers of white quartz, very sparsely mineralized, while at intervals more important east and west cross-fissurings occur, frequently quartz-filled, and sometimes important lenses or shoots of ore occur, as is demonstrated in several partially developed properties.

The geological formation of the east side of the valley is essentially and fundamentally an argillite, a sedimentary deposit, cut by intrusions of greenstone, and numerous dykes, both basic and acidic, are in evidence, the former being the larger and more plentiful, and seemingly the older, the latter the more recent—apparently in places cutting the older dykes, and also the vein-fissures; these latter are probably connected in some way with an underlying granitic batholith, and seemingly are associated with the silicification which is apparently responsible for the mineralization found. The dyke systems and lines of fissuring on the east side of the valley seem to nearly conform to the bedding planes of the argillite, and have a course approximately north and south, or roughly parallel with Bear River valley.

This generalization applies to the valley of the Bear River below American Creek, whether it will be found applicable to the country back of the first range of hills and surrounding the heads of the smaller tributary streams, at altitudes of from 3,000 to 4,000 feet, cannot be stated from personal observation.

On this eastern slope the, at present, more important properties, such as the Portland Canal Mining Company, the Stewart, Main Reef, Jumbo, and many others, lying south of Bitter Creek, seem to be all located upon the one general zone of fissuring, which is continuous for at least four or five miles, and in this the veins are found. Sometimes the vein formation is represented by a single quartz vein, while farther along it presents four or more veins; the transition from one to more veins is not shown by the work done, nor yet is it exposed by the valley of Glacier Creek, which cuts across and into the formation to a depth of some 1,500 feet, although the latter does demonstrate the veins to continue to that depth. At the present stage of prospecting and development this one main zone of fissuring seems to contain all the more important ore showings, although it is premature to conclude that it is the only zone on the hillside.

While this general fissure continues, as stated, for such a great distance, and the vein formation in it is at least seemingly continuous, as far as demonstrated, the veins being more or less mineralized throughout, still it does not follow that for all this distance the mineralization is sufficiently intense to form profitable ore; such could not be expected and does not occur, but there are parts in these veins in which the amount of mineral in the vein occurs in sufficient quantity to render it workable ore. It is as yet too early in the development to say whether the ore occurs in shoots, chimneys, or some other form, but the tunnel workings of the Portland Canal Mining Company have demonstrated that the "pay-ore," first proved on the surface, extends downward along a defined "pitch" which would seem to mark the northern end of an ore shoot, while the tunnels have not as yet at their faces reached the limit of the body of "pay-ore" to the south. By the term "ore shoot" it is not intended to imply a body of solid ore, but a portion of the length of the vein sufficiently heavily mineralized to be profitably workable.

The chances are that mineralization, generally similar in character ,although varying as to quantity, occurs throughout this main fissure. The character of this mineralization is best demonstrated by the actual extraction of the only producing mine — the Portland Canal Mining Company's—described later, and may be summarized briefly as iron-sulphides carrying gold and silver, galena carrying silver and some gold, and a small quantity of zinc-blende carrying small silver and still smaller gold values. These are essentially the ores upon which the values of the properties will probably be based, although, particularly in the upper or surface workings, specimens of exceedingly rich silver-sulphides and oxides, with also native silver and possibly gold, have been found.

In the opinion of the writer, this portion of the camp will be comparatively low-grade concentrating propositions from $10 to $20 ore, the high-grade minerals being difficult to concentrate and not sufficient in quantity to dispense with this process.

Shipping Facilities.

Seldom in British Columbia has the truth been so clearly demonstrated as at Stewart that the value of an ore-body is dependent upon the faculty of getting its contents to market and still more seldom have the facilities been so quickly obtained. Portland Canal affords a land-locked waterway by which any vessel may approach the town of Stewart where the tidal mud-flats offer proper holding-ground for pile wharves; this has been taken advantage of and a pile wharf with a pile approach from the shore a mile long, is now nearing completion; while a local railway company has built a splendid railway dock and approach, over a mile long, and has equipped it with standard-gauge tracks. The same company has about completed a railway grade up the valley of Bear River to the mouth of American Creek—a distance of approximately fifteen miles— and could, should it desire to push matters, easily have the rails laid over this length before snow falls. A locomotive and a number of cars are now on the ground ready for use, and rails have been laid from the landing as far as the railway-station.

The valley of Bear River on the flat will average about half a mile wide, being rather more than this near its mouth; its course is nearly straight, and it rises at an almost uniform grade—about 500 feet in 15 miles. The valley bottom is gravel, permitting of cheap railway construction, while the first nine miles of the railway grade contains one tangent of four and a half miles in length and many shorter ones. The hills rise abruptly from the valley, affording the best of opportunities for aerial tramways, with ample room on the flat for requisite mill-sites.

The tributary streams are all too steep to admit of railway construction up them; an exception to this rule is, however, presented in Bitter Creek, up which a railway might easily be built for a distance of from six to seven miles, or possibly to the foot of the glacier, with aerial tributaries from the side creeks. Bitter Creek valley is really a branch extension of the river valley, and is similarly filled with detritus from the glacier. The Provincial Government has built a waggon road, with necessary bridges, from Stewart up the river val-

ley, as far as and across Bitter Creek, over which two stages travel daily each way. A further extension of this road as far up as American Creek, including a bridge across Bear River, was under construction this autumn and promised to be completed before snow falls.

Steamer service is maintained from Seattle, Victoria, Vancouver, and Prince Rupert twice a week by the G.T.P. Railway, their fine boats having gone right through to Stewart during the summer months, but in the winter a transfer of passengers and freight is made at Prince Rupert to a small steamer, which serves as a tender to the larger ones. The Union S. S. Company runs its steamer "Camosun" from Vancouver through to Stewart direct without transfer, making a round trip each week. Besides these regular steamers, several coasting and freight boats make Stewart a place of call but at irregular intervals.

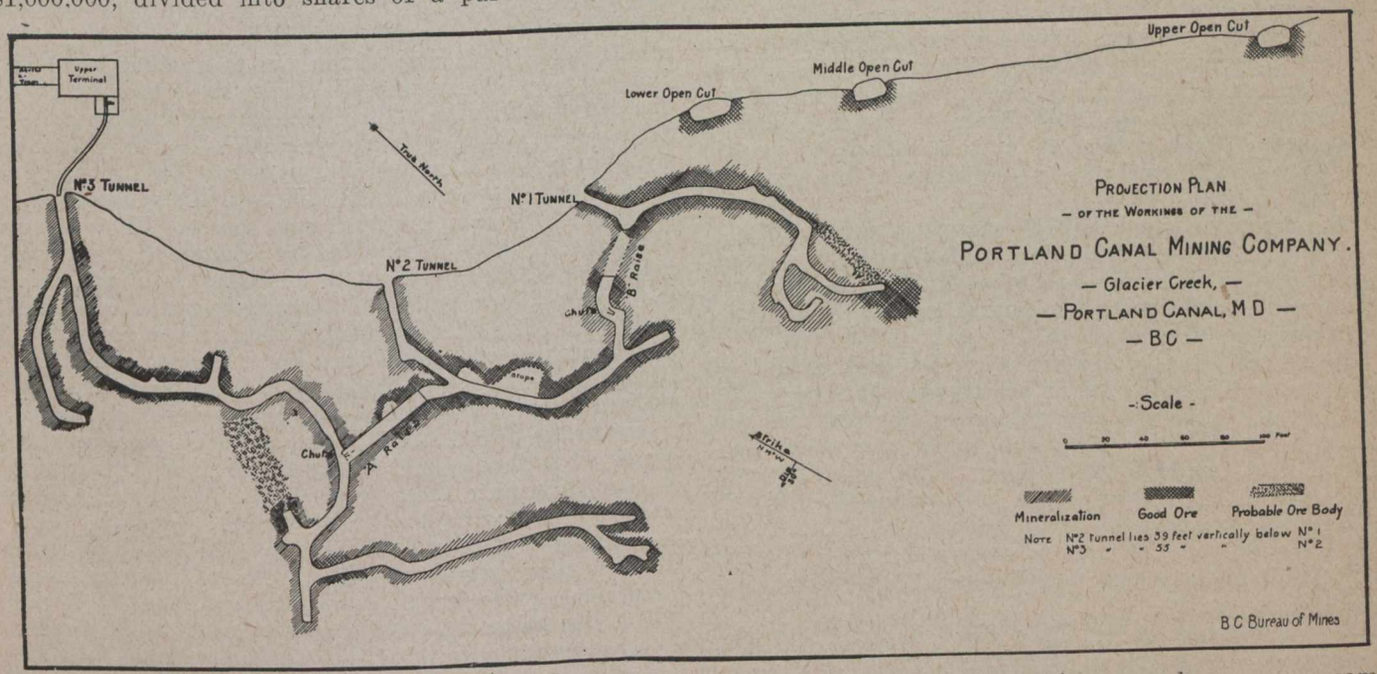
Portland Canal Mining Company.

Interest in the Portland Canal Camp at present naturally centres in the operations of the Portland Canal Mining Company, N.P.L., since the development of this company's property is the furthest advanced and it is the only company as yet in a position to make shipments. The company is a local organization, with head office at Duncan, V.I., the president being Mr. C. H. Dickey, of Duncan. The capital of the company is $1,000,000, divided into shares of a par value of 25 cents. The operations of the company at the property are in charge of Mr. W. J. Elmendorf as engineer and general manager, with Mr. N. C. Sheridan as mine superintendent, while Mr. Otto Abeling has been responsible for the construction and equipment of the concentrator. The company owns some twelve claims and fractions, viz.: Gipsy, Extension, Herbert, Mayflower, Mosquito, Richard II., Barney, Sadie, Eclipse, Little Joe, Little Joe Fraction, and Lucky Seven, all adjoining and situated on the hill forming the eastern slope of Bear River and the southern slope of Glacier Creek valleys. Serious development work has as yet been confined to the Lucky Seven and Little Joe mineral claims.

As has already been noted, the mineralization on these claims is along the line of a great fractured zone which runs in a general north and south direction, about parallel with Bear River, not only for the length of this group of claims, but continues, both to the north and south, through a number of other claims. This zone is of variable and not clearly defined width, but is in places several hundred feet across, and runs through an argillite formation, conforming, at least very nearly, to both the strike and dip of the argillite. Within this zone the argillite has been more or less crushed, and presents, when cemented together by the quartz-vein matter, a brecciated mass. Within this zone there are a number of comparatively small felsitic dykes, running with the fissure, apparently injections after the formation of the fissure, and these dykes seem to be present wherever important mineralization has taken place. Through this general zone of crushing, siliceous infiltration has taken place, the solution naturally following certain channels which the crushing had rendered more open—lines of least resistance to the flow of the solution—and these channels of silicification now form the quartz veins in which the mineral is found.

On the Lucky Seven and Little Joe the silicification seems to be confined to one main vein, as far as present development shows. In the earlier stages there were supposed to be two veins, but the management now considers the second vein as merely an offshoot of the main vein.

