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NOTES AND COMMENTS.

The *Slocan Mining Review* predicts that more ore will be shipped from the Slocan in 1907 than in any other year since 1900.

Nelson will have three big mines in its vicinity, operating with large forces this season, viz., the Ymir, La Plata and Queen Victoria, says the *Canadian*.

The *Ashcroft Journal* states that the Willow River Mining Company resumed underground work about the middle of March, under the management of F. C. Laird.

The fall of snow during the winter of 1906-7 has been generally plentiful enough to warrant the expectation of an abundant supply of water for next season's placer mining operations.

The *Enderby Progress* states that the members of the Enderby Coal Mines, Ltd., "have no doubt but what they have as valuable a coal property as there is in the Province." *Cum grano salis*.

Everything in local mining circles, reports the *Whitehorse Star*, Southern Yukon, indicates that the present will be the most prosperous year in local history. Money is freely coming in and on every hand are evidences of activity.

The winter now closing has been the most severe one the railway, mining and smelting companies operating in the Kootenay have yet experienced. The chief difficulties seem to have been overcome and conditions should soon be normal once again.

The Cariboo mine in Camp McKinney will be unwatered to the 400-ft. level by the end of the month and the mine cleaned to that depth, remarks the *Greenwood Ledge*. It will take some time to put the shaft in shape, but it is expected the stamps will be working by the middle of April.

The *Phoenix Pioneer* wonders whether "the Granby, Brooklyn, Idaho, Snowshoe, Rawhide and other mines in Phoenix camp will be worked three thousand years, like the Rio Tinto in Spain?" Our prognosticator does not feel equal to giving an opinion for fear he should lose his reputation as a prophet.

From the Kamloops *Standard* it is learned that the old Dominion group of mineral claims, which lies on Coal Hill east of the Iron Mask, has been bonded to Glasgow parties, who have also taken an option on the Python group.

The *Slocan Mining Review* of Sandon thinks "the Slocan district offers unrivalled inducement for capital at this moment, and as there are numerous properties with large bodies of pay ore in sight, dwellers in the Slocan confidently anticipate a big rush the forthcoming spring." May their expectations be abundantly realized.

The Canadian commercial agent in South Africa (C. M. Kittson) reports that asbestos in payable quantity and of excellent quality has been discovered in the Transvaal. An expert who has examined the deposit states that it is of abnormal width and equal to the finest in Canada or Italy. An offer of £40 per ton has been received from Germany for the best quality.

What is popularly known as the Eight-hour Smelter Bill, has been passed by the Provincial Legislature. In two previous sessions a similar bill had been defeated, but on the premier this year announcing his intention to support it, the passage of the measure was assured. The text of the new act is printed on another page of this number of the *Mining Record*.

As the British Columbia Bureau of Mines has exhausted its supply of copies of the "Annual Report of the Minister of Mines" for the year 1900, the provincial mineralogist is desirous that anyone having a spare copy will be good enough to forward it to him. As soon as the "Annual Report" for 1906 (now being printed) shall be issued he will be glad to send a cloth-bound copy of that volume in exchange for every paper-covered copy of the 1900 report he shall receive.

In a review supplied to the *Revelstoke Mail-Herald*, E. A. Hagen, mining engineer, who is well informed on mining matters in the northern Lardau, said: There is likely to be some activity in Eva and Imperial stock. The Eva mine at Camborne has been steadily making profits, a compressor plant has been installed and the excellent management of the property has instilled in the minds of investors increasing confidence in the property. All that is now wanted to place the property on a steady dividend paying basis is a larger mill, and this will undoubtedly be undertaken at an early date.

In the Provincial Legislature, Mr. J. A. Macdonald asked the premier the following question: 'Is it the intention of the Government to introduce legislation at the present session of the House providing for the granting to the City of Rossland of a portion of the mineral tax collected, or which may hereafter

be collected, from the mines within the corporate limits of the City of Rossland?' The Hon. Premier McBride replied as follows: "This Government does not admit that the City of Rossland is legally entitled to any proportion of the mineral tax collected from the mines within its corporate limits; but the question of paying a sum by way of a grant to the municipality, as a matter of equity, on account of the peculiar physical conditions of the municipality in its relation to the situation of the mines in that district, is under consideration." The Government afterwards placed the sum of \$2,500 on the estimates as a grant on this account.

The Le Roi Mining Company has taken a long-time option on the properties of the Spitzee Mines, Ltd. The mineral claims are the Spitzee, Fool Hen, Darby and Nelson No. 2, having an area of 110 acres in all. The *Rossland Miner* reports Mr. A. J. McMillan, managing director of the Le Roi Mining Company, as having said lately in regard to the deal: "It is quite true the Le Roi Company has taken an option on the Spitzee group of properties. The negotiations have been in progress for several months but were only concluded today. The Spitzee has shipped a few thousand tons of ore containing good values, but like many others, the company owning the Spitzee group has been hampered for want of funds and has only worked its mine at intervals. As the Spitzee is situated some little distance from the other working mines in Rossland, its success would mean much, not only for those immediately interested, but for the community as a whole. If there is a mine in the Spitzee, we hope to ascertain that fact within a few months, for it is our intention to put men on at once and proceed with development." Mr. McMillan further stated that he was not at liberty to mention the terms of the option further than that the Le Roi Mining Company had a working bond covering a long period.

The increasing importance of the copper mining industry in British Columbia is made manifest in the article on this subject appearing in this number of the *Mining Record*. A total production to date of 243,400,000 lb. is, for a country like British Columbia, which did not begin producing copper on a comparatively large scale until 1901, makes a creditable showing. The development of the industry has been much greater during recent years than earlier, as the following figures will show. The total value of copper produced during all years to date was \$34,535,000. Of this amount all but \$255,000 was the product of the ten years reviewed in the article above alluded to. The total value of the production for five years, 1897-1901, was \$8,554,000, and for five years, 1902-1906, it was \$25,726,000. Another striking comparison is that of the average yearly production of the last-mentioned five years—\$5,145,200—with that of last year—\$7,277,500. It is especially satisfactory to know that this substantial advance was not the result of higher prices only; the

increase in quantity produced in 1906 over that in 1905 was about 3,300,000 lb., or nearly nine per cent. Still more gratifying is the prospect of a larger increase in quantity in 1907 as compared with 1906, conditionally that there occur no serious interruptions to the operation of mines and smelters.

Registration as an extra-provincial company of the British Columbia Amalgamated Coal Company, with head office at Portland, Oregon, U. S. A., and capital \$10,000,000, has been gazetted. The head office of the company in British Columbia is at Victoria. It will probably be remembered that in its number for October, 1906, the *Mining Record* warned its readers against a "company" similarly designated and which, over the name of "Owen J. B. Yearsley, Banker and Broker, 61 Confederation Life Building, Toronto," published an advertisement containing what had the appearance of such gross exaggerations as to call forth a warning against the scheme from both Dominion and Provincial officials. We have no definite information that it is the same as the "Toronto Wildeat," as we called it when denouncing the ingenious misrepresentations of the individual above-named, but the fact that the Portland concern has a nominal capital of \$10,000,000 is of itself sufficient to cause enquiry as to its *bona fides*. No other coal mining company operating in western Canada has found it necessary to capitalize at half that enormous figure, not even the one having the largest collieries and production in the West. The one redeeming feature about the recently registered B. C. Amalgamated Coal Company appears to us to be that it has succeeded in getting as its attorney in the Province a barrister of such good repute and high professional standing as to make it quite certain he will not retain his connection with it in such capacity should it transpire that it is one of a class to be left severely alone. So far as the company itself is concerned we would suggest that if it be identical with the one responsible for the attempted deception of the Toronto man we exposed a few months since, and renews its efforts to sell stock, it should be given a wide berth by those who do not wish to lose their money.

The first number of the *Canadian Mining Journal*, a new mining journal published in Toronto, Ontario, has been received. The *Mining Record* extends to it a cordial welcome and sincerely hopes that the expressed intentions of its publishers to make it national in range and to assist in the upbuilding of mining, which they aptly designate 'a great Canadian industry,' may be successfully carried out. The new journal, with which has been incorporated the *Canadian Mining Review*, has been promised the hearty sympathy and active support as contributors of, among others, a number of men prominently associated with the mining industry of Canada. Its initial number is of such general excellence as to augur well for the attainment to the intended high standard it is aimed to maintain. With a single

exception the press notices we have read are favourable to the new journal. That exception is in the case of a B. C. weekly publication edited by a person long known as seemingly being unable in his connection with the mining industry of this Province to distinguish the ordinary demands of rectitude as against personal profit. He asserts that the owners of the new journal have purchased the old one "for the purpose of boosting Cobalt and any other mining district in which they may acquire large interests." Such a perverted view is a natural result of a certain habitude. In contrast to this gratuitous aspersion we quote from the *Canadian Mining Journal* its assurance that "it has no special interests to serve, no prejudices to obstruct its usefulness, and is untrammelled by considerations of financial disability in providing the necessary machinery by which to accomplish its purpose." The new journal will find its efforts along the lines indicated generally appreciated in British Columbia, long and deservedly known as "the mineral Province of Canada."

When in Los Angeles, California, recently, Mr. Samuel Newhouse, who is also largely interested in the Dominion Copper Company, operating mines and a smelter in the Boundary district of British Columbia, was interviewed by a representative of the *Mining Review*, which journal reports him as having said for publication concerning the property of the Nipissing Mining Company: "I have accepted the presidency of the company without pay and believe its property can be made a mine. I have worked out a scheme of development which will be comprehensive, and shall send several of my best men there. Though I cannot yet speak with certainty, the chances are excellent that the Nipissing will become a big producer. If that can be brought about the whole mining situation in this country will be greatly benefited." One of the "best men" sent to the Nipissing is Mr. T. R. Drummond who has been general manager of the Dominion Copper Company all through its progressive career since Mr. Newhouse became identified with it. Mr. Drummond has already gone to Cobalt, northern Ontario, where are situated the Nipissing Company's mining holdings, officially reported as being "the most extensive of any company in the camp, aggregating in all 846 acres." In the latest published report of the Ontario Bureau of Mines occurs the following concerning the Nipissing: "Only a small fraction of this area (846 acres) has been thoroughly prospected. The mines on this property have had the largest total production of any in Cobalt camp. From 25 to 30 veins have already been found, and of this number 11 were being worked at the time of inspection. A large tonnage of very high-grade ore has been taken from the most extensively developed vein—the Little Silver—the workings in which have reached a depth of 106 ft." The inspection mentioned took place some time since, the report being for the year 1905, since when developments on the Nipissing property have proved it to be wonderfully rich.

AN EIGHT-HOUR DAY IN SMELTERS.

EIGHT HOURS is to be the legal limit of time for men employed in or about smelters in certain specified kinds of work. The recent enactment by the Provincial Legislature of "An Act Regulating Hours of Labour in Certain Industries" does no more, though, than make eight hours a statutory day's work in lieu of one of the same length of time already conceded as a matter of custom in most smelters operating in the Province. The provisions of the new enactment follow:

1. This act may be cited as the "Labour Regulation Act, 1907."

2. No person shall be employed in or about any smelter, sorting, handling, removing or smelting ores or matte in any stage of preparation, for a longer period than eight hours in any 24 hours.

3. Any owner, agent, or manager, or anyone acting on their behalf, employing any workman or person in contravention of this act, shall be liable to a penalty not exceeding \$100 nor less than \$20 for each workman or person so employed, and any workman or person so working for a longer period than specified in section 2 of this act shall be liable to a penalty not exceeding \$100 nor less than \$20.

4. Twenty-four hours, for the purpose of this act, shall mean from midnight to midnight.

5. This act shall come into force on the first day of March, 1908.

STREAM-FLOW IN ALASKA.

THE STREAM-FLOW measurements that the United States Geological Survey has been making for a decade or more on important streams in various parts of the United States were, during the summer of 1906, extended to Alaska, in order that information might be obtained regarding the amount of water available for the economical development of placer mines and possible water powers in that Territory. The results of the work have just been published as No. 196 of the series of "Water-Supply and Irrigation Papers." That such information is essential to the profitable working of placer deposits is not always fully realized, and the lack of it has often been responsible for the financial failure of enterprises that promised success.

Limited funds and time necessarily restricted the investigations to a comparatively small area, and the Nome region of Seward Peninsula was selected because of its extensive mining interests. Stream-flow data were collected at 45 stations, and a careful study was made of the conditions affecting the water supply. It is believed that the data obtained, while far from exhaustive, give a fair idea of the conditions of flow that may be expected in the vicinity of the gauging stations, and that they will prove valuable in estimating stream-flow in other parts of the region.