Mine.—The mine workings are at an elevation of about 2,400 feet above sea level, and consist of three tunnels with connecting raises, as shown on accompanying plan.



The lowest, or No. 3 tunnel, is the working tunnel, the tramway therefrom going directly to the bunkers at the upper terminal of the aerial tramway. This tunnel, in October, 1910, was in about 500 feet, and follows in on the vein, which is mineralized all the way; but what is considered pay-ore was only struck at about 100 feet in, from which point it apparently continues to the face, although the tunnel in a couple of places seems, in the driving, to have run away from the ore. From this level a raise has been put up to the No. 2 tunnel, and this acts as an ore-chute from the upper levels.

The No. 2 tunnel is about 55 feet vertically higher than No. 3, the vein dipping at an angle of about 30 degrees, and was in about 200 feet, with a raise being put up to the No. 1 tunnel, and which, in October,

was almost through. At about 25 feet in from the portal the tunnel entered on pay-ore, in which it has continued to the face.

The No. 1 tunnel is about 40 feet higher than No. 2, and has been driven about 180 feet and developing pay-ore for its entire length, the face being in such ore. At one point in the driving the tunnel was deflected to the right and ran out of the ore-shoot, but, upon being brought back to the original course, picked up the ore again.

Above the No. 1 tunnel several open cuts, sunk on the outcrop, have disclosed pay-ore, indicating that this ore shoot continues for at least 350 feet to the south of the portal of No. 1 tunnel. The development work on this ore-shoot, as stated, would seem to indicate an ore-shoot at least 350 feet long, developed below the outcrops, along the plane of the vein for a distance of about 400 feet; the thickness of the pay-ore has been estimated by the management as averaging about 5 feet; this figure being, in the opinion of the writer, under the mark, rather than over it. Should the ore-shoot prove to be as long in the tunnels as the open cuts directly above them seem to indicate, this would argue an amount of ore, from present development, sufficient to keep the present mill busy for three years. The faces of all the tunnels were found to be in ore which was apparently richer than the average of the ore-shoot.

The monthly average assay for September of the face of No. 2 tunnel is reported as being: Gold, $5.20; silver, 61 ounces; lead, 2.5 per cent.; and of face of No. 3 tunnel, about, gold, $4; silver, 15 ounces; lead, 4 per cent. These values vary from month to month, and are quoted merely as an indication of the grade of ore met with.

The ore mined and milled consists of iron-sulphides and galena, both carrying gold and silver, with a small quantity of zinc-blende and occasionally some copper pyrites, all contained in a quartz gangue and mixed with fragments of argillite.

Specimens of the higher sulphides and oxides of silver and of metallic silver are frequently seen in the vein in all the levels, and, though of interest, are not taken into account by the management, nor is any special attempt made to save them. The mine depends entirely on the iron-sulphides and galena for its ore values, which are stated to be in the neighbourhood of $12 a ton of ore. The ore is conveyed from the mine to the mill by an aerial tramway of the Bleichart system.

All mining has as yet been hand drilling, but the company was engaged in laying, and had nearly completed, a pipe line from the mill to the mine for the conveyance of compressed air, and when this is completed an equipment of power drills will be installed in the mine. The compressor was on the ground all ready to be set up at the mill, where it will be driven by water power.

The mine is provided with good and substantial cook and bunk-houses and other buildings, including a house for the mine superintendent.

The development accomplished by the mine workings covers but a small part of the main fissure contained within the company's property, in other portions of which important surface showings of ore have been found, but these have, for the time being, been left dormant, pending the development in the mine workings.

Of these minor developments, one, however, deserves special mention; it is located some distance, about 1,000 feet, to the north of the mine workings and on the same vein, but, owing to the contour of the hill, at a considerably lower elevation, and is so situated that ore mined there could, with slight expense, be delivered to the present tramway for transmission to the mill. At this point the main vein outcrops strongly and is heavily mineralized; it is further developed by a short tunnel in which the mineralization of the vein is satisfactory. This development would seem to indicate another ore-shoot, easy of exploitation, but requires further development to show its extent and ultimate value; it, however, gives ground for the belief that between this point and the mine other ore shoots will eventually be developed.

Mill.—The company had, in October, just about completed a concentrating mill for the treatment of the ores from the mine; this mill is situated in the Bear River valley, at the mouth of Glacier Creek, the lower terminal of the aerial tramway being some 2,200 feet lower than the upper terminal. The mill building is a substantially framed structure, sheathed with double boarding with paper between, built on the lowest slope of the hill. The mill consists of a receiving chute capable of holding 75 tons of ore and a bin holding 175 tons. From this latter the ore is fed through a challenge gate to a 6-inch by 16-inch Sturtevant crusher, which reduces the ore to 1-inch size. The crusher discharges on to a rubber belt conveyor, set with a slight fall, which conveys the ore to another bin holding 175 tons of crushed ore. From the crushed ore bin the ore is fed by an Allis-Chalmers roll-feed automatic feeder to a set of slow-running Allis-Chalmers 12-inch by 24-inch rolls, from which it passes to No. 1 elevator is thus raised to the top of the mill, and is discharged into a revolving trommel, with 5 mm. screen. The oversize from the trommel is returned by a chute to the second rolls, the discharge going to a second trommel which is fitted with two panels of 2 mm. screen and one panel of 3 mm. The oversize from this trommel goes direct to 5 mm. jig, and the 3 mm. screenings to the 3 mm. jig. The 2 mm. screenings go to a classifier, which separates out the 2 mm. and 1 mm. sizes, which go respectively to the 2 mm. and 1 mm. jigs, while the overflow passes on to four suspended iron conical settlers, which in turn distribute their product, the first to a Wilfley table, the second to an Overstrom table, and the third and fourth each to a Frue vanner. The overflow from these settlers passes on to a series of large settling tanks on a lower floor. The middlings from the 5 and 3 mm. jigs go to the second, a finer, set of rolls; thence to the second elevator. The middlings from 1 and 2 mm. jigs go to a 10-foot Lane mill, and after recrushing, pass on to No. 2 elevator.

All these recrushed middlings are then elevated to the top of the mill and discharged into a third trommel, the oversize from which is returned for recrushing, and the screenings go to the classifier, so entering the process again. The tailings from all the jigs and tables, being sufficiently clean, go to the tailings-dump. The concentrates from the jigs and tables discharge by gravity into receiving bins on the lower floor.

The capacity of the crushing, screening, and elevating part of the mill is 100 tons of ore a day; the installation of jigs and tables now in place is for 50 tons only, but provision has been made for doubling this as soon as it is required, so that, while now the mill as a whole has a nominal capacity of 50 tons, this could be doubled at a comparatively small expense. In the construction of the mill the very best and most

efficient construction has been employed, and the machines are of the most modern type.

To accompany this report a flow sheet has been prepared to show graphically the process of concentration employed.

An electric light dynamo to be driven by water-power was being installed, which would light the mill and other surrounding buildings.

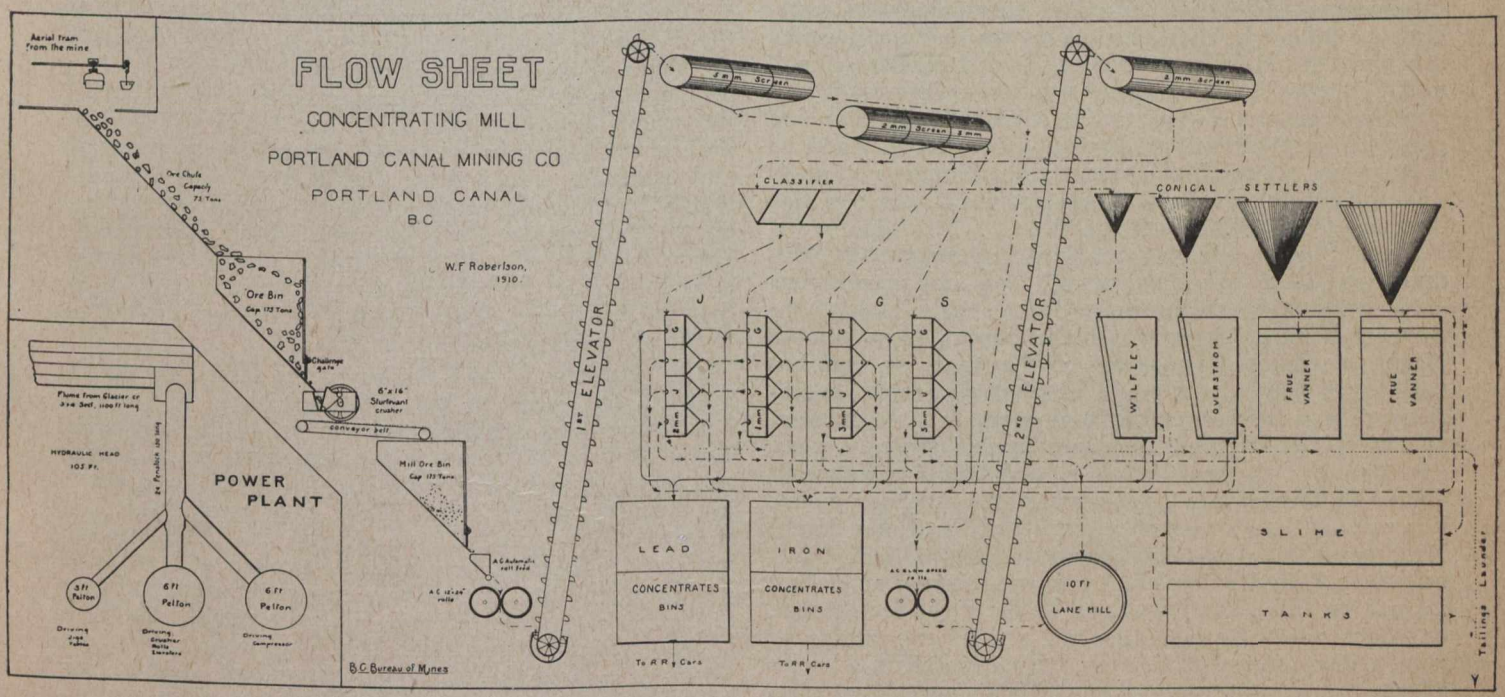
Concentration Effected.—The concentrating plant was only started about October 1st, and when visited by the writer, some ten days later, was only being "tuned up" on a low-grade feed, so that no definite results as to the ultimate percentage of saving, the average assay of tailings, or the rate of concentration could be obtained. The work being done, therefore, represents only the "first try," and, as this was good, better results may be expected after adjustment.*

The rate of concentration will be approximately from 3 to 3 1-2 tons of ore into 1 ton of concentrates; these concentrates consist of iron sulphides and galena, collected separately, in what proportion is not yet definitely demonstrated, but a very clean separation between the two was being effected.

concentrates—gold, from $8 to $10; silver, 15 to 20 oz. per ton. Lead concentrates—gold, from $8 to $10; silver, from 35 to 45 oz. per ton; lead, from 65 to 75 per cent. No zinc concentrates are saved, as they were found by actual test to contain but low assay values in silver—about 1½ oz. to the ton.