As a result of the great value of the waters for use in the auriferous gravels, water-power possibilities on the peninsula have been neglected; but the de-

velopment of a large number of excellent power sites is feasible both from an engineering and a financial standpoint, and the attention of mining men is directed to such development. The report summarizes the hydraulic development of the region, and contains a much-needed warning against construction and installation of expensive machinery without the necessary preliminary investigation and engineering advice.

The report may be obtained free of charge by applying to the director of the United States Geological Survey, Washington, D. C.

DOMINION GOVERNMENT COAL REGULATIONS IN THE WEST.

COAL LANDS in the West, under the jurisdiction of the Dominion Government, are to be leased in the future. Under the caption "Better Late than Never," the *Canadian Manufacturer* has published the following comment:

An important change has been made by the Government in the regulations governing the acquirement of coal-bearing lands in the West still under Government control, with a view to preventing any further alienation of western coal areas to absolute control of private parties, and also with a view to securing the prompt development of all further areas opened to private enterprise, instead of having them held merely for speculative purposes by the purchasers. Hereafter, according to an order-in-council, the Government will only lease rights to mine coal on all lands still comprising Crown domain in the West. Under the previous arrangement the lands acquired by the Canadian Pacific Railway, the Hudson's Bay Company, the school lands, etc., were given without any proviso as to the Government's right to any coal found on them. Later the law was changed so as to allow the purchasers to buy the surface rights at \$3 per acre, and the coal rights at \$7 per acre, making a total of \$10 per acre for absolute control of all the lands in the coal-bearing areas. A royalty of 10 cents per ton on all the coal mined was also required by the Government. Under these regulations, which have now been cancelled, many millions of acres of land have passed out of the control of the Government, and there has been complaint in the West because the coal-bearing areas are not being developed, but are being held for speculative purposes to the detriment of the settlers. It is believed, however, that as much coal-bearing land remains still under Government control in Alberta, Saskatchewan and in the Peace River district as has been already alienated. It is proposed that hereafter a 21-year lease be granted to private individuals wishing to get control of coal-bearing lands, and that an annual rental be charged therefor by the Government. This rental will probably be one dollar per acre, and the lease will have to be taken out for a minimum area. This area will, it is said, be about 2,500 acres, so that the annual rental cannot be less than \$2,500. This will,

it is hoped, insure prompt development and meet the objections as to speculators holding coal lands for a raise in price without doing anything to develop them. It will also pave the way for future Government ownership and operation of coal mines, if it should be deemed advisable.

A LABOUR DIFFICULTY AT TEXADA ISLAND MINE.

HIGHER PAY has been demanded by miners employed at the Marble Bay mine, Texada Island. Since the demand has not been acceded to, the men have ceased work and the mine has been closed down. The *Vancouver News-Advertiser* has published the following account of this matter:

The miners at the Marble Bay mine on Texada Island have gone out on strike, and all work has been suspended for the present. The Western Federation of Miners has called the men out because the management refused to agree to the demands of the union, which the company does not deem fair nor just, considering the favourable conditions under which mining is carried on at the Marble Bay mine, and, in consequence, they claim that the men have no cause for the action and stand taken by them.

Mr. A. Grant, manager of the mine, states that the beginning of the trouble came shortly after the notice of the demand of the union for increased wages was received, which was as follows: That machine helpers be abolished; that men engaged in stope work, drill work and hammer work should be paid \$3.50 per day of eight hours; that shaft-sinking work should be paid \$4 per day; that all men working in the timber crew should be paid \$3.50 per day, and the scale of wages was to go into effect on April 1.

The Marble Bay mines are owned by the Tacoma Steel Company, and Mr. Grant received a wire from the Tacoma office on the 18th inst., instructing him to discontinue shipments of ore as the smelter in Tacoma was closed down by reason of a strike.

In pursuance of this order, stoping was suspended on the 25th inst., and the men working in the stopes were paid off. Thereupon, a committee of the union waited upon the manager, Mr. Grant, and intimated that unless their demands were agreed to the union would call the men out of the shaft. Work has since been brought to a standstill.

The company claims that the scale of wages paid at the mine is fair and equitable. The board and lodging for single men at the company's hotel is but \$26 a month, and the option rests entirely with the men whether they stay at the hotel or not. At most of the other mines the men have to pay \$1 a day, or buy their provisions at the company's store, as is the case at the Britannia mine, which is four miles from the beach. The scale of wages paid at the Marble Bay mine is as follows: Machine men, \$3.50 per day, shaft sinking 50 cents per day extra; machine helpers, \$3, shaft sinking 50 cents per day extra; hammer and drill workers, \$3.50; head timber man,

\$3.50; timber men, \$3; top men, \$3; station men, \$3; hoist men, \$3.50; muckers, \$2.75; firemen, \$3.25; blacksmith, \$4; blacksmith's helper, \$3, and carpenters, \$3.50. Nine hours is a day on all surface work.

Mr. Grant announces that the shipping bunkers are full, and that there is plenty of good ore waiting to be broken up in the southeast end of the big stope.

The men base their claim on the fact that the price of copper is such that the company can pay higher wages, and they intend to insist upon their demands being granted, or they will not work.

A NEW PROCESS OF ZINC SMELTING.

ZINC SMELTING by a new process protected under Patent No. 24,096, 1906, possesses the great advantage over the ordinary process in the fact that metallic zinc is recovered direct from sulphide ores, such as we have in this country, says the *London Mining Review*.

The process consists of heating a mixture of blende with metallic iron at a temperature of 1,000 deg., in an electric furnace, whereby the iron combines with the sulphur of the blende and pure zinc is distilled off in the usual way.

This process has so many advantages over the present one in use, that all those interested in the zinc industry of British Columbia should at once test its practicability.

Amongst its advantages are the following:

1. It is continuous in action, the ordinary method in use is not so.

2. It is specially adapted to zinc ores carrying silver, as the silver is easily recovered from the iron matte by smelting. The residues from the ordinary process are not amenable to smelting for recovery of silver contents, except where very rich.

3. The process is unaffected by the presence of iron in the zinc. In the ordinary process iron is so objectionable that it is penalized when it exceeds a certain amount. The presence of iron in some ores is the chief cause of poor prices and all attempts to remove this have been, practically speaking, unsuccessful in the past. This forms, then, the most important, and to us the most pleasing feature of the process.

4. The plant is easy to work, is capable of being set up in small units, and costs much less than that in ordinary use. The practicability of the process in British Columbia depends upon the price of iron. In the Slocan, for instance, the mines are too far removed from coal and iron to apply it at them. On the coast, however, where iron can be made and coal and water power are easily obtainable, there is every reason to believe this process would supersede the ordinary method with its expensive outfit and high costs of working.

Wildcat promotion is a pronounced feature in connection with mining camps where success is greatest and activity most noticeable.

THE FIGHT IN THE UNITED STATES FOR A DUTY ON ZINC ORE.

MINE-OWNERS and others in British Columbia directly interested in having the United States market free to British Columbia zinc ores have, no doubt, read many published opinions, both for and against the imposition of a duty, on them. A little variety has been given to the character of the comments made in newspapers and mining journals by the publication of the following in the *Lead and Zinc News* of Joplin, Missouri, U. S. A.:

The fight of the Joplin operators for a tariff on zinc ore imported into the United States is at an end, with the weight of victory so heavy in the scale pan of the smelters that blindfolded justice is thinking seriously of using her sword arm to support the one with the scales. So the operators think. The smelters have taken a different view and instead of being jubilant about an imaginary victory lay obstinate claim to the truth of the statement that the victory is as big for the producer as it is for the smelters. These widely different attitudes, which have been held throughout the contest, have added a certain variety of lamour to the fight which otherwise might have been unrelieved, if it is true, as the smelters say, that the operators have raised a storm of opposition to a policy which in reality is essentially beneficial to their own interests. The reason for their attitude is easily seen and not at all unnatural. They reasoned that an influx of Mexican carbonates would place the smelters in a position of independence highly dangerous to the future prospects of the producers' invested capital. On the other hand, the smelters declare with a smile that the Missouri-Kansas district cannot furnish enough ore to keep the smelters of the country busy and that but for the Mexican and Canadian ores a number of the smelters now in steady operation would have gone to the wall, thus destroying that competition necessary to the maintenance of the present prices of ore.

The adverse conclusions on which the two interests have acted and the difference in the manner of treatment of the question by the producers, who regard it as a question vital to their interests, and the smelters, who regard it largely as a joke at a spot expense to the producers of somewhere near \$10,000, has furnished a piece of light comedy thoroughly enjoyed by the public. Meantime the actual outcome of free ore into this country is awaited with much interest by all concerned.

IMPORTANT MINING DEVELOPMENT IN SLOCAN DISTRICT.

MINING on what is known as the Rambler-Cariboo group, situated in McGuigan Basin, Slocan district, has been carried on under various ownerships over a period of about 14 years. The group has been owned since the spring of 1899 by the Rambler-Cariboo Mines, Ltd., a company

capitalized at \$1,250,000 and having its head office at Kaslo, British Columbia. The total value (gross) of ore taken from this property is about \$1,200,000. There has been practically no production for the three years last past, for during this period important development work has been in progress with the object of making the ore in the lower levels accessible at a much lower cost for delivery at surface than was practicable under the conditions prevailing when this work was undertaken.

The present manager, Mr. W. E. Zwicky, took charge of the mine in 1902. After a thorough study of the known ore bodies in the mine, from which up to that time silver-lead ore having a gross value of about \$800,000 had been mined, he concluded that they continue down to a considerable depth, but it was difficult to induce similar confidence in their permanence among those who would have to finance the costly undertaking of driving a long tunnel at a low level. Eventually, however, it became manifest that costs as greater depth was reached were increasing to such an extent, every additional 100 ft. adding from 20 to 30 per cent., that the manager's recommendations were adopted and the old method of working abandoned. The new plan involved the driving of a cross-cut tunnel between 4,000 and 5,000 ft. with the object of cutting the vein at a depth of about 1,400 ft., or 600 ft. below the bottom level of the old workings. "We had reached the limit of our power plant," reported Mr. Zwicky in June, 1904, "and we had either to drive this long tunnel or put in a new and larger plant so that we could go deeper. To do the latter and sink to the level where the tunnel will cut the vein would cost as much as, or more than, driving the tunnel, beside which our expenses each year would be enormous for pumping alone, as the more ground we opened up and the deeper we got the more water we would have to contend with."

Work on the deep-level tunnel was commenced on July 9, 1904. By May, 1906, a distance of 4,600 ft. had been driven, the dimensions of the tunnel being 9 ft. 6 in. high by 7 ft. wide (7 ft. 6 in. by 7 ft. in the clear). Several small stringers of ore were cut but not the main vein, so as funds were getting low a raise was commenced. At 150 ft. up it entered the vein, giving a depth of 450 ft. below the old bottom level and 1,250 ft. from the surface. Thence up to the old 800-ft. level the raise was made large enough for later use as a 3-compartment main working shaft (12 ft. by 4 ft. 6 in. in the clear).

Early in March of this year it was calculated that the top of the raise was about 18 ft. from the bottom of the old workings, so a drill hole was put up and at 17 ft. it tapped the water. This was regarded as excellent work, but with the workings above full of water from 450 down to 800 ft. Mr. Zwicky took no chances, the safety of the men putting up the raise requiring that a close check be kept on their progress as they approached the flooded old workings. Once tapped, the water took 11 days to run off. It is estimated that it would have cost fully \$10,000 to

have pumped the mine out, and then there would have been the necessity for keeping the pumps regularly going or it would have filled again.

By March 20 the raise was completed through to the old workings, and now preparations are being made for a resumption of production. Already some ore has been taken out, and as soon as the road down to the railway shall be in good condition for hauling, shipment to the smelter will again take place.

The successful completion of this enterprise, which was the most important mining development ever undertaken in the Slocan district, and probably in the Province of British Columbia, is a matter for much satisfaction to all concerned, and particularly to Mr. Zwick, whose confidence and energy led to results of such moment as to give promise of leading other mine-owners to also develop their mines at depth and so be far-reaching in their good effect upon lode mining throughout the district. The significance of the success attained in this instance will be better appreciated when it is borne in mind that by drifting farther into the mountain, which rises high above the collar of the old shaft, it will be practicable to gain a depth of 2,500 ft., or twice that at which the raise from the deep-level tunnel entered the vein.

It may be of interest to note that machine drills were used, compressed air for operating these having been furnished by a Canadian Rand Drill Company's 14 by 22 D1 air compressor, belt-driven by a 3-ft. 6 in. Pelton wheel running under a head of 750 ft., or a pressure of about 325 lb. to the sq. in.

The rock formation of the district is slate, through which a great boss of granite has been forced up, the whole being much cut by porphyry dykes. A well-defined quartz vein cuts through both slate and granite, and across the contact, and has been traced on the surface for a long distance, in a northeast by north direction, with a dip to the south or into the mountain.

THE DEPARTMENT OF MINES ACT.

HON. WILLIAM TEMPLEMAN, who is named as the minister who will have charge of the new department, has introduced into the Dominion House of Commons "An Act to Create a Department of Mines." The text of this act follows:

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

1. This act may be cited as "The Department of Mines Act."

2. In this act, unless the context otherwise requires,—

(a) "Department" means the Department of Mines;

(b) "Minister" means the Minister of Mines.

3. There shall be a department of the Civil Service to be called "The Department of Mines," which shall be under the control and management of a member of the King's Privy Council for Canada, who shall be named from time to time for that purpose by the

Governor in Council, and who shall be called "The Minister of Mines."

4. The department shall administer all laws enacted by the Parliament of Canada relating to mines and mining, and shall also have the management and direction of all subjects assigned to it by the Governor in Council.

Whenever, under the provisions of this section, the management and direction of any subject is transferred from any other department to the Department of Mines, the minister of mines and the deputy minister of mines shall be substituted for, and have all the powers and perform all the duties of, the minister and deputy minister, respectively, of such other department, as defined and provided by the acts and regulations relating to such subject.

5. The department shall consist of two branches, one of which shall be called the Mines Branch, and the other of which shall be called the Geological Branch.

6. The functions of the "Mines Branch" shall be:

(a) To collect and publish full statistics of the mineral production and of the mining and metallurgical industries of Canada, and such data regarding the economic minerals of Canada as relate to the processes and activities connected with their utilization, and to collect and preserve all available records of mines and mining works in Canada;

(b) to make detailed investigations of mining camps and areas containing economic minerals or deposits of other economic substances, for the purpose of determining the mode of occurrence, and the extent and character of the ore-bodies and deposits of the economic minerals or other economic substances;

(c) to prepare and publish such maps, plans, sections, diagrams, drawings and illustrations as are necessary to elucidate the reports issued by the mines branch;

(d) to make such chemical, mechanical and metallurgical investigations as are found expedient to aid the mining and metallurgical industry of Canada;

(e) to collect and prepare for exhibition in the museum specimens of the different ores and associated rocks and minerals of Canada and such other materials as are necessary to afford an accurate exhibit of the mining and metallurgical industries of Canada.

7. The functions of the "Geological Branch" shall be:

(a) To make a full and scientific examination and survey of the geological structure and mineralogy of Canada, and of its fauna and flora;

(b) to study and report upon the facts relating to water supply for irrigation and for domestic purposes, and to collect and preserve all available records of artesian or other wells;

(c) to map the forest areas of Canada, and to make and report upon investigations useful to the preservation of the forest resources of Canada;

(d) to prepare and publish such maps, plans, sections, diagrams and drawings as are necessary to

illustrate and elucidate the reports of surveys and investigations:

(e) to make a collection of geological and natural history specimens and to classify for exhibition in the museum such specimens as are necessary to afford a complete and exact knowledge of the geology and natural history of Canada;

(f) to carry on ethnological and paleontological investigations.

8. The Governor in Council may appoint a deputy minister, a director of the mines branch, a director of the geological branch, and such other officers and clerks as are required for the proper conduct of the business of the department, who shall be appointed and classified under Schedule A of "The Civil Service Act," and in accordance with and under the terms of section 6 of the said act.

9. Such officers of the department as are continuously engaged in the prosecution of original scientific work or investigation shall be classified as technical officers, under paragraph (b) of Schedule A of "The Civil Service Act," and the Governor in Council may cause to be prepared a list of such officers of the department as are considered to be entitled to be thus classified, with any designations deemed expedient to indicate the scientific work in which they are engaged.

10. No person shall be appointed to the department under paragraph (b) of Schedule A of "The Civil Service Act," unless he is a science graduate of either a Canadian or a foreign university, or of the Mining School of London or the Ecole des Mines of Paris, or of some other recognized science school of standing equal to that of the said universities and schools, or a graduate of the Royal Military College.

11. When the deputy minister reports, for reasons set forth in such report, that assistance of a technical, professional or special character is required in the department, the Governor in Council may, without reference to any examination, or to the age of the person, if the minister concurs in such report, temporarily employ such person at such remuneration as is deemed expedient.

12. Any person appointed to the department shall be appointed on probation and shall not receive a permanent appointment until he has served a probationary term of at least one year, during which probationary term he may be rejected upon the report of the director of the branch in which the temporary appointment has been made; but if he is not rejected, the deputy minister shall signify, in writing, to the minister that he considers the person so appointed competent for the duties of the department, and the appointment may thereupon be made permanent.

13. Persons employed in one section of a branch may be directed by the minister to perform any duty in or with respect to any other section in the same branch.

14. The Governor in Council may, on the recommendation of the minister, assign the present officers of the Geological Survey to the branch in which it is deemed desirable that their services shall be util-

ized; provided that the rate of pay or tenure of office as at present existing shall not be impaired or altered by such assignment.

15. Nothing in this act shall be construed to invalidate or interfere with the commissions, as assistant directors, heretofore issued under orders in council to certain members of the scientific staff of the Geological Survey.

16. No person employed in or under the department shall—

(a) purchase any Dominion or Provincial lands other than for personal residential purposes, except under authority of the Governor in Council;

(b) locate military or bounty land warrants, or land scrip, or act as agent of any other person in that behalf;

(c) disclose to any person, except his superior officer, any discovery made by him or by any other officer of the department, or any other information in his possession in relation to matters under the control of the department or to Dominion or Provincial lands, until such discovery or information has been reported to the minister, and his permission for such disclosure has been obtained;

(d) make investigations or reports relating to the value of the property of individuals, or hold any pecuniary interest, direct or indirect, in any mine, mineral lands, mining works or timber limits in Canada.

17. The directors of the branches shall, as soon as may be after the close of each calendar year, make summary reports of the proceedings and work of their respective branches for the year, and shall also furnish final and detailed reports, to be issued from time to time in such manner and form as the minister directs; and the minister shall cause the said reports to be laid before Parliament, with such remarks, explanations and recommendations as he thinks proper.

18. The department shall be furnished with such books, instruments and apparatus as are necessary for scientific reference and for the prosecution of the work of the Mines Branch and of the Geological Branch.

19. The minister may cause distribution to be made of duplicate specimens to scientific, literary and educational institutions in Canada and other countries, and also authorize the distribution or sale of the publications, maps and other documents issued by the department.

20. The minister may, for the purpose of obtaining a basis for the representation of the mineral, mining and forestry resources and of the geological features of any part of Canada, cause such measurements, observations, investigations and physiographic, exploratory and reconnaissance surveys to be made as are necessary for or in connection with the preparation of mining, geological and forestry maps, sketches, plans, sections or diagrams.

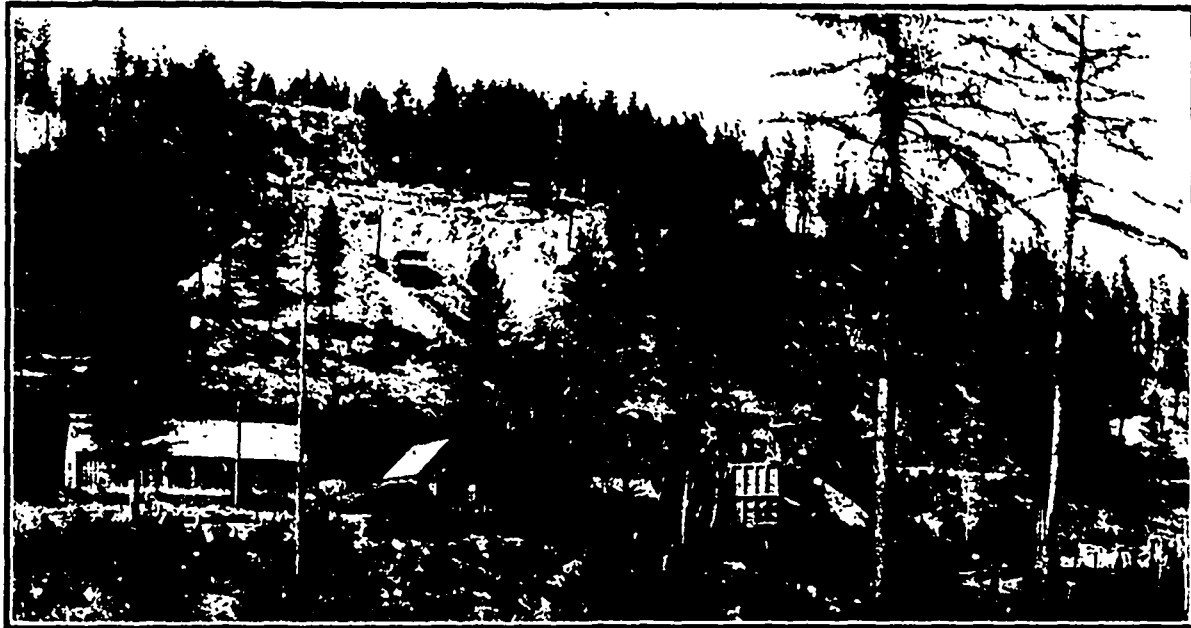
21. Chapter 65 of the "Revised Statutes, 1906," is repealed.

COPPER MINING AN IMPORTANT INDUSTRY IN BRITISH COLUMBIA.

By E. Jacobs.*

COPPER MINING has become an important industry in British Columbia, and that to a far greater extent than in any other province in Canada. The leading position in the Dominion in this connection occupied by this Province is shown by statistics of the copper production of Canada. The subjoined table shows the total production during ten years, 1897-1906, and British Columbia's proportion thereof:

years) has been very marked in comparison with that of the remainder of the Dominion (only 50 per cent.). The considerable increase in 1901 over 1900 was the result of the establishment of copper smelters in the Boundary, the production of which district was 5,672,177 lb. in 1900 (its first year as a producer of copper) and 14,511,787 lb. in 1901. To make complete the record of the total production of the Province in all years the following figures are added: Production in 1894, 324,680 lb.; in 1895, 952,840 lb.; in 1896, 3,818,556 lb.; in 10 years, 1897-1906, as above, 238,218,632 lb.; grand total, 243,414,708 lb. By districts this aggregate of production was contributed, approximately, as under:



Boundary.—Dominion Copper Co.'s Rawhide Mine, near Phoenix.

Copper Production for Ten Years, 1897-1906.

	Whole of Canada. Lb.	British Columbia. Lb.
1897	13,300,802	5,325,180
1898	17,747,136	7,271,678
1899	15,078,475	7,722,591
1900	18,937,138	9,997,080
1901	37,827,019	27,603,746
1902	38,804,259	29,636,057
1903	42,684,454	34,359,921
1904	41,383,722	35,710,128
1905	48,024,000	37,692,251
1906 (estimated).....	55,000,000	43,000,000
Total	328,787,005	238,318,632

It will be seen that the progress of British Columbia in the production of copper (800 per cent. in 10

District.	Lb.
Cassiar	310,000
East Kootenay	40,000
West Kootenay—	
Nelson	12,300,000
Rossland	63,825,000
Other parts	20,000
	<hr/> 76,145,000
Yale—	
Boundary	135,500,000
Kamloops, etc.	1,420,000
	<hr/> 136,920,000
Coast	30,000,000

The increase in the chief producing districts is shown by the following comparative table, giving the total production in two periods of five years each:

District.	1897-1901. Lb.	1902-1906. Lb.
West Kootenay	31,568,000	39,375,000
Yale	20,225,000	116,695,000
Coast	6,100,000	23,900,000

*Editor British Columbia Mining Record.

In West Kootenay the increase was wholly in Rossland camp, Nelson having so fallen off that its copper production during the full period of five years 1902-1906 did not equal that for the year 1901 alone, while the last-mentioned year's production was less than one-half that of 1897. The considerable increase in the Boundary district has been steadily maintained year by year, until the quantity of copper produced reached a total for 1906 more than twice as much as that for 1902. If there be no serious interruption to production in 1907 the advance this year over 1906 will be a substantial one, the producing capacity of the mines and treatment capacity of the smelters being greater now than at

Gribbell and Princess Royal Islands during three years, 1903-5. Last year there was a decided substantial increase, nearly 150 tons having been won, chiefly the product of ore from the Brown-Alaska Company's Outsiders group, situated on Portland Canal, a brief account of which property was printed in the *MINING RECORD* for January last (p. 10). It may be expected that a much larger production will be made during the current year, for the owning company is extending its operations and shipping regularly to its smelter at Hadley, Prince of Wales Island, Southeast Alaska.