The slime-tanks were not at that time in operation, so that it is not as yet known whether any saving will be made of the small quantities of higher silver-sulphides and oxides which are visible occasionally in the ore and which, from their nature, would slime.

POWER PLANT.—The company owns a water record on Glacier Creek which has been developed to supply all the power necessary for the mine and the mill. The water is taken out of the creek canyon at the head of a fall, the intake being well protected by projecting rock from any drift-wood or drift-ice. The intake is for the first few feet in solid rock, when the water enters a flume 3 feet deep by 4 feet wide, built of 2-inch plank with battens, laid on a grade of 1-inch fall in 4 rods. From the intake to the pressure-box the flume is 1,100 feet long; it follows down the north side of the creek for some distance, when it crosses over to the south side



The tailings from each of the machines contained but small values in gold and silver, even with the incomplete adjustment, showing that the process was satisfactory, the separation of the mineral from the gangue being easily and very completely effected.

The separation on the Wilfley table was very nearly theoretically perfect, the lines of galena, iron-sulphides, zinc-blende, and tailings on the table being the most clearly defined that the writer has ever seen.

The concentrates being made, from the class of ore being experimented with, ran about as follows: Iron

*A letter from the general manager to the president of the company, dated Nov. 22nd, received as this goes to press, places the mill feed at that time as about: Gold, $3; silver, 14 oz. to the ton; lead, 3.7 per cent.—about $13 ore. "Our extraction at this time is about 80 per cent., but with the Lane mill in operation and several small changes, now completed, we will raise this to 85 per cent., and I think ultimately to 87 per cent."

on a trestle 100 feet above the creek-bed. The pressure-box is 105 feet above the Pelton wheels, to which the water is conveyed in a wrought-iron penstock 24 inches in diameter and 150 feet long, with suitable branches and valves. The power is developed by two 6-foot and one 3-foot Pelton wheels. One 6-foot wheel drives the main counter-shaft from which is belted the crusher, rolls, Lane mill, and conveyors; the other 6-foot wheel was being held for the compressor. The 3-foot wheel was used exclusively for the jigs and tables, thereby obtaining a steady and constant motion for these machines.

OTHER BUILDINGS.—The company has erected near the mill a large and very complete boarding-house, kitchen, dining-room, sitting-rooms, and bedrooms for the men; there is also a well-equipped laboratory building with rooms for the assayers. The office contains public and private office rooms and living quarters for the manager. Stable, blacksmith, and carpenter shops have been planned out and will be erected at an early date.

TRANSPORTATION.—The Portland Canal Short Line Railway has laid out a spur from its main line to directly in front of the concentrator building, so that ore will eventually be loaded direct from the mill into the cars.

In addition to this, there is from the mill a good Government waggon-road to the town of Stewart, distant about three miles and a half; this road is practically level and has a good hard gravel bottom.

All supplies for the mine are received at the mill and taken up on the aerial tramway.

The mine office and various mill offices are connected by telephone and also with an office in Stewart.

Stewart Mining and Development Co.

The Stewart Mining & Development Company has eight or nine claims on the north side of Glacier Creek at an altitude of about 1,000 feet. The company has been at work for the past three years steadily developing its property by means of tunnels, etc. There has been a great deal of surface work done as well, but this becomes of secondary importance since general zone of crushing or fissure upon which the Portland Canal mine ore-body is located passes northward, through the intervening properties, into and through the Stewart claims. In such a crushed zone the mineral-bearing solutions would follow the lines of least resistance, and while in the Portland Canal property these solutions appear to have been confined to one channel, producing one vein, in the Stewart they appear to have produced four veins, all parallel as to strike, though not as to dip, and all contained within the zone of fracture, which here has a width of about 400 feet.

From Glacier Creek northward, following the fracture zone, there are a couple of deep and precipitous-sided gulches extending up as far as the cabins of the Stewart Mining Company. In the sides of these gulches Nature has caused exposures of the veins, so that but little work had to be done to prove their general conditions. From the bottom of the deepest of these gulches, on the George E. claim, the company has driven a crosscut tunnel to the east, into the bank, for a distance of about 300 feet, and in so doing has crosscut three veins, known locally, in order of sequence, as No. 1, No. 2, and No. 3 veins—the last being also called the "Green Vein" or "East Vein." The No. 1 vein was struck at 50 feet in, and on this a drift was run to the right for 60 feet, but does not determine the full size of the fissure or vein, which, however, is more fully exposed in a series of cuts higher up the very steep hillside, and there seems to be a well-defined quartz vein, 2 feet to 4 feet wide, and dipping to the west at an angle of about 55 degrees. The vein contains some heavy sulphides of iron, carrying gold values, but no large body of ore has been encountered.

At 100 feet in from the portal of the tunnel the No. 2 vein was cut, and has been drifted upon for 60 feet on either side of the tunnel. The fissure of this No. 2 vein is from 6 to 7 feet wide, and shows a quartz infiltration and replacement of the fractured argillite carrying more or less mineral.

At 300 feet in from the portal, and 150 feet from No. 2 vein, the No. 3 vein was cut, and its general fissure is about 25 to 30 feet wide, while the dip is nearly vertical. In this vein a drift had been made to the right for 50 feet, while to the left one had been driven for 200 feet, and was still being pushed forward, receiving the greater part of the attention of the management; several crosscuts had been put off from the drift at various points to test the width of the fissure. This vein is similar in general character to the others, but in addition to the quartz-gangue matter there was apparent a considerable quantity of calcite. There were some sulphides visible in the vein-matter, but no commercial body had as yet been struck. There were, however, numerous showings of native silver and of the higher silver-sulphides, which, although they gave great encouragement to the management, were not sufficiently plentiful to constitute ore.

On the west side of the gulch, directly opposite to the mouth of the crosscut tunnel already mentioned, No. 4 vein has been opened up by a tunnel driven in along the vein for some 200 feet. This is a large strong vein and seems to carry a greater percentage of heavy iron-sulphides than was then visible in any of the other veins. This vein dips to the west at a flatter angle than the other veins, and the mineralization more nearly approaches in character that found on the Portland Company's property, giving rise to the belief that this vein is the continuation of the Portland vein. This belief, however, lacks definite confirmation, and it is not at all improbable that all the veins are equally continuations of the Portland vein.

Portland Wonder.

The Little Wonder mineral claim, being developed by the Portland Wonder Mining Company, is situated to the south of the eastern portion of the George E. claim of the Stewart Mining Company, and contains within its borders a continuation of the No. 3 vein of the Stewart, which here also is found dipping nearly vertical and is easily traced from the Stewart down Lucky Gulch from Clacier Creek and at an altitude of 700 feet above sea-level; the No. 2 tunnel has been driven in for about 360 feet, of which the first 150 feet is through slide material. Practically all the work is now being done in this tunnel, from which a raise has been put up to the old workings on No. 1 tunnel.

The vein here is very similar to the same vein on the Stewart, but seems to have been subjected to a severe disturbance and crushing, subsequent to the formation and deposition of the ore in the vein, since small masses and lenses of solid iron-sulphide are encountered showing straight parallel striæ, which have been crushed by movement into small lenses covered with "slicken-siding" and occurring in a mass of broken and polished graphite argillite. This latter movement would appear to be local in character and has so disturbed the vein in the present workings that little can be definitely said about it, beyond the fact that the amount of solid sulphide present in the crushed vein-matter gives reasonable hope that when the crushed portion of the vein has been passed, a more than usual amount of sulphide ore may be looked for.

The development was being carried on by a force of eight men, with Mr. McCrimmon as foreman. Comfortable cabins had been erected, which would enable work to be carried on during the winter. On the dump at the mouth of the tunnel there was a pile containing a number of tons of solid sulphides of iron and lead, from which a rough sample was taken which assayed: Gold, $16.80; silver, 19.4 oz. to ton; lead, 36.5 per cent.

Lulu Mineral Claim.

The Lulu mineral claim lies south of the western portion of the George E. claim, and undoubtedly contains within its borders some of the veins developed on the Stewart property, but the development has not as yet proceeded far enough to demonstrate what they may there contain. A crosscut tunnel is being driven in from a small gulch, with the intention of crosscutting the ledges, and had proceeded some 180 feet.

Minutes of Organization Meeting, International Geological Congress.

At the instance of the Director of the Geological Survey, a meeting of Canadian geologists and mining engineers was called for December 2nd, at 11 a.m., in Toronto, to arrange for the Twelfth International Geological Congress, which is to be held in Canada.

There were present Dr. F. D. Adams, Mr. J. C. Murray, Mr. O. E. LeRoy, Mr. H. Mortimer Lamb, Mr. J. A. Bancroft, Prof. E. Dulieux, Dr. T. L. Walker, Prof. M. B. Baker, Mr. J. B. Tyrrell, Mr. James McEvoy, Dr. W. G. Miller, Dr. W. A. Parks, Mr. J. McLeish, Dr. A. P. Coleman, Mr. R. G. McConnell, Mr. O. N. Scott, Mr. W. McNeill, Mr. W. S. Lecky, Mr. R. W. Brigstock, Mr. G. G. S. Lindsey, Mr. F. Loring, Mr. A. A. Cole, and Mr. R. W. Brock.

Dr. Adams was chosen chairman of the meeting, and Mr. R. W. Brock secretary.

Dr. Adams called the meeting to order and explained the object. On motion of Dr. Miller, seconded by Dr. A. P. Coleman, it was decided that the Congress should be held in Canada in 1913, this date being chosen on account of the British Association meeting in Australia in 1914, and possibly the Winnipeg Exposition in Canada, also in 1914. The meeting then proceeded to elect officers for the Congress.

On motion by Dr. Miller, seconded by Dr. Coleman, Dr. Adams was elected President. Dr. Coleman moved, and Mr. James McEvoy seconded, that Mr. R. W. Brock be elected Secretary. Dr. Miller and Mr. Tyrrell suggested that the offices of Treasurer and Secretary be combined. This was included in Dr. Coleman's motion, and the motion thus amended was carried. On account of the great amount of work which would be necessary to make the meeting a success it was decided that a paid Secretary or Manager should be appointed to assist the Secretary and Executive Committee.

The question of committees was then discussed, but it was decided that before these could be formed it would be necessary to decide upon the place of meeting.

Dr. Miller moved, seconded by Dr. Parks, that the Congress be held in Toronto. This motion was carried.

In the discussion, the point was brought out by Dr. Walker that local meetings might be held in the east and west as well as the main meeting at Toronto. This suggestion met with the approval of the meeting.

The discussion regarding committees was then resumed. In the course of the discussion it was brought out that a large honorary committee, a large general committee, local committees, and an executive committee would be necessary. As a great deal would depend upon the careful selection of these committees, it was decided to appoint a small executive committee who could spend some time and thought on the selection of the other committees. It was moved by Dr. Miller, seconded by Mr. LeRoy, and carried, that the President, Secretary, Dr. Coleman and Mr. Tyrrell should be appointed a committee to recommend to this meeting names for an executive committee. It was moved by Dr. Miller, seconded by Mr. McEvoy, that Dr. Coleman and Mr. Tyrrell be members of the executive committee. The committee nominated then retired, and after fifteen minutes' consultation recommended the following names as an executive committee: F. D. Adams, R. W. Brock, A. P. Coleman, W. A. Parks, G. G. S. Lindsey. The convener pointed out that the names were confined to persons living in the central part of the country on account of the necessity of the committee meeting at frequent intervals.

It was moved by Mr. Cole, seconded by Mr. McEvoy, that the gentlemen recommended be appointed an executive committee of the Geological Congress, with power to add to its members. Carried.

Dr. Walker moved that the general committee, honorary committee and any other committees that might be found necessary be appointed by the executive committee. This was seconded by Mr. M. B. Baker and carried.

Dr. Walker moved, seconded by Dr. Miller, that the executive committee be authorized to appoint vice-chairmen of committees who could act in case of the absence of the chairman.

An informal discussion then took place regarding the excursions which it was felt should be the main feature of the Congress in Canada. Various suggestions were made and it was decided to have the members consider this question carefully and send their suggestions to the executive committee, who would go thoroughly into the matter.

On the question of major subjects for the Congress it was felt that it might be advisable to get up a special memoir on Coal, similar to the one on the Iron Ores of the World, prepared for the past Congress, as this subject would be supplementing the Iron Memoir.

The Secretary stated that Dr. J. G. Anderson, Secretary of the Eleventh Congress, had called attention to the fact that the Congress had accepted the proposal of Dr. Hobbs that an international inquiry on the subject, "The Fracture System of the Earth's Crust," should be undertaken; that Congress in accepting this proposal expressed its opinion that the manner employed by the Swedish executive committee when undertaking inquiries on the iron ore resources and the post-glacial climates, could serve as a model to the coming executive committee of Canada when organizing the proposed enterprise, and charged the named committee to arrange the matter together with Dr. Hobbs.

The subjects for the Congress were left to the executive committee.

The meeting then adjourned to attend a lunch given by the Toronto branch of the Canadian Mining Institute.

Ore Dressing--Coniagas Concentrator.

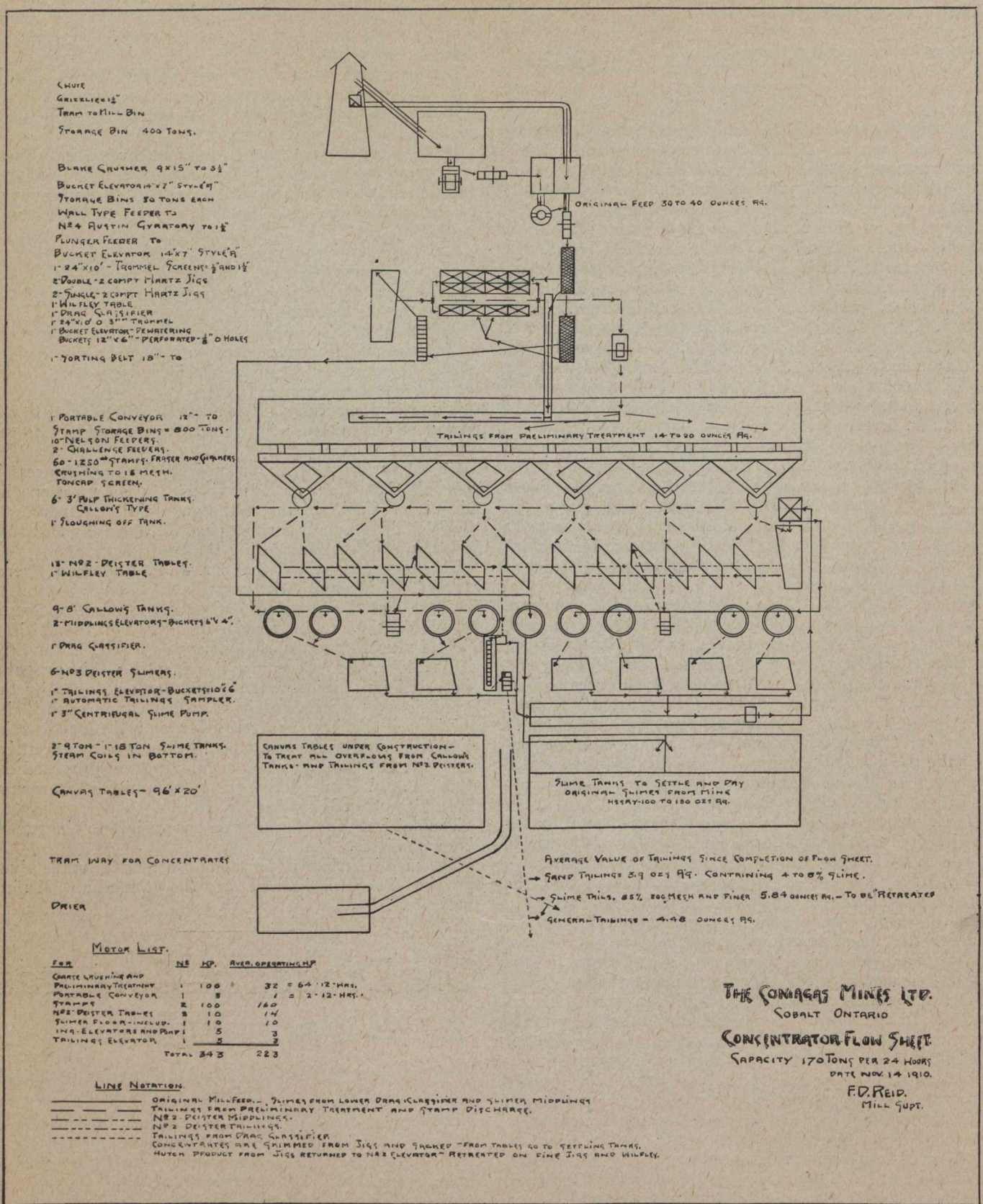
(Written for the CANADIAN MINING JOURNAL by Fraser Reid.)

[Editor's Note.—This succinct account of concentrating practice and results at the Coniagas mine will repay careful study. It is the product of much thought and experimentation. The treatment of slime is an outstanding feature.]

The minerals of economic value in the veins and wall rock of the Coniagas mine are native silver, argentite, parargarite (ruby silver), smaltite and niccolite.

The argentite is confined usually to the contact of the conglomerate with the Keewatin, while the parargarite occurs in the form of a drusy coating, or wash, in the wall rock of some of the workings.

The specific gravity of the vein matter varies from native silver sp.g. 10.5, to calcite sp. g. 2.7; intermediate



MOTOR LIST.

FOR	No	HP.	AVER. OPERATING HP
COARSE CRUSHING AND PRELIMINARY TREATMENT	1	100	32 = 64-12-HRS.
PORTABLE CONVEYOR	1	5	1 = 2-12-HRS.
STAMPS	2	100	160
No 2 DEISTER TABLES	9	10	14
SLIMER FLOOR-INCLUDING-ELEVATORS AND PUMP	1	10	10
TAILINGS ELEVATOR	1	5	3
	TOTAL	343	223

LINE NOTATION.

ORIGINAL MILL FEED.-SLIMES FROM LOWER DRAG CLASSIFIER AND SLIMER MIDDLINGS
TAILINGS FROM PRELIMINARY TREATMENT AND STAMP DISCHARGE.
No 2 DEISTER MIDDLINGS.
No 2 DEISTER TAILINGS.
TAILINGS FROM DRAG CLASSIFIER
CONCENTRATES ARE SKIMMED FROM JIGS AND TABLES-FROM TABLES GO TO SETTLING TANKS.
HUTCH PRODUCT FROM JIGS RETURNED TO No 2 ELEVATOR-RETREATED ON FINE JIGS AND WILFLEY.

THE CONIAGAS MINES LTD.
COBALT ONTARIO
CONCENTRATOR FLOW SHEET.
CAPACITY 170 TONS PER 24 HOURS
DATE NOV. 14 1910.
F.D. REID.
MILL SUPT.

specific gravities being regulated by the combinations of native silver, calcite, smaltite and niccolite.

The veins vary in physical properties from the solid well-defined and more or less easily recoverable, to the decomposed, in which the smaltite or niccolite has suffered oxidation, the native silver being unaltered and in forms similar to that in the solid veins, i.e., from the finely disseminated and invisible to the dendritic and massive.

Values occur in the wall rock in the form of stringers, leaf silver and finely disseminated mineral. The finely disseminated mineral, along with the fine leaf and ruby silver in the wall rocks, makes hand sorting of waste impracticable.

The flow sheet accompanying this gives details of treatment. The principal features of the mill are:—

1. The hand sorting of oversize of one and one-quarter inch rings, the tailings from sorting belt going di-

rect to stamp bins. By this method the process is simplified, hand sorting in the mine is greatly reduced, and flake silver and silver in gangues of low specific gravity are sorted out, whereas in jigging, values in this form are liable to go over with the tailings. Attritional losses are also greatly reduced.

2. The original slime from the mine is cut out in the initial stage and piped direct to settling tanks, the product running from 115 to 175 ounces of silver to the ton. This process takes care of the decomposed vein matter.

3. The stamp discharge is thickened in 3-foot cones, the unclassified product going direct to No. 2 Deisters. The tailings from the No. 2 Deisters go to a Drag Classifier, the clean sand going to waste and the slimes pumped back and retreated on No. 3 Deister Slimers. By this method the slimes are reduced in value from about 20 to 12 ounces of silver before treatment on slimers, the sands on panning show very little, if any, free mineral, and the concentrates from No. 2 Deisters range from 1,800 to 2,200 ounces silver.

The sand tailings vary from 2 1-2 to 5 1-2 ounces silver, and vary directly as the nature of the wall rock treated. Ore from some of the workings crushed to 16-mesh and treated on tables, will give a 2 1-2 ounce sand, whereas ore from other workings would require to be crushed to 60-mesh to produce tailings of the same low value.

The slime tailings vary from 6 to 8 ounces silver, depending on the value of the feed to final treatment tables—the slimers making an extraction of from 40 to 50 per cent.

Recommendations as to Mining Legislation

(Submitted by the Special Committee of the Canadian Mining Institute.)

A committee of the Canadian Mining Institute consisting of G. G. S. Lindsey (Chairman), T. B. Caldwell, Lanark; Colonel A. M. Hay, Haileybury, Clifford E. Smith, Brockville, and J. L. Retallic, Kaslo, was appointed on the 1st of March to visit Ottawa and urge upon the Government that the recommendation of the Select Standing Committee of the House of Commons, on Mines and Minerals, dated Tuesday, the 18th day of May, 1909, be carried by the Government into effect.