IN EAST KOOTENAY.

As yet no important copper mine has been devel-



Rossland.—Le Roi Mining Co.'s Headworks over Main Shaft, in background.—Le Roi No. 2 Co.'s Josie Mine Surface Works and Dumps.

any previous time in their history. On the Coast, too, the outlook is favourable for an increase, the production in 1906 having been larger than in 1905 and the mines giving promise of a still larger tonnage in 1907.

Taking in order the several producing districts appearing in the second of the foregoing tables the following brief review of them may serve to convey a fair idea of their respective positions in the scale of importance as copper producers:

MINES IN CASSIAR DISTRICT.

Prior to 1906 the production of copper in Cassiar district had been restricted to an aggregate of less than 10 tons, derived from ore mined principally on

opened in this district, the chief mineral products of which have heretofore been placer gold, lead-silver ore, and coal. In parts of the district, which covers a large area, copper ore is known to occur, both in the west central section and in the north. The comparatively small total production reported to date has been from ores in which copper has been found in association with other metals.

MINES IN WEST KOOTENAY.

Previous to the development of the enormous low-grade copper ore bodies of the Boundary section of Yale district West Kootenay mines were the main contributors to the total copper production of British Columbia.

Nelson.—In 1896-7 Nelson produced about 5,700,000 lb. of copper as against Trail (Rossland) with a production in the same period of about 3,400,000 lb. Thereafter the production of the former decreased; from 3,453,000 lb. in 1897 it fell to 92,600 in 1905. Last year, however, there was a partial recovery, with a production not far short of 220,000 lb. With several properties only lately on the producing list, the expectation is that this division will make a better showing in 1907. The Silver King will probably produce more this year than for

the belief that they will continue to be productive for many years. The Le Roi No. 2 similarly in degree gives much promise of proving a profitable mine over a considerable period.

The development and progress of mining in this camp is reflected in the following table of production:

	Ore. Tons.	Smelter returns.	Value per ton.
1894	1,856	\$ 75,510	\$40 69
1895	19,693	702,457	35 67
1896	38,075	1,243,360	32 65



Rossland.—1—Nickle Plate Power House.

2—Centre Star Surface Works.

3—War Eagle Head Frame, Hoist House, etc.

several recent years; the Dandy may be placed on the shipping list; the Eureka should improve on the modest production that resulted from its operations last year; and the Queen Victoria, now in its first year as a shipper, gives promise of adding considerably to the output of copper ore from Nelson district mines.

Rossland.—The leading feature of Rossland camp today is that several of the mines in it are being developed at considerable depth, the Le Roi at about 1,800 ft. and still going deeper, and the Centre Star-War Eagle at about 2,000 ft. with sinking also still in progress. Large bodies of ore have been met with in the lower levels of these mines, which are regarded as amply warranting confidence in their permanence, with resultant operations on a scale in keeping with

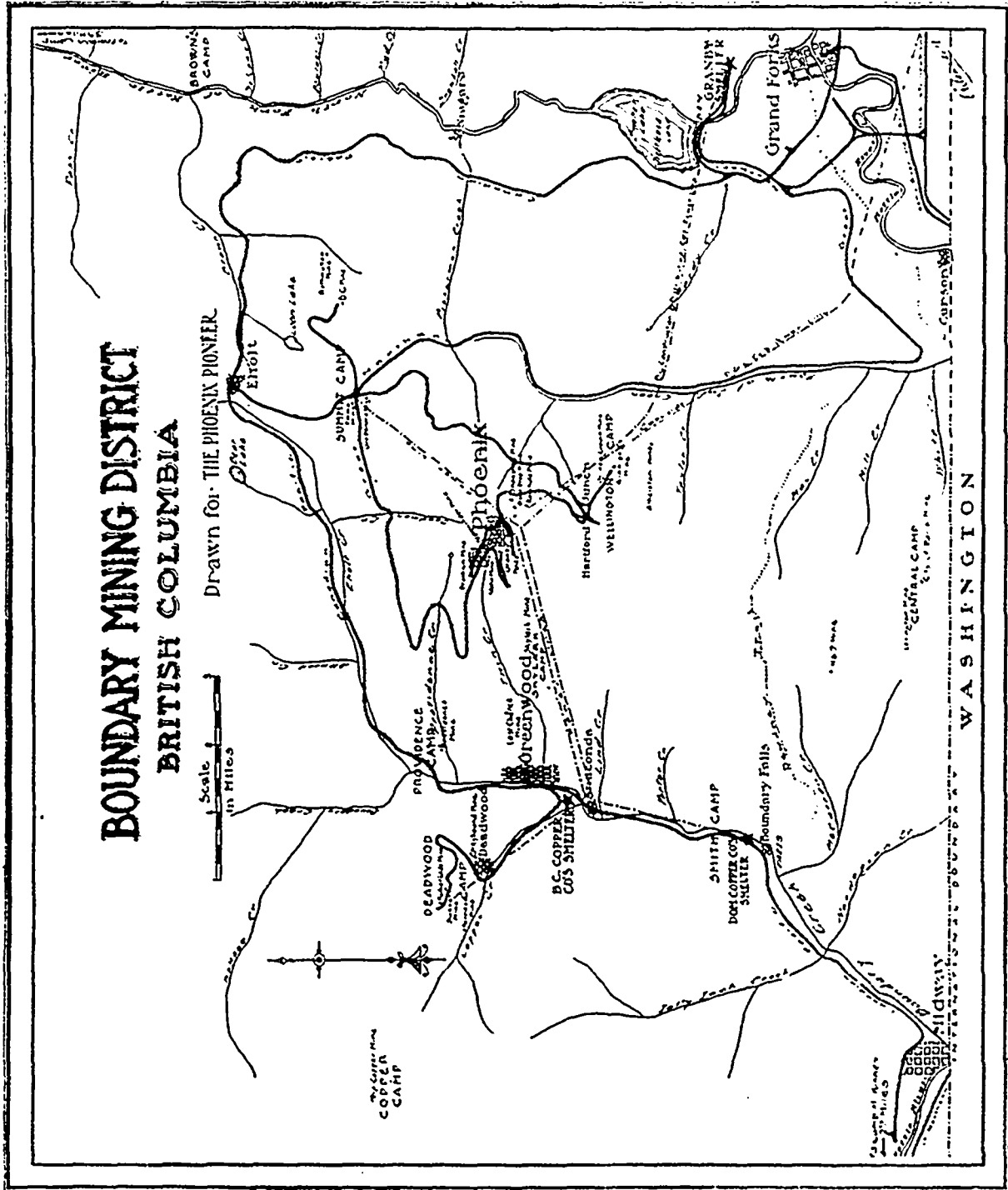
1897	68,804	2,097,280	30 48
1898	111,282	2,470,811	22 20
1899	172,665	3,229,086	18 70
1900	217,636	2,739,300	12 59
1901	283,360	4,621,299	16 31
1902	329,534	4,893,395	14 85
1903	360,786	4,255,958	11 80
1904	312,991	3,760,866	12 01
1905	330,618	3,672,828	11 10
1906 (estimated) ..	277,361	3,328,332	12 00

Total 2,624,661 \$37,090,482 \$14 13

Considerably reduced mining costs and smelting charges have induced the mining of much ore of a poorer grade than under former conditions, hence the

lower average value of the ore shipped. It should be noted that the chief value in Rossland ore is gold; this accounts for the wide difference between the total value of copper produced by the mines of this camp being so much smaller than that above shown as total smelter returns from ore shipped. Official re-

following comparative figures are submitted: Average metal contents of 128,428 tons of ore, being the total production of the first four years (1894-7) of mining in this camp: Gold, 1.46 oz. per ton; silver, 1.96 oz. per ton; copper, 1.73 per cent.; average value per ton, \$32.05. Average contents of 330,618



Map Showing Location of Mines, Smelters, Railways, etc., in part of Boundary District.

turns for 1905 show the following proportions of values in that year: Gold, \$2,683,855; silver, \$84,707; copper, \$904,266; total value of 330,618 tons, \$3,672,828. As further illustrating the effect of mining and smelting under conditions now prevailing as compared with the high costs of 10 years ago the

tons of ore shipped in 1905: Gold, 0.39 oz. per ton; silver, 0.44 oz. per ton; copper, 0.9 per cent.; average value per ton, \$11.10.

The proportions of the various mines of the foregoing aggregate tonnage of ore shipped are, approximately, as under:

Mines.	Tons of Ore.
Le Roi	1,360,000
Centre Star and War Eagle	930,000
Le Roi No. 2	225,000
Jumbo	31,000
Iron Mask	18,000
Rossland-Kootenay	13,000
Rossland-Great Western	13,000
White Bear	8,000
Velvet-Portland	8,000
Spitzee	7,000
Giant	5,000
Miscellaneous	7,000
Total	2,625,000

The "Preliminary Report on the Rossland, B. C., Mining District," by Mr. R. W. Broek, of the Geological Survey of Canada, which was reprinted in the *MINING RECORD* for June, 1906, (pp. 219-239), contains much detailed information concerning this camp. For full particulars of an individual mine an article entitled "The Le Roi Mine—its Past



Boundary.—Part of Granby Co.'s Mines at Phoenix.

History and Present Condition," published in this journal last November (pp. 428-437), will also be of value to those desiring to familiarize themselves with the general conditions in this camp.

The production of copper in other parts of West Kootenay has been too small to call for notice of the several properties from which an aggregate of only about 10 tons has been obtained during the period under review. This quantity came partly from each of the following sections: Ainsworth, Slocan, and the northern portion of the district.

BIG MINES IN BOUNDARY, YALE DISTRICT.

The most striking development of the copper mining industry in Canada is that which has taken place in the Boundary district of British Columbia during seven years, 1900-1906. Perhaps the most convincing evidence that can be adduced in support of this statement is the record of copper recovered from ore produced by district mines. The following table gives

the official figures, taken from the "Annual Report of the Minister of Mines for British Columbia," for the several years (1906 excepted) now under review:

Year.	Copper.	Value.
1899	None
1900	Lb. 5,672,177	\$ 918,325
1901	" 14,511,787	2,337,849
1902	" 14,955,582	1,739,334
1903	" 18,485,542	2,446,561
1904	" 22,066,407	2,828,913
1905	" 27,670,644	4,313,853
1906 (subject to re- vision)	" 32,000,000	6,186,960

TotalLb. 135,362,139 \$20,771,795

This production of 68,000 tons of copper does not, however, of itself convey an adequate idea of the extent of mining and smelting operations in the district. To those familiar with conditions usually prevailing where a large tonnage of ore is regularly produced the next following table will better indicate the importance of the larger mines of this district. The *Phoenix Pioneer*, established in the district and publishing weekly generally reliable information relating to local mining and smelting industries, shows the ore production to have been as under:

Year.	Tons.
1900	96,600
1901	390,800
1902	508,876
1903	690,419
1904	\$29,808
1905	933,548
1906	1,158,991

Total4,609,042

Four copper-mining and smelting companies are operating in the Boundary on a producing basis. Three of them own several mines each; the fourth—the Consolidated Mining and Smelting Company of Canada, having mines in East and West Kootenay and smelting works at Trail—is working the Snowshoe mine under lease with option of purchase. The total tonnage of ore, comprising the aggregate shown above, produced by the several groups of mines is, in round numbers, as follows:

	Tons.
Granby Company	3,005,000
B. C. Copper Company.....	1,073,000
Dominion Copper Company....	390,000
Snowshoe	102,000
Sundry smaller shippers.....	40,000