The recommendation of the Select Standing Committee was as follows:—

"Your committee is of the opinion:—

"(1) That there should be assigned to the Mines Department the administration of mines, including the issue of title thereto, and of all mining laws.

"(2) That an Act should be passed consolidating all the laws relating to mines under Federal control.

"(3) That consideration should be given to a policy which will have for its object the re-acquisition by the Crown of mining rights heretofore granted in patents of land."

The Prime Minister appointed Monday, the 21st day of March, 1910, at eleven o'clock, to hear the committee, at which time all the members were present, except Mr. J. L. Ratallic, who had not sufficient length of notice to enable him to be present.

Mr. James Conmee, Chairman of the Select Standing Committee, introduced the committee, with Mr. H. Mortimer Lamb, at whose request Professor Willmott, F. T. Congdon, M.P., and Ralph Smith, M.P., were also present. Besides the Prime Minister, the Hon. Wm. Templeman and the Hon. Chas. Murphy received the committee. After the matter had been presented by Mr. Lindsey, Chairman of the committee, and spoken to by other members, the Minister of Mines gave his hearty endorsation to the proposal, and Sir Wilfrid Laurier promised that the first and second recommendation of the Select Standing Committee would be put into effect, and urged the Institute to prepare a statute consolidating all the laws relating to mines under Federal control, on the promise that the Government would introduce it at the next session of the Dominion Parliament.

At half-past three o'clock the same afternoon, at the request of the Minister of Mines, the committee waited upon him, when it was agreed that the Select Committee of the House would be called together immediately, a sub-committee appointed to draft the Act consolidating the mining laws, and an appropriation obtained so that the sub-committee might have the opportunity of dis-

G. G. Lindsey, K.C.

cussing with representative mining men from every province of the Dominion, the principles and details of the statute, so as to enlist their co-operation and support, and in this way secure a statute which would commend itself to as many provinces as possible, and possibly be followed by them in legislation for their own provinces.

On the 12th of April the report of the committee to the Institute was adopted, the committee was asked to continue to serve, given power to add to its number and full authority to act on behalf of the Institute, and was also empowered to take such steps as they might deem expedient in the premises.

The House of Commons did not appoint a sub-committee or take any further steps in the matter before rising. This having been brought to the attention of the Council of the Institute on the 7th of October, the committee was enlarged by the addition of the gentlemen who served on the previous committee appointed in 1909—Dr. A. E.

Barlow, Messrs. J. B. Tyrrell, B. A. C. Craig, J. M. Clark and A. B. Willmott, and this enlarged committee was empowered to draft certain recommendations to constitute the basis of a mining law for submission to the Council at its next meeting in December.

The enlarged committee met and prepared the following recommendations, and asked that a special meeting of the Council consider the same, which was done on the 11th of November, when the report was adopted, with the exception of Paragraph 5, which was changed.

The Secretary then submitted the committee's report, as follows:—

Report of Committee on Mining Legislation.

The committee of the Canadian Mining Institute, appointed to recommend a basis of a mining law for the Dominion for the purpose of submission to the Council of the Institute at its next meeting in December, respectfully submits:—

1. That the title to be required should be lease for 99 years for all purposes.

2. That the rental should be based upon the acreage and paid in advance at the rate of $1.00 per acre per annum.

Work done on any claim to the extent of the rental, but only where the work done amounts to at least $200 in any one year, is to be received in lieu of rental for that year.

3. That, in addition, royalties at the rates at present provided be paid, (it to be made clear what the general clause in regard to royalties in the existing statute means).

In the case of coal the present royalty, 5c. per ton (2,000 lbs.) should prevail up to the year 1930 (this date is given because the existing 21-year leases based on a 5-cent royalty expire at that time), and after 1930, and up to the end of the present century the royalty should be 10c. per ton.

Note:—Existing lessees should be permitted to exchange for lease under the new statute.

4. The prospector is not to be obliged to make discovery of mineral in place to the satisfaction of anyone, but having made what, by him, is believed to be a discovery of mineral in place, he is to be permitted to stake out a claim of 52 acres on the ground, and then record it in the Government Recording Office at a nominal fee, on doing which a lease is to be issued to him, which lease is to be perfectly free from any conditions dependent on the opinion or reports of officials.

5. There shall be no license fee or permit required for prospecting on the domain of the Crown.

6. Conformably with the promise of the Prime Minister there should be assigned to the Mining Department the Administration of Mines, including the issue of title thereto, and the making of all mining laws.

On motion of Mr. Donnelly, seconded by Mr. Penhale, it was also decided to delete paragraph 5, and substitute therefor the following:—

5. "A license fee shall be required of persons applying for the lease of mining lands from the Crown, and a prospector must either obtain a license to prospect before going into the field, or qualify before recording a claim."

The following resolution was passed:—

In addition, the Council requests the committee to submit the report to the Minister of Mines and to request him to provide a grant of money to cover the cost of drafting the Act in accordance with the suggestion made to the committee by the Prime Minister.

At the luncheon held by the Toronto branch on Friday, the 2nd, the usual discussion at such meetings was upon the recommendations of the committee as approved by the Council, and these were unanimously adopted and the committee was requested to press through legislation during the present session of the House.

The committee have an appointment with the Minister of Mines and with the Select Standing Committee of the House at Ottawa on Wednesday, the 14th December.

The Committee of Council (Messrs. Lindsey, Caldwell and Lamb), met in Ottawa on the 14th of December, to urge before the Select Committee of the House on Mines, the necessity for urgent action; each member present addressed the committee.

The committee of the House reaffirmed unanimously its anxiety to have a mining law passed at once, and to have the disposition of mining lands transferred to the Department of Mines, but as that involved a transfer of power from the Department of the Interior, at the suggestion of the Minister of Mines, a sub-committee of the House was appointed to wait upon the Prime Minister, the Minister of the Interior and the Minister of Mines, and discuss these questions with them, and the Committee of Council were asked to accompany the sub-committee.

On the same day these deputations did wait upon the three Ministers mentioned, when the Prime Minister stated that if the Minister of Mines would prepare a Mining Act it would be introduced into Council, and if any objections should be presented to it, they would be threshed out there, and he was quite prepared that an appropriation should be made to meet the expenses of preparing such an Act.

The Minister of Mines next day arranged an appropriation and has placed in the hands of Mr. J. M. Clark, K.C., the preparing of the Statute, which is to be drawn up, on the basis, that the disposition of mining lands will be vested in the Department of Mines.

Personal and General

Col. A. M. Hay is in Haileybury.

Mr. Robert Bryce is in Porcupine.

Mr. Martin Nordigg sails for Europe on January 9.

Mr. R. E. Hore was in Toronto during Christmas week.

Capt. John Hampson, formerly manager of the Alice mine, near Creston, B.C., has gone to England.

Mr. F. M. Young, secretary of the Crow's Nest Pass Coal Company, has returned to Fernie, B.C., from a visit to the coast.

Mr. S. S. Fowler has returned to Nelson from a visit to mining properties on Princess Royal Island, in the Coast district of British Columbia.

Mr. J. W. Evans, Belleville, is recovering from the effects of an operation for appendicitis. He will not be able to move around for some time.

Mr. H. McI. Weir passed through Toronto on his way to Brantford, there to spend Christmas. Mr. Weir represents Toronto interests in Porcupine.

Mr. A. J. Becker, superintendent of the Lucky Jim zinc mine, Bear Lake, Slocan District, B.C., was in Winnipeg lately, in connection with the prospective provision of transportation facilities, to allow of a resumption of shipment of ore from the Lucky Jim.

SPECIAL CORRESPONDENCE

QUEBEC.

The report of Mr. J. B. Tyrrell on a large feldspar deposit on the north shore of the Gulf of St. Lawrence, 40 miles from the north shore of Anticosti Island, has come to hand. More exactly, the deposit is situate on a peninsula two miles long on Quatichoo-Manicuagan Bay, 37 miles east of Esquimeaux Point. The shore is generally low, although there are rounded hills of rock that rise to an elevation of 100 feet or more. The bay has not been charted, but Mr. Tyrrell believes that it is navigable for ocean-going vessels of ordinary draughts. Communication with the outside world is provided for by a telegraph line two miles from the point.

The greater portion of the coast appears to be underlain by dark, coarse-grained hornblende schist, striking towards the

northeast and dipping vertically. With the hornblende is associated a finer grained quartzitic rock. Parallel with the schistosity, great dykes of orthoclase pegmatite have been intruded into the schist. Whilst the walls are well defined in most places, in spots large masses of schist have been broken off and included in the pegmatite. The dykes vary in width from 100 to 200 feet, and extend from the extreme point of the peninsula northeastward for a mile or more on the property. Two of these dykes were examined.

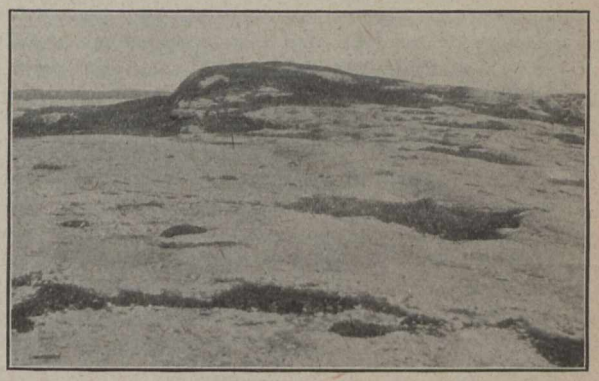
The pegmatite of the dyke is composed chiefly of orthoclase (or microcline) feldspar and of quartz. Small quantities of

biotite, muscovite, and black tourmaline are associated. [Note —Orthoclase and microcline feldspars are of identical chemical composition. They both contain 16.9 per cent. potash theoretically. In nature, the potash may be replaced by varying amounts of soda.]

The feldspar is generally pink or light grey in colour. In places it occurs in large, very pure crystals, twelve inches or more in diameter; but, for the most part, even when the definite crystalline form is retained, the feldspar is mixed with small prisms and bands of quartz. In such cases the feldspar constitutes about 80 per cent. or more of the whole. This combination makes up the greater part of the dykes.

In some places the rock consists almost entirely of feldspar; in others it consists almost entirely of quartz, with a few large crystals of feldspar scattered irregularly through it. Most of the quartz is white, or light grey, in colour; but in some places it is of a beautiful pink colour, with an opalescent appearance. This would make a good ornamental stone. Generally, the more quartzose perlions of pegmatite are near the sides of the dykes, whilst the feldspar predominates near the middle.

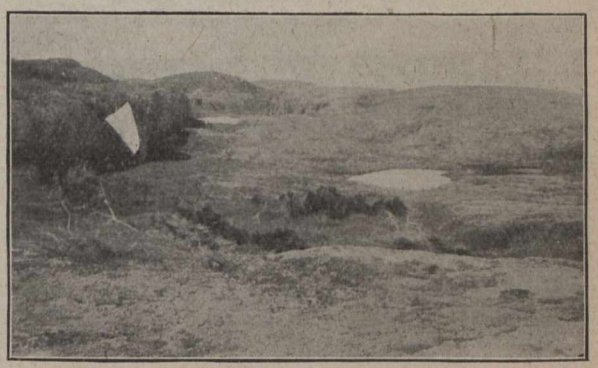
The enormous pegmatite dykes are very coarsely crystalline. Large and very pure masses of feldspar crystals are often segregated together in quantities that may yield hundreds, or even thousands, of tons. From these segregations a pure high-grade potash feldspar could be obtained. But the great portion of the feldspar in the dykes is closely associated with a small amount of quartz, and forms with it a typical graphic granite, usually free from biotite or other deleterious material. Vast quantities



of feldspar in this form, corresponding to the "Standard" feldspar of commerce, could be mined above the level of tidewater, and, doubtless, much more could be obtained below this leve.

ONTARIO.

Cobalt.—It is predicted that 2,000 companies with Porcupine as their base of operations, will be formed this year. It is easy to sell any kind of property, no matter where it be, for a thousand dollars, as long as it is reasonably near good claims. They are being bought for acreage in companies forming.



There is a very general feeling among mining men that the Government should see to it that the wildcatting in the early days of Cobalt should not be repeated at Porcupine, as it will do harm to legitimate operators.

The bullion shipments so far this month of December have not been very high. But the total at the middle of the month had reached the 418,684 mark, so that it is certain that over half a million ounces will be accounted for.

The Jacobs interests have purchased the Bruce Brymer claim situated in the south of Tisdale and adjoining the Foster. Camps will be built and work commenced at once.

While there is no slackening of interest in Porcupine the real estate boom has for the moment eclipsed mining speculation. Since the announcement of the building of the railway the lots

have trebled in value and there is now much competition for lots on the townsites at Golden City, Porcupine City and South Porcupine. All three have claims on the purchaser. In the last month the building activity at the south end where Col. Carson is now interested, is intense.

Two new smelters are in the market for ore. One will be ready to treat ore by the end of next month as the building at Orillia is completed, and most of the machinery has arrived. It is known as the Canadian Refining & Smelting Co. and will treat 20 tons of high-grade a day for the present. The other has a small plant on Dufferin Street, Toronto, and is bidding especially for high-grade cobalt ores. They will give ten cents a pound for 7 per cent. cobalt, and 8 cents for 6 per cent. In silver ores they will only take the very high grade. They are also bidding for high-grade nickel.

The Porcupine Power Company is making every preparation to rush the work on the power plant at Sandy Falls on the Mattagami. They will have storehouses of their own at Kelso, their own teams on the road, and they are confident that they will have all the machinery at Kelso by the end of February and can deliver power.

A syndicate of New Liskeard, Hamilton, Toronto and Cobalt men has purchased the O'Kelly claim at Miller Lake for $40,000. Mr. V. E. Taplin is the secretary-treasurer of the company. Work will be commenced as soon as possible.

The Temiskaming mining company, which resumed regular dividend payments on Nov. 10, has declared a 5 per cent. bonus for the new year, in addition to the regular 3 per cent. They will on Dec. 31 have paid 32 per cent., or altogether $784,156.25.

With the payment of the dividend on Jan. 12, the Nipissing will have practically redeemed its capitalization, having disbursed 99 per cent, or $5,940,000. The La Rose at the same time will have paid 29 per cent., or $2,079,185. While there was no increase in the La Rose dividend rate this quarter there is every hope for a rise at the next declaration.

The Floyd Mining Company has gone into liquidation. The company's main claims were in an unproductive portion of Coleman.

The Hon. Frank Cochrane, Minister of Lands, Forests and Mines, has returned to Toronto after his trip to Porcupine. He states that no expense will be spared to push the Porcupine Railway to completion with all despatch. If necessary, a thousand men will be employed in the work. He expressed himself as highly pleased with the Porcupine country. At Porcupine a contractor named Morrison cross-examined the Cabinet Minister rather severely and very plainly told him the views of a portion of the mining men in the North.

The eight Armstrong-Booth claims adjoining the Rea mines have been optioned to Mr. E. P. Earle, president of the Nipissing, for a sum between $150,000 and $200,000. Three of the Armstrong-Booth properties were under option to the Timmins, but they did not take them up.

With the declaration of their Jan. 16 dividend the Crown Reserve will have paid 150 per cent. on its capitalization in less than three years. For eight quarters it has now paid 15 per cent.

Last November La Rose produced 408,000 ounces. The operating profits amounted to $153,000 as compared with $138,000 in October.

The Princess and Lawson alone earned the La Rose dividend for the month.

To broaden investments in Northern Ontario, the Trethewey-Cobalt intends to increase the capitalization to two million dollars. There is some opposition to the suggestion among stockholders.

After a considerable period of development, during which there was no attempt to take out ore, the Beaver is now preparing to ship a high-grade car, which will leave before the end of the year. In the meantime on all three levels good ore bodies are being opened up. On the 200-foot level a crosscut has now opened up a five to six-inch vein of 4,000 to 5,000-ounce ore.

The Right of Way will pay the regular dividend of 2 per cent. on Jan. 1. It has now paid 73 per cent. of the original capitalization of $500,000. Since the capitalization has been raised to a million and a half, 8 per cent. has been disbursed.

East of the Fourth of July alone the Meyer vein at the 175-foot level now shows ore for 225 feet. For twenty feet there was a barren patch in the vein, but with this exception the lead has averaged from six to eight inches wide of 4,000 to 5,000-ounce ore. Two hundred feet from the shaft a winze will be sunk on high-grade ore to ascertain the depth of the conglomerate. The dip of the conglomerate is much more pronounced here, so that in all probability 300 feet of that formation will be obtained in the drift farther east.

The month of November was notable with the Nipissing, both in regard to production and also the discovery of new ore bodies. During the month $200,851 net was produced, and $398,410 was shipped, all net. Of this total $84,000 came up the Fourth of July Shaft. The discoveries included the new vein at the Kendall, the ore at 140 feet at the new shaft 122, and further ore bodies at the Meyer and 164.

Seven tons of high-grade ore left the camp early in December from the Waldman mine. This was taken out from the old shaft some time ago, but was not shipped immediately.

In a very interesting paper at the Cobalt Board of Trade banquet, Mr. T. R. Jones, of the Buffalo, stated that the gold area represented in Porcupine is supposed to include 180 townships, or 6,480 square miles, of which only 84 square miles had been in the least prospected. In the possible silver area there were 9,072 square miles, of which 222 square miles, or 2 1-2 per cent., had been prospected. Of the area so far prospected, 5 per cent. had proven more or less producing areas.

Col. Carson, president of the Crown Reserve, confirmed the report that his company is contemplating the erection of a big mill if no customs concentrator is to be commenced at once in the Kerr Lake district. He stated that when the high-grade had been exhausted at the Crown Reserve it would still be a great low-grade proposition. He understood on good authority that there was five years of milling ore right in sight in the Kerr Lake district already.

In a few weeks there will be the best possible accommodation at Porcupine for travellers. Big well-equipped hotels are building at Porcupine City and South Porcupine.

The telephone line from Matheson to Porcupine is now in good working order, and is doing considerable business. A large number of messages have already been sent over it.

Campbell and Deyell, the two Cobalt chemists, will establish a branch of their business at South Porcupine, where a building has already been commenced and the machinery sent up. Dogherty and Dixon, two more Cobalt mining men, will also establish an assaying business in the camp.

There is now a rush into Denton Township, or what is better known as Cripple Creek. It is 45 miles from Porcupine. The assays from that district, while not spectacular, are uniform and fairly high.

BRITISH COLUMBIA.

The Granby Consolidated M. S. and P. Company has declared a dividend of one per cent., total amount $148,500. This is the twelfth dividend the company has paid, and it brings the aggregate of profits distributed among the shareholders up to approximately $3,900,000.

The Hastings (British Columbia) Exploration Syndicate, Ltd., operating the Arlington gold mine at Erie, in Nelson mining division, lately declared a dividend of sixpence per share on its 60,375 issued shares. The company's head office is in London, England. Mr. Leslie Hill, M.E., of Nelson, is resident consulting engineer and manager. This is the third dividend this company has paid during Mr. Hill's management,

but the first and second were each at the rate of one shilling per share.

Cariboo.—Now that the placer gold mining season is over for the year it is realized that there will probably prove to be a decrease in the quantity of gold recovered in 1910, as compared with that in 1909. The chief cause of the expected decrease was that the washing season closed early and there was not sufficient water to admit of the sluice boxes being cleaned up on several of the larger mines, consequently much of the gold washed out of the gravel must remain in the sluice boxes until after next year's season shall have opened. Good progress has been made with construction work on the Quesnelle Hydraulic Gold Mining Company's 17-mile ditch and pipe-line from Swift River to the company's gold-bearing leases on and near Quesnel River about 20 miles below Quesnel Forks.

Atlin.—The season is believed to have been the best placer mining operators on Atlin creeks have experienced since 1907. This is reported to be largely due to the greater yardage of gravel the North Columbia Gold Mining Company washed during the 1910 season and the consequent increase in the quantity of gold recovered. In addition there was some lode gold obtained from quartz crushed in a small stamp mill on Taku Arm of Tagish Lake.

East Kootenay.—While the tonnage of lead ore from the St. Eugene mine is less now than for years production at the Sullivan mine, also operated by the Consolidated Mining and Smelting Company of Canada, has been large enough lately to make good that deficiency. An ore-testing plant, designed to treat ores on a commercial basis, has been put in at the St. Eugene mill. Shipment of ore from the Society Girl mine, near Moyie, was in progress about the middle of December, but the tonnage then available was not large—probably between 150 and 200 tons of hand-sorted ore. Coal mining has been active at four collieries, namely, those of the Crow's Nest Pass Coal Mining Company at Coal Creek and Michel, and of other companies at Hosmer and Corbin, respectively, also in the Crow's Nest Pass district.

West Kootenay.—It is proposed to develop the Highland mine, Ainsworth camp, at a deeper level than has yet been worked on the property, if satisfactory financial arrangements can be made by the Kootenay Silver Lead Mines, Ltd., which company holds the property under option of purchase. Work is being done on both the No. 1 and Gallagher mines, and both will send down some ore when the sleighing shall be good enough for heavy hauling. The 1910 season has not been a generally good one at mines on the south fork of Kaslo Creek, from which the output of ore was comparatively small. The machinery for the Joker stamp mill has not yet been hauled to the property, but lies where unloaded from the K. & S. Railway, near the junction of the south fork with the main stream. Efforts will be made to do the necessary heavy hauling as soon as there shall be sufficient snow on the ground to make a good road. The late lessees of the Whitewater mine have abandoned their lease of the property as a result of the destruction of the concentrating mill by fire last summer. With neither concentrating nor transportation facilities, both having been destroyed by fire, there was no inducement to re-open the upper mine. Development work is, however, still being done in the "deep" of the Whitewater vein, by the company known as the Deep Mine, Limited.