Total4,610,000

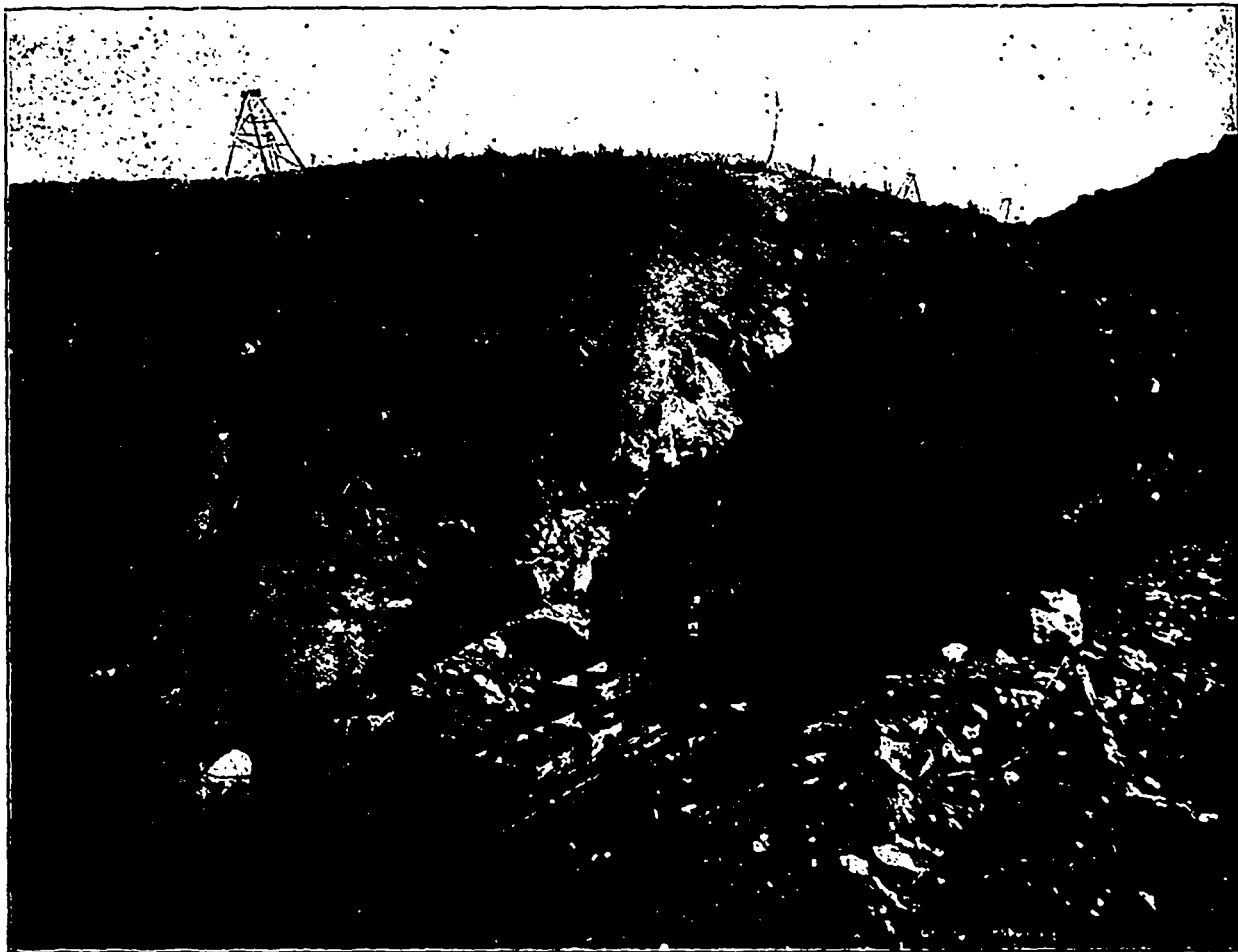
Included among the smaller shippers are some 20 properties which have together produced about 15,000 tons of quartz ore carrying silver or gold values but no copper. With this small exception the output of the district, shown above, has been ore having more or less copper as its valuable metal content.

It is not intended to here give a description of the big copper mines of the Boundary, much as they

merit such prominence, both in connection with the size of their ore bodies and the unusually low cost of mining here established. The latest publication giving much interesting detail concerning these mines is the *Phoenix Pioneer's* "Fourth Annual Holiday Number,"* several of the illustrations from which are, with the courteous permission of the editor of the *Pioneer*, here reproduced. Brief mention, however, will be made of the properties of the larger companies.

Granby.—The Granby Consolidated Mining, Smelting and Power Company, Ltd., owns a large

miles. In addition, diamond drilling has been done, with a total of rather more than 26,000 lin. ft. The number of men employed at these mines at the present time is about 525 and the monthly pay-roll on this account is quite \$50,000. The mine equipment includes much modern machinery and plant, such as two Canadian Rand Drill Company's cross-compound duplex air compressors, together equal to operating 60 3¼-in. machine drills, and driven by two Canadian Westinghouse Company's 700-h.p. induction motors; electric locomotives and complementary appliances for hauling ore from mine workings to rail-



One of Granby Co.'s Ore Quarries. Steam Shovel Handling Ore near one of the Tunnels.

group of mineral claims at Phoenix, 30 or more, with an aggregate area exceeding 1,000 acres. To date the greater part of the 3,000,000 tons of ore this company's mines have produced has been taken from above the 400-ft. level, much of it from immense quarries in an ore body in places 400 ft. in width. The number of lineal feet of development work done—sinking, raising, cross-cutting, and drifting—exclusive of open-cut or "glory-hole" work, which has of itself been extensive—now exceeds 42,000, or eight

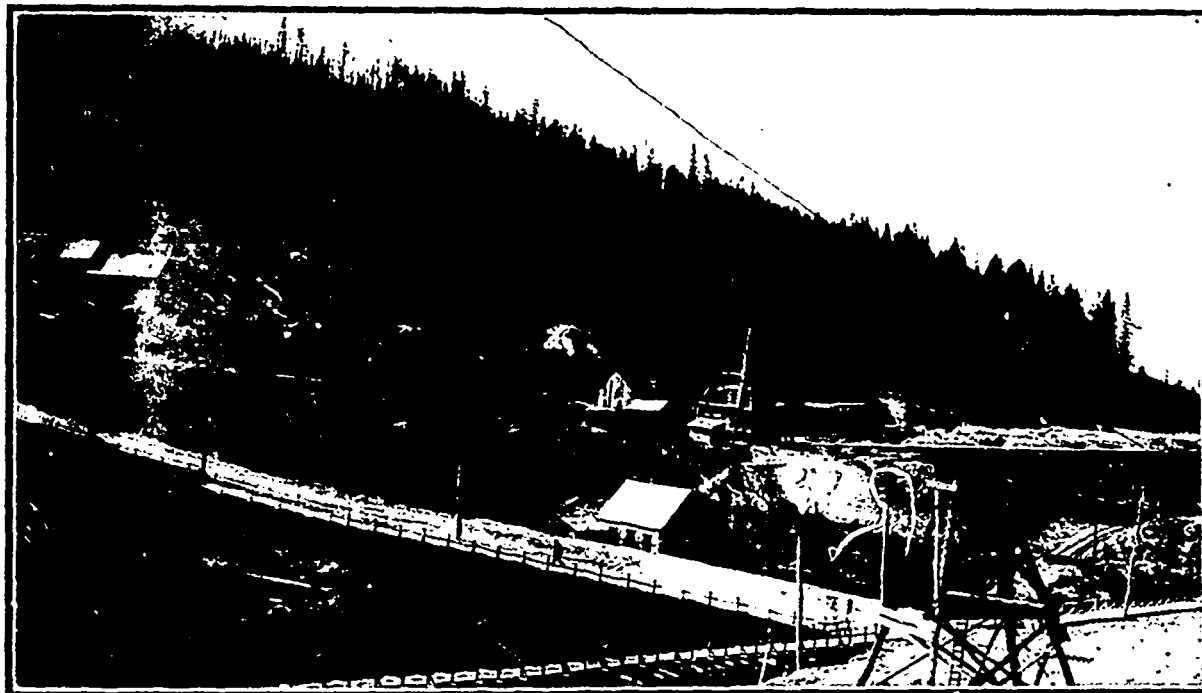
*"Pioneer's Fourth Annual Holiday Number—a Record of Progress in the Boundary Mining District, B. C." Issued by the *Pioneer*, Phoenix, B. C. Price 25 cents.

way terminals; three Farrel-Bacon ore crushers with jaw openings 42 by 32 in., driven by 100-h.p. induction motors and having a capacity of 150 tons of rock per hour crushed to a maximum size of 8 in.; steam shovels for work in the ore quarries; and much other plant and labour-saving machinery to admit of large production at low cost. The output capacity of the mines is stated to be up to 5,000 tons of ore per day, but heretofore the treatment capacity of the company's smelting works having been less than 3,000 tons per diem, the mines have not produced the larger tonnage for which they are equipped and have been developed.

The Granby smelter is situated at Grand Forks, distant from the mines about 20 miles, with a down-grade haul, by both connecting railways. There are eight blast furnaces, together having a treatment capacity of nearly 4,000 tons of ore per day. Recent enlargements of several of these furnaces have increased the total capacity of the works to the quantity mentioned. Furnace charging is by a mechanical system, electrically operated, the charge cars being moved along tram tracks between ore and coke bins and the furnaces by 20-h.p. Westinghouse electric locomotives. Slag is dumped hot, slag pots being hauled to and from the dump by steam locomotives. Blowers for the blast furnaces include the "Jumbo," which is the largest size made, having a capacity of 30,000 cu. ft. of air per min., double drive and operated by two 150-h.p. induction motors. The copper matte is converted into blister copper at the works, the converter department also being equipped with modern plant and machinery. In fact these reduc-

Lode mine, situated about three miles from its smelter at Greenwood. Other mines it is operating are in Summit camp, also having railway connection with the smelting works. Smaller quantities of ore are obtained from two mines it is working, situated across the International Boundary line in the neighbouring State of Washington.

The Mother Lode ore body shows a width on the surface of 80 to 160 ft. and is known to extend along a distance of about 2,000 ft. to where it dips under heavy drift. The accompanying illustration shows the big quarry opened from the surface. Levels have been opened at 60, 200, 300 and 400 ft. depth, respectively. The main four-compartment shaft is 475 ft. in depth. Prospecting with the diamond drill having proved the occurrence of large ore bodies at depth, development work is being pushed on the lower levels for the purpose of making these additional supplies of ore also available. The present output capacity of this mine is about 1,000 tons per diem, and



Boundary.—Dominion Copper Co.'s Idaho Mine at Phoenix.

tion works all through are up to date, thus enabling the production of copper at a cost surprising to metallurgists not acquainted with local conditions and capabilities. Some 350 men are employed here, the monthly wage payments totalling about \$35,000.

It is noteworthy that the Granby Company declared four dividends in 1906, the total amount of profits thus distributed having been \$1,215,000. With copper remaining at the average price of the last two years and no serious interruption to a continuance of mining and smelting operations this company may be expected to keep up a profit-earning record similar to that of 1906.

B. C. Copper.—The British Columbia Copper Company, Ltd., has mines in several Boundary camps. Its chief source of ore supply is its Mother

preparations are being made to increase it. The mine equipment includes a 40-drill air compressor, for the driving of which electricity has lately been substituted for steam. It is proposed to make a similar change in connection with the big double-drum hoisting engine. There are two large ore crushers here, of similar make to those mentioned as at the Granby mines. Mother Lode ore shipments to date aggregate about 850,000 tons.

The mines this company is operating in Summit camp are the Emma, Oro Denoro, and B. C. The main incline shaft at the Emma is nearly 300 ft. in depth. On the 150-ft. level there is an ore body consisting of 30 to 40 ft. of solid magnetite carrying copper values, while another important shoot of ore has been entered by the diamond drill. During five

years total shipments of between 90,000 and 100,000 tons of ore have been made from this mine. The Oro Denoro adjoins the Emma. It has shipped between 40,000 and 50,000 tons of ore. The development work done has disclosed the occurrence of much more ore, so that it may be regarded as another source of supply for the smelter at Greenwood for years. The first rock breaker of English manufacture used at a mine in this district is one made by Hadfield's Steel Foundry Company of Sheffield, England, and recently installed at this mine. The size of its receiving opening is 24 by 18 in. and its crushing capacity exceeds 150 tons in 10 hours. It was supplied by Peacock Bros., engineers, Montreal, Quebec, sole Canadian agents. The B. C. mine during four years, 1900-1903, shipped rather more than 100,000 tons

hearth area of each furnace is 48 by 240 in. Furnace charging is by side-dumping cars hauled by 6-ton trolley locomotives. The blast for each furnace is supplied by a separate large Roots' rotary blower. Three 300-h.p. Westinghouse induction motors drive the blowers. Molten slag is hauled to the dump in 25-ton cars by 15-ton Baldwin-Westinghouse electric locomotives. The standard-gauge slag cars, each of which has an electric motor for tilting the car when dumping the slag, were brought from the factory in Pennsylvania over the railways a distance of 3,000 miles on their own wheels.

The B. C. Copper Company, like the Granby, possesses its own bessemerizing plant, which converts the 45 per cent. copper matte into blister copper 99 per cent. fine. The plant consists of two converting



Boundary.—Snowshoe Mine, showing (1) Head Frame over Main Shaft; (2) Railway Ore Bins; (3) Old Surface Works.

of ore of generally higher grade in copper than that produced by the larger mines of the Boundary. The average assay value of 67,000 tons of roughly sorted ore, shipped to the smelter at Trail in 1900-1901, which was before the local smelters were ready to take much custom ore, was: Gold, 0.015 oz. per ton; silver, 2.45 oz. per ton; copper, 5.8 per cent. Unsorted ore afterwards sent to local smelters averaged: Silver, 1.75 oz. per ton; copper, 4.1 per cent. The mine was purchased by the B. C. Copper Company in 1906 after having been inoperative for three years.

The company's smelter at Greenwood was last year much improved by the remodelling of its blast furnace plant and other additions of modern machinery facilities for economical smelting. Three blast furnaces, having a nominal treatment capacity of 600 tons per diem but in actual practice treating 700 tons, have been erected, thus giving the works a total capacity of about 2,000 tons every 24 hours. The

stands, equipped with shells of the trough type 84 in. diameter and 126 in. long. The blast for the converters is furnished by a Nordberg blowing engine having a capacity of 5,000 cu. ft. of air per minute. The whole plant—furnaces and converters—is housed in a steel-frame building.

The company employs at its several mines and smelter about 425 men, of which number 300 are at work at the mines. The monthly payroll payments total from \$40,000 to \$50,000.

Dominion.—The Dominion Copper Company, Ltd., owns several groups of claims situated in Boundary mining camps. Its producing mines are the Brooklyn, Stenwinder, Idaho, and Rawhide, at Phoenix; Sunset, near Greenwood; and Mountain Rose, in Summit camp. The Morrison mine, in Deadwood camp, from which about 3,500 tons of copper ore were taken in 1903, has not been operated by the company, owing to its not having railway

transportation facilities. Another property, the Athelstan, has shipped about 12,000 tons of ore, the chief value of which was in gold. The Brooklyn and Stemwinder, adjoining mines, have been the company's largest producers thus far; their output in three years, 1904-6, having totalled 229,000 tons. The Idaho, also adjoining the Brooklyn, commenced shipping late in 1906 and sent about 3,000 tons to the company's smelter. This mine is being opened up with the expectation that it will produce largely in future. The Rawhide, distant about a mile from the Brooklyn-Stemwinder group, shipped 3,000 tons in 1904 and by the end of 1906 had increased its total output to 54,000 tons. The Sunset, which lies close to the B. C. Copper Company's Mother Lode mine, has shipped during several years a total of 79,000 tons, of which 48,000 tons were produced in 1906. The Mountain Rose has sent out 10,000 tons.

other important shoots, these developments indicating that this mine will probably be the main source of supply for the company's smelter until the Idaho shall have been extensively opened up. The Sunset group is now having more attention, the Crown Silver, lying between the Sunset and Mother Lode, is again being worked after having been inoperative for several years. The ore reserves at the mines above-mentioned are stated to be sufficient to supply 1,500 tons daily for several years.

The company's smelting works are situated at Boundary Falls, three miles south of Greenwood. Two blast furnaces, together having a treatment capacity of 600 to 650 tons per day, have been in operation for some time. The installation of a third and much larger furnace is approaching completion. It is the largest copper-smelting furnace yet erected in British Columbia, and is equipped with Giroux hot



Boundary.—B. C. Copper Co.'s Mother Lode Mine, showing Big Open Workings and Headworks over Shaft.

The aggregate production to end of 1906 of the Dominion Copper Company's mines is thus shown to have been 390,000 tons.

The Brooklyn mine has been developed by levels down to 350 ft. depth and its main shaft is 75 ft. deeper still. Connection has been made on the 250-ft. level with the Idaho. A steam power plant at the Brooklyn has heretofore been used in the development of both mines, but a new plant, installed at the Idaho, will supply most of the power for these mines and the Rawhide as well. Included in this central plant are a 25-drill air compressor, driven by electricity, and a double-cylinder double-drum hoisting engine. A 5-drill electrical air compressor has been in use at the Rawhide for more than a year, but this is now altogether too small for that mine's requirements. Several tunnels driven on the Rawhide have proved the occurrence of immense bodies of ore and further prospecting is disclosing the existence of

blast, in which respect it also stands alone in the Province. Its dimensions are 255 by 44 in. and it has 22 3½-in. tuyeres. Its daily capacity is calculated to be about 800 tons. It will be fed mechanically, using side-dumping steel cars drawn by electric locomotives. The ore will be crushed by a large Farrel crusher of similar style to those in use at the Granby and Mother Lode mines. Electric power is superseding steam at these works, the 80-mile 60,000-volt circuit connecting the Boundary district with the generating station a Bonnington Falls supplying the current. When the new equipment shall be in good running order it will be practicable, in the opinion of the company's consulting engineer, for the Dominion Copper Company to mine and smelt at a profit ore carrying as small a percentage of copper as one per cent.

Snowshoe.—The total production of this mine to the end of 1906 was about 102,000 tons, of which

8,400 tons were mined by the Consolidated Mining and Smelting Company of Canada during the latter part of last year. Production at an average rate of 1,200 tons weekly is the record for the present year. The mine has been opened to 350 ft. depth; altogether between 7,000 and 8,000 lin. ft. of development work have been done. Large shoots of ore are known to occur. The lease granted to the Consolidated Company, upon royalty, is for a period of two years—to the summer of 1908—or until 125,000 tons of ore shall have been extracted. The power plant includes

of the Boundary district in which are found the above-mentioned mines.

Iron Mask at Kamloops.—This mine is in Yale district, though not in the Boundary section. It is idle now after two or three years' activity. During the period mentioned a concentrating plant was installed and a total production of about 680 tons of metallic copper made. Ore and concentrates were smelted at Trail. A small smelting plant erected at the mine is stated to have been ineffective. The tonnage of ore produced in 1905 was about 14,600 tons;



Britannia Mines.—Mammoth Bluff before breaking down for shipment of this Enormous Body of Ore.

the first half of a 30-drill air compressor and a 150-h.p. electric hoisting engine. In other respects the mine is well equipped, and as a railway crosses the property transportation facilities are convenient.

Franklin Camp.—This camp, situated on the east branch of the north fork of Kettle River, about 43 miles by road from Grand Forks, both in the nature of its ore deposits and geology, is stated by Prof. R. W. Brock* to bear a strong resemblance to that part

the figures for 1906 are not yet available, excepting that the Kamloops Board of Trade has reported shipments to have been 128 cars. Underground development work has been extensive and large ore bodies are known to exist. No reason for the suspension of work has been made public but it is understood that the cash capital at the disposal of the management was insufficient to provide for operating requirements.

COAST COPPER MINES.

The Coast mines producing copper in large quantity are not numerous. The Britannia on Howe

*See "Summary Report of the Geological Survey Department of Canada for 1906," pp. 62-5.

Sound, Marble Bay mine on Texada Island, and Tyce on Vancouver Island were the important producers in 1906. Recently the Richard III, near the Tyce, commenced making shipments. There are several promising copper properties, not yet developed to any considerable extent, on both Texada and Vancouver Islands, and others that in past years have shipped ore on a commercial scale, these latter including the Van Anda mines (Cornell and Copper Queen) on Texada Island, Lenora at Mt. Sicker on Vancouver Island, and Monitor and Yreka on the west coast of the latter island. Mention has already been made of copper mining properties in the northern part of the coast district of the Province so no further reference will be made to them now. An omission should be rectified, though—the Hidden Creek group on Observatory Inlet, an arm of Portland Canal, should have been noticed. Some infor-

“The Britannia Copper Syndicate’s mines are 3.8 miles from the beach, and 3,300 ft. above sea level. The company has 8,500 ft. of lode which has a maximum width of 600 ft. The deposit is essentially a low grade proposition, but the enormous amount of ore in sight, and its situation, present most favourable advantages for economic mining and large output. At present the ore is mined only on the Jane claim at the Jane bluff and Mammoth bluff. The method of mining is by tunnels, cross-cuts and stopes, and glory holes. The ore is conveyed to the beach by a Riblet aerial tramway, the shipping ore going directly to the bunkers and the concentrating ore to the mill. About 350 tons a day are mined at present, but it is the intention of the company to greatly increase the output at an early date. The ore is shipped to the Britannia Smelting Company’s smelter at Crofton, Vancouver Island.



Surface Works of Tyce Copper Co.'s Tyce Mine at Mt. Sicker, Vancouver Island.

mation relative to this property will be found on another page of this issue.

Howe Sound Mines.—Concerning mining properties on Howe Sound, Mr. O. E. LeRoy of the Geological Survey of Canada, last year reported as under:*

“The Britannia mineral zone lies on the east side of Howe Sound 23 miles from the entrance. The zone has a width of one and one-half miles along the shore and extends inland about eight miles. The rocks are conglomerates, quartzites, slates and sericite schists. The mineralization is confined almost wholly to the silicified sericite schists. The ores are mainly chalcopryrite and pyrite, the former occurring in lenticular areas and masses while the latter is finely disseminated through the schist and quartz. Both carry appreciable values in gold and silver. On the western half of the zone there are three principal groups, the Goldsmith, Britannia and Empress.

*See “Summary Report of the Geological Survey Department of Canada for 1906,” pp. 32-3.

“The Empress mine lies east of the Britannia, across the divide, in South Valley. Development work, principally by tunnelling, is being carried on with a view of reaching the shipping ore as soon as possible.

“The Britannia West Copper Company’s property is situated on the west side of the sound and almost due north of Britannia Beach. The ore body is 1,500 ft. square and consists of an impregnated zone in granite porphyry. Small quartz veins are numerous and carry bornite. At present the company is engaged in building a tram line from the mine to the beach, and in constructing a concentrating mill and other mine buildings, and no ore will be mined until these are completed.”

Additional information relative to the Britannia mine and smelter is as follows: In 1905 an aerial tramway was constructed down to deep water, power machinery installed at the mines, a hydro-electric station established, a big crushing and concentrating plant (with 65 tables) placed at Britannia Beach,

shipping facilities provided, and the smelter at Crofton, Vancouver Island, purchased. In 1906 production totalled 108,398 tons of copper-gold ore; of this quantity, 42,552 tons were shipped to the smelter as crude ore, while from the remaining 65,844 tons, milled at the company's concentrator, 12,612 tons of concentrates were obtained and sent to the smelter.

At the Crofton smelting works there are two blast furnaces of a stated daily capacity of about 350 tons each, also a 65-ton cupola for re-melting matte. The copper converter plant consists of one converting stand, with four shells of the trough type 84 in. diameter and 126 in. long.

Texada Island Mines.—Statistics of total production of copper ore from Texada Island mines have not been published during recent years. It is probably more than 100,000 tons, contributed as to about one-fifth by the Van Anda mines—Cornell and Copper Queen—and four-fifths by the Marble Bay mine. In his report Mr. LeRoy says of Texada Island (see pp. 33-4), which he visited last summer:

"At present the only producing mines on the island are the Marble Bay, owned by the Tacoma Steel Company, and the Cornell, operated under lease by a Seattle syndicate. The Puget Sound Iron Company's magnetite deposits, and the Copper Queen mine, both of considerable promise, have not been worked this (1906) season. The Loyal and Commodore mines are still engaged in development work, and have not yet reached the shipping stage.

"The Marble Bay mine is now 760 ft. deep, and the ore shoot at that level is more than 40 ft. long, with a maximum width of 20 ft. The ore is mainly bornite, which is disseminated through green felsite and garnetite. The copper, gold and silver values have steadily increased with depth. About 1,100 tons a month are mined and shipped to the smelter at Tacoma.

"In the early part of the summer the Cornell mine was pumped out down to the 260-ft. level. The ore on the 160 and 260-ft. levels is being stoped out and shipped to the smelter at Ladysmith. The present output is between 500 and 600 tons a month. The ore and its mode of occurrence are similar to those of Marble Bay."