In the eastern part of Slocan district, the Rambler-Cariboo and Lucky Jim mines are preparing for producing ore on a larger scale than for years. Already some 4,000 sacks of ore—about 300 tons— from the Rambler-Cariboo have been hauled part of the way to Three Forks, as far on the way as there has been snow for good sleighing. The snow is unusually late in coming this year, there having been little fall as yet low down the mountains. It is intended to regularly maintain an output from the Rambler-Cariboo of about 200 tons of silver-load ore per month, there being plenty of ore available for stoping on several levels down to the 1050-ft. Driving the low-level adit at the Lucky Jim zinc mine is being done faster now that there is compressed air for machine drills. A new compressor has been put in to replace that destroyed in last summer's forest fire. Development work is being continued throughout the winter at the Washington mine, above McGuigan Basin, and at the Surprise and Noble Five, on the Cody side of the divide. Near Sandon, mining progress is much as during several recent months, with the Ruth-Hope and Richmond-Eureka both shipping ore in quantity and the Slocan Star doing similarly, though on a smaller scale for the present. Practically all the smaller mines have been closed for the winter, work not being practicable to advantage when the winter snows are deep, and sometimes dangerous by reason of the risk of snow slides. There have been reports published in effect that the Standard mine has been sold, but as yet these are premature, for no sale has been effected. There is such an unusually large showing of shipping ore in the mine, with good reason to look for its continuance, much development work warranting this expectation, that its purchase from the present owners by Spokane capitalists is regarded as probable.

About Nelson, there is also activity in several directions. The Consolidated Mining & Smelting Company has been constructing a four-mile aerial tramway from the Molly Gibson concentrator towards the landing on the west arm of Kootenay Lake preparatory to resuming shipment of silver-lead ore from this mine. The organization of a company named the Kootenay Gold Mines, Ltd., has been in hand and it is understood has been accomplished. The authorized capital of this company is $250,000, and the chief object the acquirement of the Granite-Poorman gold mines and 20-stamp mill, situated within a few miles of Nelson. The property is owned by the Duncan United Mines, Ltd., and is being worked under lease by Messrs. Gough, Guille and Swedborg, fo Nelson. Copper ore is being shipped from the Eureka mine to Trail. The assets of the Hall Mining & Smelting Company, including the Silver King mine and a large group of adjacent mineral claims, smelter at Nelson, aerial tramway connecting mine and smelter, water rights, electric power transmission line, etc., have been sold, together with several other groups of claims also situated on Toad Mountain. The sale is an absolute one, and 60 per cent. of the purchase money has been paid, the remainder being payable in two instalments, the final one falling due next summer. It is reported a strong company is being organized in England to acquire this big consolidated group and other property included, and that it is proposed to drain the Silver King mine by a deep-level tunnel; also to work the North Star group, which is one of those being acquired. The question of operating the smelting works will be considered later, but it is regarded as a possibility.

At Sheep Creek developments continue to be satisfactory. The Queen is mining ore from a big shoot found in the deeper part of the mine. The Nugget keeps its 4-stamp mill going, and, at the same time the work of further exploring the mine is being steadily proceeded with. The Kootenay Belle is reported to have quite lately cut one of the known veins at a depth of more than 200 ft. below where it had previously been opened. The crosscut adit entered the vein at 325 ft. from its portal. Where explored in No. 1 adit at 90 ft. from the surface this vein ranged in width from 30 in. to 5 ft. A larger vein occurs within 100 ft., and the lower adit is to be extended so as to cut that at greater depth, as well. Little information is obtainable concerning the Mother Lode, which Mr. John McMartin, formerly of Cobalt, has been prospecting all the year. It is known, though, that developments are regarded as quite satisfactory, and tests of ore are being made with a view of determining the style of mill best suited for treating the ore.

Coast.—It is stated that the Tyee Copper Company has taken over from the Northern Texada Mines, Ltd., the lease of the Cornell mine, on Texada Island. This mine is one of the Van

Anda group, which in past years produced a considerable quantity of gold-copper ore, much of it of high grade. The output of the Cornell, however, during 1909 and 1910, was of ore which though of fairly good grade, was not as high as in earlier years. During 1909 and part of 1910 there was produced from the Cornell 14,600 tons of ore running from 3.7 to 4.5 per cent. copper, and about 1.4 to 1.7 oz. silver and 0.3 to 0.4 oz. gold per ton. Princess Royal Island is again having attention. Some years ago a company having its headquarters in one of the Maritime Provinces, did some mining on this island, but no work had since been done there until lately. An adjacent island, Gribbell Island, also had mining done on it, but this part also has been neglected for years.

Much interest is being taken in the official bulletin on Portland Canal, by Mr. W. Fleet Robertson, provincial mineralogist, shortly to be issued. There is this satisfaction derivable from Mr. Robertson's reports—he is thoroughly conscientious and reliable, and may always be depended upon to unequivocally state the facts as he finds them.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Reports from Scheelite, the Moose River tungsten mining camp, indicate that progress is being made. Several new and rich veins have been cut. Mr. Victor Hills, of Denver, has recently concluded an examination of the property.

Springhill.—M. J. Butler, general manager of the Dominion Steel Company, accompanied by Mr. McDougall, assistant general manager of the Dominion Coal Company, and Hector McInnis, the newly elected vice-president of the Cumberland Coal & Railway Company, who are now inspecting the Springhill properties, went to Parrsboro to-day to view the terminal facilities of the company at that point. They returned to Springhill this afternoon.

The strikers anticipated that Mr. Butler would ask for a conference with the men, but so far he has given no indication of a desire to meet them. A cheque for $21,000 arrived in Springhill this week from the headquarters of the U.M.W., in Indianapolis, and as rather a peculiar coincidence a double indemnity order was issued on the same day this week as the polling took place for the election of executive officers.

For over a week past picketings have been going on in a most active and demonstrative fashion. Hundreds of men and many women will line the sides of the streets and jeer and hoot at the strike-breakers. Arrests are being made daily. Some of the parties have been tried before the Magistrate in Springhill, while others are taken to Amherst. The feeling in town is growing more bitter and more intense, and it is difficult to understand how the present conditions can continue longer without more serious trouble arising.

NEW BRUNSWICK.

Hillsboro.—Buried beneath three or four hundred tons of rock was the terrible fate that befell three workmen in the Albert Manufacturing Company's quarries at Hillsboro on Dec. 16th. Several others had miraculous escapes. The dead are: Fred Nelson, aged 40; Edward Collect, aged 45; Theophilus Allain, aged 21. Octave Duplessis was severely injured.

The men were working on the face and at the bottom of the 40-foot embankment. Two of the men were drilling into the face of the quarry with a view to blasting the top off when suddenly the rock gave way and fell, burying the three men.

ONTARIO.

Ottawa, Dec. 14.—A deputation representing the Canadian Mining Institute, and a sub-committee representative of the Commons Standing Committee on Mines, conferred this afternoon with Sir Wilfrid Laurier and Hon. Messrs. Oliver and Templeman with regard to the recommendation passed by the Mines Committee this morning, that steps be taken by the Federal Government to pass a general Mining Act, and to secure as far as possible, from the provinces, uniformity of legislation and regulations governing mining operations.

It was agreed that an Act should be drafted and presented by the Government to the House this session, codifying the existing Federal regulations with respect to mines, and whatever further action possible to carry out the wishes of the mining men with regard to the uniformity of legislation throughout Canada.

Ottawa, Dec. 13.—Mr. Hudson, Government expert on explosives, has been sent out to investigate the cause of the disaster in the coal mine at Bellevue, Alberta. It is expected that the Government measure to be brought down this session with reference to the manufacture and use of explosives may also contain provisions tending to improved methods of mining and reduction in the number of fatalities.

ALBERTA.

Edmonton, December 12.—Thirty lives are known to have been lost, as a result of the disastrous mine explosion which occurred Friday night at 7 o'clock in the Bellevue coal mine, three miles east of Frank, Alberta.

There were forty-six men on the shift, and thirty-three of them were killed. Fifteen were rescued, some of them having narrow escapes. A rescue party was imprisoned, and two or more of the members of it have lost their lives it is feared.

The known dead include Fred Alderson, fire boss at Hosmer Mines, one of the rescue party, who first entered the mine, and the only man not an employee of the West Canada Coal Company.

News of the disaster did not reach Fernie until late Friday night and a caboose and engine bearing a party of rescuers from the Coal Creek mines, including Mr. Evans, Superintendent Shanks, and others, started for the scene of the disaster, picking up a life-saving apparatus at Hosmer.

A. Michael, General Manager Ashworth, of the Crow's Nest Pass Coal Company, and others, boarded the special which, after transferring at Coleman and changing crews at Frank, arrived at Bellevue at 3 o'clock Saturday morning.

A rescue party was at once formed, and the men, under the direction of J. W. Powell, superintendent of the mines, equipped with Draeger helmets and oxygen apparatus, entered the mine. The oxygen apparatus, though not thoroughly understood by the users, proved of much value, but owing to the fact the charges lasted only thirty minutes, and also through the lack of men to form sufficient relays, the apparatus was not as effective as expected.

The rescuers worked until 5 o'clock Saturday morning, when a cave-in occurred, imprisoning the entire party. Two of the men were experts in the use of the oxygen helmets, but one man, Mr. Fred. Alderson, was brought out dead.

Mr. McKenzie, of Blackmore, a member of the rescue party, was brought out barely alive, and is in a very serious condition. Many others are still in a precarious condition.

The thirty-three bodies recovered, in addition to those of the Hosmer miners, were all bodies of the original forty-five or forty-six imprisoned in the mine. Many have been identified, but in the case of foreigners especially, identification is difficult. Many bodies are badly mutilated.

Coroner E. M. Pinkney, of Lille, arrived soon after noon Saturday, and had a jury empanelled at once. An adjournment to the 19th instant was taken.

Relief trains, equipped with blankets, food, etc., and bringing physicians have arrived from all directions on the Crow's Nest line between Cranbrook and Lethbridge, and there is no lack of willing, sympathetic aid.

Every coal mine in the district is closed down and the miners are working in shifts in the work of rescue.

Many stories of the wonderful heroism will be told when the work of rescue is complete, but while there remains a single chance to save a life, the men refuse to talk of their experiences in the mine.

One incident, however, stands out clearly. Jack Hutton, miner at Frank mine, was one of the volunteers for the first relief party. After entering the portal he heard that his brother, Ike, was among the imprisoned. He worked until three in the morning, and finally located his brother in one of the side galleries. Ike, with others, had started for the surface, when they were caught in the second fall, and retreated to the gallery where the air was comparatively pure. When the second relief party arrived, and removed the debris, Jack Hutton staggered out carrying the insensible form of his brother. Both were overcome.