Writing recently Mr. W. M. Brewer, whose paper on the "Occurrence of Deposits of Copper Ore on the North Pacific Coast" was reprinted in the last month's number of the *MINING RECORD* (p. 62), made the following observations relative to these mines:

"During the past year development work and shipment of ore has been carried on continuously, especially at the Marble Bay mine, where the lowest depth reached is, today, about 900 ft., and the lowest level where stoping is done, 760 ft. From reliable information I am of the opinion that further prospecting along the contact of the limestone and felsite on these deeper levels will demonstrate the occurrence of other ore bodies. In fact, on the 680-ft. level of the Copper Queen mine, such has been the case, while at the Marble Bay the ore body shows

every indication of trending more directly toward the ore body on the adjoining Copper Queen, than it did when an examination of both properties was made by me some four years ago."

Vancouver Island Mines.—Of Mt. Sicker, where chalcopyrite ore occurs in association with iron pyrite, barite or heavy spar, and a small percentage of lime, and where mining operations have been carried on since 1899, Mr. Brewer remarks (p. 65):

"The principal mines opened are the Tye, from which about 200,000 tons of ore have been mined and treated; the Lenora, which has produced some 50,000 or 60,000 tons of ore; and the Richard III, now being actively operated after having remained idle for about two years. Of these mines the Tye has been the most important. It has been in continuous operation since 1900, and the development has been carried on to a depth of 1,250 ft.

"The occurrences of ore on Mt. Sicker in the schist country rock afford an interesting study to the geologist, as well as to the metallurgist; to the former, because, notwithstanding the large extent of the ore bodies, especially in the Tye mine above the 300-ft. level, no other ore was discovered until the 1,000-ft. level was reached so far as exploitation has shown, and this has been carried on very thoroughly between that level and the 1,250-ft. level; to metallurgists, because of the high percentage of barium sulphate (about 40 per cent.) that occurs in the gangue.

"Below the 1,000-ft. level in the Tye mine, ore of practically the same character, but of lower grade than in the upper levels was exposed down to the 1,250-ft. level. At present development work is being carried on at these levels, while the main shaft is being sunk to the 1,400-ft. level and ore mined from above the 300-ft."

At the Tye mine cost of mining per ton of ore shipped during two successive years was as under:

Stoping and raising ore.....	\$1.359	\$1.325
Proportion for development.....	0.499	0.485
Surface work	0.124	0.220
Ore dressing	0.041	0.040
Transportation to railway (aerial tram)	0.150	0.140
<hr/>		
Total cost of ore delivered at E. & N. Railway.....	\$2.173	\$2.210

The timbering in this mine is exceptionally substantial and good, sawed square-sets being used. The power plant is sufficient and modern. An aerial tramway conveys the ore 3 1-3 miles to the railway whence it is hauled in bottom dump-cars to the smelter at Ladysmith, distant 17 miles from the lower terminal of the tramway.

The exceptional character of the ore from the Tye mine is indicated in the following excerpt from a report by Mr. W. F. Robertson, provincial mineralogist:*

*"Annual Report of the Minister of Mines for 1903," pp. H 207-8.

"The report of the manager of the Tyce Copper Company's smelter at Ladysmith, Mr. Thos. Kiddie, is exceedingly interesting from a metallurgical standpoint, as showing the practical results obtained in smelting an ore carrying over 35 per cent. of barium sulphate, a problem, as far as can be learned, not met with outside of this camp. The following figures show the results of the first few months run on this ore, which, as just intimated, is unique in character, and concerning which no previous results were obtainable as a guide; consequently, as must be recognized, the work was largely experimental:—

"Ore receipts from September 22, 1902, to April 30, 1903:

Copper-bearing ore (roughs)	15,060.725 tons.
Copper-bearing ore (fines)	5,173.785 "

Total	20,234.510 "
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"The average assay of this ore was:—

Copper (wet assay)	4.43 per cent.
Silver	2.76 oz. per ton.
Gold	0.12 "

"Other receipts were as follows:—

Schistose flux ore	1,340.9 tons.
Sandstone	396 "
Iron ore	551 "
Coke	2,346 "

"Burnt Ore.—The average analysis of the burnt ore delivered to the smelter was as follows:—

Iron	10.44 per cent.
Zinc	8.14 "
Alumina	3.61 "
Barium sulphate	34.08 "
Magnesia	trace.
Lime	3.46 "
Silica	22.51 "
Combined sulphur	7.42 "
Total sulphur	13.86 "

"During the last quarter of the fiscal year the burnt ore showed on analysis an increase of:—Iron, 1.86 per cent.; zinc, 0.93 per cent.; barium sulphate, 7.66 per cent.; lime, 0.5 per cent.; combined sulphur, 0.54 per cent.; and a decrease in silica of 11.49 per cent."

The Tyce Copper Company's smelter as constructed is of 250 tons daily treatment capacity, but in the erection of the main buildings provision was made for enlargement to 600 tons capacity and room was left for a bessemerizing plant whenever the quantity of ore available shall warrant the installation of the additional machinery, etc., requisite for the treatment of this larger tonnage, and for converting the matte into blister copper at the works. Before Mr. Kiddie resigned the management of the smelter, in 1905, he installed here the Kiddie Hot Blast System.

As a company was lately registered in England with the object, it is reported, of acquiring and working the Lenora mine, which adjoins the Tyce, the following excerpt may be of interest in this connection: "The Lenora was the first property in this district to assume any commercial importance. The

work of prospecting was commenced in 1897. In 1898 the Lenora-Mount Sicker Mining Company was organized to acquire and develop the mine. Full particulars of ore shipments are not available, but a statement, prepared by the management of the company, was published in the 'Annual Report of the Minister of Mines for 1902' (pp. H. 248-9). This showed that the average assay value per ton of 26,195 tons of shipping ore was: Gold, 0.1707 oz.; silver, 3.57 oz.; and copper, 7.95 per cent. (wet assay). Besides this first-class ore, there were about 52,000 tons of second grade, the bulk of which has since been smelted, of an estimated average assay value per ton of: Gold, 0.05 oz.; silver, 1.03 oz.; and copper, 2.3 per cent. (wet assay)."

Development work was resumed on the Richard III mine, situated a short distance east of the Tyce, (the Lenora adjoins the latter on the west), last October after a suspension of operations over a period of two years and six months. A cross-cut was driven at a depth of 330 ft., corresponding to the 100-ft. level of the Tyce, which lies lower down the mountain. The extension of the Tyce ore shoot into Richard III ground was encountered later, and since then the production of ore on a comparatively small scale has been regularly maintained. A report published recently was to the effect that the new workings were in ore of good value, net smelter returns from eight carloads having been about \$21 per ton. It is expected that the output will ere long be increased to 60 or 70 tons per day. The work done in earlier years included sinking a two-compartment shaft 500 ft. and opening four levels from it. Some 1,500 tons of ore were taken from between 400 and 500 ft. depth, but the shoot gave out and no considerable body of ore was again met with until lately.

CONCLUSION.

Of course there are many copper-bearing properties in various parts of the Province that give promise of becoming productive on an appreciably large scale after adequate development shall have been done, but the purpose of this article has been to deal with the mines that are or have been producing ore in such quantity as to make them of considerable importance from a commercial point of view, rather than to give a long list of, with an accompanying running commentary on, numerous claims, many of which have been proved to be ore-bearing and not a few shipped from a carload to several hundred tons of ore. Incidentally, brief particulars of the copper smelters of the Province have been given, these serving to show that not only are there good copper mines in British Columbia, but as well modern reduction works and some of them of large capacity

According to the report of Mr. Edward W. Parker, statistician of the United States Geological Survey, the production of coal in 1905 amounted to 392,919,341 short tons, having a value at the mines of \$476,756,963, surpassing in both quantity and value all previous records in the history of the country.

THE CANADIAN MINING INSTITUTE.

Proceedings at the Ninth Annual Convention.

THE NINTH ANNUAL MEETING of the Canadian Mining Institute was opened on March 6, at the King Edward Hotel, Toronto. This was the second meeting held in Ontario, the institute having met in Toronto in 1904.

The following report of the proceedings is from *The Engineering and Mining Journal*, New York. It was prepared for that journal by Mr. Frederick Hobart, associate editor:

THE FIRST DAY.

The morning session was devoted chiefly to routine business. President George R. Smith delivered a brief annual address, in which he spoke of the great progress of the mineral industry of Canada in recent years. He called especial attention to the late developments in Ontario, especially in the Cobalt district, and the extraordinary increase in the mineral production of that province. He also referred to recent changes in the mining laws of the provinces, and to the proposed measures for taxation of mining property.

The report of the treasurer showed a balance of about \$1,300, after paying all claims.

The report of the council covered the work accomplished during the year, and continued as follows: "It is gratifying to be able to record an important increase, of approximately 20 per cent. in the membership during the year, which now, including students, for the first time exceeds 500 names. This may be regarded as indicative of appreciation and recognition on the part of those engaged in the development of our mineral resources, of the useful work this institute is attempting to perform in the interests of mining in the Dominion.

"Pursuant to a resolution unanimously passed at the Quebec meeting, requesting the president to appoint a delegation to wait on the Dominion Government and urge the desirability of the early establishment of a Federal Department of Mines, under the direct supervision of a responsible minister, a deputation consisting of Messrs. Smith, Adams, Porter, Drummond, and Brown, proceeded to Ottawa on April 18, 1906, and presented the views of the institute to Sir Wilfrid Laurier and his colleagues, by whom they were most favourably received. Within a few weeks of this interview, the office of director of the Geological Survey of Canada, which had remained vacant since the death of the late Dr. George Dawson, was filled by the appointment of A. P. Low, whose interest in that branch of geological science which deals more particularly with the solution of economic problems, is well known. The work of the Survey during the past year under Mr. Low's direction has been of an eminently useful and practical character; and the appointment of that gentleman to the head of the Survey is a matter for congratulation. Following the appointment of Mr. Low, the Survey was disassociated from the Department of the Interior, and placed under the ministerial charge of

Hon. William Templeman. Although, as yet, the bill for the establishment of a Department of Mines has not been introduced into Parliament, it is understood that such a measure is now under contemplation, and it is hoped, therefore, that before another year shall have passed, the wishes of the mining industry in this important respect, will have been realized.

"During the year an addition of some 50 volumes was made to the library, and a number of exchanges, including transactions of technical societies, official reports and periodicals, covering a period of three years, were bound and added to the shelves.

"After receiving the report of the judges, Messrs. Charles B. Going and Frederick Hobart, the council awarded the president's gold medal for the best paper submitted by a student member during the year, to Frank G. Wickware, of McGill University, for his thesis entitled 'The British Columbia Copper Company's Mine and Smelter.' The council also awarded three cash prizes of \$25 each as follows: To Frank G. Wickware for the paper mentioned above; to J. J. Robertson, School of Mining, Kingston, for his paper entitled 'Cyanide Tests on Temiskaming Ores'; and to R. P. Cowen, McGill University, for his paper entitled, 'Number Four Pit, Brayton Domain Collieries, Cumberland, England.'"

The ballots for officers were referred to the scrutineers, Messrs. F. Hobart, J. C. Murray and A. R. Wilson being appointed to that position.

At the afternoon session J. M. Clark read a brief paper on "Royalties on Minerals in Ontario." This was followed by a discussion on the mining tax law pending in the Ontario legislature, at the close of which the following resolution was adopted:

"This institute believes that the bill now before the Ontario legislature providing for the taxation of mines is opposed not only to the mining interests, but also to the manufacturing and agricultural interests of the province, and we, as a body, respectfully ask the Ontario Government to take time, and carefully consider what has been the effect of mining legislation in other countries and in this province."

The members of the institute then proceeded to the Parliament Buildings, where the Minister of Mines, Hon. Frank Cochrane, had arranged for hearing a discussion of the bill. President Smith, Messrs. Hardman, Coste, Hay, Leonard and Clark were spokesmen for the delegation.

At the evening session a number of papers were read by title. Three papers were presented in full: "New Tilbury Oilfield in Ontario," by Eugene Coste; "Status of Mining in Canada," by J. C. Gwillim; "Anthracite Coal Mining," by H. H. Stock. Mr. Coste's paper was accompanied by maps and diagrams. Mr. Gwillim's paper, which referred to the ethics of the mining profession and the relations between engineers and promoters, was discussed at some length.

THE SECOND DAY.

The morning session was chiefly devoted to Cobalt. W. G. Miller, provincial geologist of Ontario, opened with a brief address on recent changes and develop-

ments in the Cobalt district, which was illustrated by maps and geological sections. He was followed by Prof. C. R. Van Hise in a long and interesting paper on the "Ore Deposits of the Cobalt Region," in which he discussed the probable methods in which the ores were deposited. He considered it probable that the cobalt was the result of deposition by underground waters, the silver being a secondary deposit due to descending waters. He gave his reasons for this belief in a very clear way. In conclusion he expressed the belief that other rich deposits might be found in the neighbouring areas. It is impossible to abstract this valuable paper in a brief space. It was followed by a discussion, in which a number of members took part.