There are several stories at present as to the cause of the explosion. The one most generally accepted is that a fire supposed to have been put out in October, broke out again and ignited the gases. No shots were fired after the shift had left the mine.

Alderson, the mine boss from Hosmer, who lost his life trying to save others, leaves a wife and four children in England.

Six English miners were on the imprisoned shift and of these three have been identified as Joseph Maguff, Homan Tippo, pit boss, and Isaac Hutton, fire boss.

Edmonton, December 13.—Premier Sifton announced in the Legislature that the fullest possible investigation was being made into conditions of the mines in the south of the province, and particularly the one at Bellevue, owing to the recent disaster there. A provincial mine inspector has been sent there, and a local inspector has been on the scene since Saturday. Following the investigation, he stated that a commission would probably be appointed.

BRITISH COLUMBIA.

Fernie, December 13.—Six of the Slav victims of the Bellevue disaster were buried here in one grave, and the body of Fred Alderson will be interred at Hosmer to-morrow.

It is a significant fact in connection with the disaster that a Government mine inspector viewed the mine for escaping gas three days before the fatality, and posted a notice to the effect that the timbering and ventilation were good, and that there was no gas.

The Miners' Union had asked that an inspection of the mine be made and told Inspector Sterling, it is stated, that there were volumes of gas in the mine. It is thought that there is yet one unrecovered body.

Nelson, December 15.—The bonding of the C.P.R. group of claims at Ymir to a Vancouver syndicate, represented by Charles Jennings, with whom negotiations have been proceeding for some weeks, has been consummated.

The C.P.R. group, owned by Edward Peters, of Ymir, and George Colwell and G. G. Peters, of Nelson, and a number of associates, is located in close proximity to the Sterling group, which was recently bonded to Phil White, of Vancouver, and to the Blackcock, upon which a deal with Mr. White is now pending.

All papers in connection with the bond have been executed, and are now in escrow in the Royal Bank of Canada. The final payments are to be made within two years, and one of the conditions of the deal is that the development work at present being carried on shall continue throughout the winter. There are ten claims in the group, and a large number of surface cuts, a shaft, and several tunnels have been already driven on the property.

Vancouver.—It is announced that the Tyee Smelting Company, of Ladysmith, has bought the interests of the Cornell mine at Van Anda, Texada Island, originally worked by a British syndicate.

The latter syndicate abandoned operations and sold out to the Northern Texada Mines, Limited, who struck a rich formation of Cornite copper, yielding high values in silver and gold. They expended $300,000, and within two years this was all recovered from the mine and a handsome dividend was paid the shareholders, so that the sale price of the lease left them very much to the good.

The Tyee Company intends to put in a large amount of additional machinery, and development work will be started on a big scale. Others interested in the selling company in addition to Dr. Tanzer, are Messrs. S. G. Faulkner, A. A. Jones, Dr. W. R. Spencer and J. Y. Griffin, of this city; J. B. Suess, of Seattle; R. J. A. McGuiness, of Van Anda, and others. On his retirement as president and manager, Dr. Tanzer was the recipient of a presentation from the men.

The mine property itself is owned by Mr. H. W. Treat, of Seattle, and is situate one mile from Van Anda. Since January 1, 1909, 20,000 tons of high-grade ore are claimed to have been taken from the mine to the Tyee smelter at Ladysmith. Since that date $225,000 is also said to have been paid in wages and supplies, ninety-four per cent. of which remained in this province, and a further sum of $40,000 went to Mr. Treat in royalties. The machinery which the company installed upon taking possession cost another $25,000.

MINING NEWS OF THE WORLD.

..**Bolton, Eng., December 21.**—Three hundred and thirty-seven coal miners were entombed to-day in the Hutton colliery by a terrific explosion.

Eight hours after the disaster occurred only fifteen of those entombed had escaped. A pit boy who was the first rescued, declared that the disaster would cost the life of every man working in the shaft. The mine caught fire from the explosion and great gusts of black smoke rolled from the mouth of the shaft, driving back the rescue parties.

The shock of the explosion was felt for miles around and the families of the imprisoned men crowded about the shaft screaming and trying to enter.

As the body of one dead man was brought out there was a rush to try to identify the blackened remains.

Gusts of the deadly fire damp which filled the pit drove back the rescuing parties. The clothing of the rescuers was burned off and some of them emerged minus hair and eyebrows.

Great throngs crowded about the shaft begging to be allowed to take part in the rescue work. They were mostly relatives of entombed men and the officers who were strung about the pit were compelled to fight them back.

Eight hours after the disaster the rescuers took seven of the miners to the surface of the shaft. Although life was still in them they were badly hurt and the physicians who made a hasty examination before they were taken to the hospitals declared that they were probably fatally wounded.

A shift had just finished work in the shaft, but the men rushed from their homes, grimy from their night's work, clamoring to enter the shaft and rescue their comrades.

Special relief trains were rushed from surrounding towns bearing doctors, nurses and medical supplies. Experienced miners, long used to the disasters of the coal mining district,

were hurried to the scene. Especially constructed devices to guard against the fatal gases in the mine were brought there.

A temporary hospital and morgue were established. As the blackened and wounded men were brought to the surface they were taken with all possible despatch to the hospital. The dead were hastily embalmed and placed in the morgue for identification.

There were 337 men in the colliery at the time the explosion occurred and eight hours later only fifteen survivors had been taken out. At that time ten of the dead had also been removed.

Fire broke out in the mine following the explosion and prevented rescue work. Vast volumes of smoke mingled with the fatal fire damp. Great billows of fire spurted from the pit thousands of feet in the air and pockets of gas exploded from time to time with tremendous detonations.

Within a few minutes after the first blast occurred, the mouth of the mine was surrounded with relatives and friends of the miners. When these learned that the mine officials were considering sealing the mouth of the pit rioting broke out. The mine officials were attacked by the infuriated mobs and a detachment of soldiers was summoned to protect the representatives of the owners and prevent the men in the crowds from rushing to their doom in the shaft in the hope of attempting a rescue of their imprisoned comrades.

The local authorities were powerless to restore order. The municipal authorities deputized armed guards to patrol the mine company's property.

Members of the early rescue party, which was able to penetrate a short distance into the shaft before the fire passed beyond control, declared that more than 250 miners were undoubtedly dead, as they were working in a section of the mine completely cut off by falls of slate and a seething furnace of rescuers declared that the poisonous fumes and lack of fresh flames. Even if they escaped death in the raging holocaust, the air would kill them.

The mine owners declared that the explosion had been caused by an ignition of accumulated fire damp from an open lamp worn on a miner's cap.

The plight of the miners was rendered more desperate by a mishap to the machinery of the shafts where the cages refused to move for a time, preventing a quick escape and interfering with the ventilation. The rising gases were checked by obstructions and driven back upon the entombed men.

SOUTH AFRICA.

Johannesburg.—The Johannesburg Star reports the discovery of a gold formation—said to be similar to the Glynn's Lydenburg deposit—traced for a distance of 4,000 yards and situated 11 miles southwest of Pretoria.

Three of the finance houses are interested and prospecting is proceeding.

A prominent group of engineers who inspected during the week-end the Cyferfontein discovery on the Klerksdorp goldfield, express themselves impressed by the showing.

INDIA.

The gold production of the mines of the Kolar Goldfield (Mysore) and two outside mines (the Hutti Nizam's and the North Anantapur) for November was 47,272 ozs., an increase of 43 ozs. compared with the return of the previous month.

UNITED STATES.

Bakersfield, Cal.—At the recent meeting of the directors of the Independent Producers' Agency, in this city, several plans for the improvement of the oil markets were considered and it is probable that in the near future action will be taken to carry out the plans that met with general favour. One of the projects is for the Agency to rent all the storage it may need for a period of 10 years on a certain fixed amount, and not for month to month as prevails at this time. It is likely that steps will soon be taken towards this end.

San Francisco, Cal., December 20.—More than $78,000, $18,232 in gold bullion, and $60,000 in express bullion, has been stolen by Alaska treasure thieves, and the Canadian Government and the United States Post Office Department are working to-day to solve the crime, which was committed under mysterious circumstances.

The robbery of the $78,000 worth of bullion took place while the treasure was enroute from Fairbanks, Alaska, to this city. The authorities have been working upon the supposition that $60,000 was stolen from a United States mail bag on board the steamer Humboldt between Skagway and this city. Inspector Durand to-day declared, however, that he had discovered evidence that the treasure was stolen between Dawson and White Horse Rapids in Canadian territory.

Four persons giving the names of E. L. Smith, Margaret Henry and T .J. and G. M. Woodson, are under arrest in San Francisco. The quartette had $12,500 worth of gold bullion and currency in their possession when arrested. The authorities have not revealed the part they claim the woman played in the robbery.

Redding, Cal.—The Farmers' Protective Association has unanimously adopted a resolution demanding that the Balaklala Copper Company cease from operating its smelter at Coram, except in strict conformity to the decree of Judge Morrow, of the United States Circuit Court at San Francisco. The farmers charge that the fumes are still causing great damage to crops and that the smelter must close until such time as the Cottrell or other devices effectively control the objectionable smoke.

Colorado Springs, Colo., December 17.—Dividends aggregating more than $550,000 have already been declared or will be declared this month by mining companies operating at Cripple Creek, with headquarters in this city. Among the companies that have already announced these so-called "Christmas" dividends are: El Paso, $24,000; Golden Cycle, $30,000; Elkton, $37,500; Gold King, $19,737; Vindicator, $45,000; Acacia, $7,194; Granite, $16,500; Portland, $60,000.

Leadville, Colo.—When the year 1910 shall have been completed and figures are made up on zinc production in Lake County for the year, it is expected that the figures representing the output of carbonate of zinc will represent a surprisingly large percentage of the total. Close to 4,000 tons a month of carbonate of zinc are being produced, and the returns thus far indicate an average value of about $20 a ton net to the shipper.

MEXICO.

Durango, Mex.—Forty-seven miles northeast of Telehuanes, the Inde Gold Mining Company at the camp of Inde, is treating an average of 3,000 tons of ore a month, employing an all slime cyanide process and grinding with high-speed rolls and tube mills. The reduction equipment will be enlarged by the addition of a half-dozen Pachuca tanks to care for the ore from the company's recently acquired Potrillo mine.

SILVER PRICES.

		New York. cents.	London. pence.
"	13	54⅜	25⅛
December	7	54¼	25
"	8	54⅛	25
"	9	54⅝	25¼
"	10	54½	25 3/16
"	12	54⅜	25⅛
"	14	54½	25 3/16
"	15	54⅜	25¼
"	16	54⅝	25¼
"	17	54⅝	25¼
"	19	54¾	25 5/16
"	20	54½	23 3/16
"	21	54⅜	25⅛