In discussing the paper, Eugene Coste said that the Port Arthur district would yet surprise Canadians for silver deposits. It had never been properly explored, and if it were it would show ores of exceptional richness, he thought.

Dr. Robert Bell, of Ottawa, read a technical paper on "The Cobalt Mining District," giving an account of his explorations in regard to mineral areas of the north.

At the afternoon session there was some further discussion on the Ontario tax law, and the following resolution was adopted:

"While freely acknowledging and assenting to the right of the Government to impose such taxation as may be shown to be necessary or expedient for purposes of revenue, yet it is an axiom of justice that all such measures of taxation should be framed only after such consideration and discussion as may insure a minimum of discomfort and of burden to the industry thus taxed. Therefore, be it resolved: That the mining industry has no objection to taxation imposed of necessity and equitably distributed and collected, and provided, further, that such taxation thus imposed shall not attack rights and titles already vested with the sanction of the Crown; that it does object to the principle of a royalty tax, because it is confiscatory in its nature. Properties have been taken up under legislative enactments abolishing royalties in Ontario. It is impossible of collection except by an intolerable system of inquisition, which is imposed on no other business interests in the province. It will undoubtedly act, as did the bill of 1891, to prevent the investment of capital in Ontario.

"In consideration of these facts we hereby request the appointment of a commission to consider the bill along the following lines, namely: The amount of revenue which your Government deems necessary to procure from the mines of the province; a proper and equitable method of collecting such revenue; the effect of such a tax upon the mining industry and upon those interests which depend thereon; the history and effect of similar legislation in the Dominion of Canada; the following methods of raising such revenue, if necessary: A tax on acreage of mining land; a tax upon the capitalization of mining companies; an increased annual licence fee from incorporated mining companies; a tax on dividends de-

clared by mining companies."

P. H. McBennie, Niagara Falls, read a paper prepared by himself and F. A. Fitzgerald on "Magnetic Separation by the Goudal Process," showing that this method was used in Scandinavian countries with success. The crushing, mechanical treatment and other incidents were explained.

Dr. Robert Bell, Ottawa, read a paper on "Sir William Logan and the Geological Survey of Canada," giving a selection of the incidents and anecdotes, reminiscences of the man from all points of view.

Hiram W. Hixon, Victoria Mines, read a paper on "Magmatic Waters," which called out a lively discussion.

THE ANNUAL DINNER.

The annual dinner of the institute, always an important function, was largely attended, and passed off very successfully. Some excellent speeches were made in response to the various toasts. After the usual toasts to the King and the President of the United States, he following were given:

The Dominion and Provincial Governments, responded to by Lieutenant-Governor Clark, of Ontario, Hon. Frank Cochrane, minister of mines, and Hon. W. J. Hanna, provincial secretary.

The Mining Industry; J. E. Hardman, of Montreal, and Prof. J. R. Kemp, of New York.

Sister Societies; Dr. A. R. Ledoux, of New York, for the American Institute of Mining Engineers, R. W. Leonard for the Canadian Society of Civil Engineers, and H. W. Corbett for the Mining Society of Nova Scotia.

The Guests; Prof. C. R. Van Hise, Prof. Chamberlain and Bailey Willis, of the United States Geological Survey.

The Press; Frederick Hobart, of New York, J. C. Murray, of Toronto, and H. H. Stock, of Scranton, Pa.

The Transportation Companies; R. C. Steele, of the Toronto Board of Trade.

Retiring President George R. Smith delivered a brief and appropriate valedictory, and introduced the new president, Frederic Keffer, who responded, also briefly.

THE THIRD DAY.

At the morning session a paper was given by Dr. William Campbell, of Columbia University, New York, on "Microscopic Examinations of Nickeliferous Pyrrhotite." His address was illustrated by lantern slides.

"The Marble Bay Copper Deposit, Texada Island, B. C.," by O. E. Leroy, of Ottawa, was read.

E. Jacobs, of Victoria, dealt with "Progress of British Columbia Mineral Production." He stated that the dividends declared last year by British Columbia mining companies amounted to between \$3,000,000 and \$4,000,000.

It was announced that the mine taxation bill of Ontario would probably be considerably modified, or that full opportunity would be given to draft a new bill.

At the afternoon session the scrutineers reported the result of the ballots as follows, the gentlemen named being elected for the ensuing year:

President—Frederic Keffer, Greenwood, B. C.

Vice-presidents—Dr. J. Bonsall Porter, Montreal, Quebec; W. G. Miller, Toronto, Ontario; W. Fleet Robertson, Victoria, B. C.

Secretary—H. Mortimer Lamb, Montreal.

Treasurer—J. Stevenson Brown, Montreal.

Council—E. W. Gilman, Montreal; James McEvoy, Fernie, B. C.; Frank B. Smith, Edmonton, Alberta; R. W. Brock, Ottawa, Ont.; J. C. Gwillim, Kingston, Ont.; Dr. F. D. Adams, Montreal; H. E. T. Haultain, Craigmont, Ont.; D. H. Brown, Copper Cliff, Ont.

The following papers were read and briefly discussed: "The Geology of the Franklin District Ore Deposits, B. C." by R. W. Brock, of Ottawa.

"Some New Points in the Geology of Copper Ores," by Prof. James F. Kemp, New York.

"Iron Possibilities of the Province of Quebec," by F. Cirkel, Montreal.

"History of the Bruce Mines," by H. J. Carnegie Williams, Bruce Mines, Ontario.

A number of papers were read by title. The usual resolutions of thanks, etc., were passed and the meeting finally adjourned.

THE COBALT EXCURSION.

A party of about 70 members of the institute left Toronto at 8:30 p. m. on Friday on a trip to Cobalt, a special train having been furnished by the Grand Trunk and Temiskaming & Northern Ontario lines. This party spent two days in Cobalt, leaving there at 4:30 p. m. on Sunday, March 10, for North Bay, whence the members dispersed to their homes. This closed one of the largest and most successful meetings ever held by the institute.

MINING IN FAIRVIEW CAMP.

Particulars of Operations During Recent Months.

FAIRVIEW CAMP, in Okanagan Valley, which some years since was the scene of much activity, with a number of gold-quartz properties being worked, still possesses the confidence of shareholders in one company, as indicated in the accompanying notes, reprinted from the *Hedley Gazette*:

The last eight months have seen many additions to the extensive plant of the Stenwinder Gold and Coal Mining Company, Ltd., at Fairview, all tending to such greater efficiency and economy of production and treatment that the management now feel justified in believing the next 12 months will prove the property to be in their own words, "one of the best mines in British Columbia."

During the temporary suspension of work, caused by the fault which cut off the ore body at three places in the mine, the machinery and plant suffered no harm whatever, and the same has, with additions, been put into such shape that work of much magnitude can be successfully coped with.

The old New Fairview Corporation, Ltd., underwent reconstruction and thereby were secured additional working funds to open up the ore under the break referred to (which ore, by the way, is the best the mine has yet shown).

A new flume more than a mile long has been constructed from the waters of Reed Creek to the head of the pipe-line and this will double the water supply available for power and treatment purposes, enabling in the spring and early summer months steam costs to be entirely dispensed with. A large belt-driven cross-compound Rand air compressor has been purchased and installed in the southeast end of the mill, which has been enlarged for its accommodation, adjoining the powerful Corliss engine that will operate it in addition to the 46 stamps when the water supply is short; and a large stock of supplies has been laid in for the contemplated work.



Stenwinder Mill and Other Buildings, Fairview Camp.

Chief among these latter are a couple of the new Murphy drills, which certainly do wonders in the way of perforating rock. With the self-feeding attachment and mounted on a bar the bit is placed where a hole is desired, air turned on, and the drill is "let go" for all it is worth. The way a round is put in is a revelation to those accustomed only to the old style drills. Two rounds a shift is easier than one before, and so successful have these machines been in some preliminary work (a 20-ft. raise 5 ft. square having been completed inside of two days) that another drill has been ordered.

The shaft is being sunk to the 600-ft. level from the bottom of the present 300-ft. incline shaft, all new work being perpendicular. A raise is to be made from the present 600-ft. level which will come out at the back of the mill and give an admirable site for headworks and dump crusher and facilitate the delivery of ore to the bins.

Work on the shaft is now under way, and unless unlooked-for difficulties arise, by cross-cutting the ore each 100 ft. during sinking operations there will become available a large amount of pay ore that will amply demonstrate the value of the property.

QUEEN CHARLOTTE GROUP, NORTHERN
BRITISH COLUMBIA.

Official Report on Graham Island.

QUEEN CHARLOTTE ISLANDS, in common with other parts of northern British Columbia, are receiving increasing attention from prospectors for minerals and cruisers for timber. It has long been known that several of the group are mineral-bearing, but owing partly to the general roughness and densely forested character of the country, with its consequent comparative inaccessibility, and partly to the absence of frequent and convenient means of communication with the more populous parts of the Province, there has not been until recently much mining done on a commercial scale.

There have not been many official reports, neither Dominion nor Provincial, of these islands published. Among those available, beside the literature referred to in the following report, are two published by the Bureau of Mines of British Columbia, but these deal with particular localities. In the "Annual Report of the Minister of Mines" for 1901, pp. 999-1003, may be found a report by Mr. H. Carmichael, provincial assayer, on a visit to Ramsay Island and adjacent islands. In the 1902 "Annual Report," pp. 54-58, there was printed a "Report on the Coal and Iron Deposits on Graham Island, one of the Queen Charlotte Group," by Dr. T. Rhymer Marshall, F. C. S., etc. The most recent official information is contained in a "Report on Graham Island, British Columbia," by Dr. R. W. Ells, of the Geological Survey of Canada. This report gives first the information reprinted herewith, and next treats of the general geology of Graham Island and its coal-bearing rocks in particular. Space limitations prevent the publication in this number of the *MINING RECORD* of the full report, so only that part first above-mentioned is reproduced at this time, the present purpose being to place at the disposal of those interested the following observations made by Dr. Ells preliminary to the more technical part of his report:

The group of the Queen Charlotte Islands is situated off the west coast of British Columbia, and extends, roughly speaking, between longitudes 130 deg. 54 min. west, for the south part of Kunghit or Prevost Island, and 133 deg. 9 min. for the northwest part of Graham Island, at Frederick Island; and in latitude between 51 deg. 53 min. and 54 deg. 15 min. north. It comprises a number of islands of which the principal, from south to north, are Prevost, Moresby, Graham and North, while, on the east coast of Moresby, are several others of considerable size, such as Burnaby, Lyell, Louise, etc.

A report was written in 1878 on the geological features of the group, by Dr. G. M. Dawson, with which was incorporated much information relative to the natural history, the Indians and other matters of general interest. Examinations were carried out by means of a small schooner, and were almost en-

tirely confined to the eastern shores of the several islands, though a trip was made into the interior of Graham Island, following the waters of Masset Inlet from the north end.

The portion to which the present report chiefly refers is the most northerly, comprising Graham Island, the largest of the group, and North Island, at its northwest angle, these two forming the most northwesterly portion of the Pacific seaboard of the Dominion of Canada. These islands lie between longitude 131 deg. 36 min. (that of Rose spit, the northeast point of Graham Island) and 133 deg. 9 min. (that of Frederick Island, on the west coast), and in latitude between 53 deg. 8 min. and 54 deg. 15 min.

The only two settlements on Graham Island are the Indian villages of Skidegate, at the southeast extremity, and of Masset, at the north end. The nearest shipping ports on the mainland of British Columbia are Ports Simpson and Essington, the distance from Masset to the former in a straight line being 85 to 90 miles and from Skidegate to Simpson 115 miles, or to Essington 115 miles. The sailing distances are of course somewhat greater than those given. The nearest land on the north is at Point Chacou in Alaska, distant about 45 miles.

Connection with the mainland is made by means of a steamer calling at Skidegate once a month and at Masset once a year, though a less infrequent service to the latter place is contemplated. At other times communication is had with the ports in British Columbia by sailing boats of about five tons burden, known as "Columbia River boats," which usually have fine sea-going qualities.

Graham Island is much broader at the north end than at the south. Thus, from Rose Point, on the northeast, to Cape Knox, at the northwest extremity, is 53 miles in a direct line; while from Lawn Hill, near the southeast point, to the south entrance of Rennell Sound, on the southwest coast, is only 25 miles across country. This is also practically the distance between Skidegate Village and Hunter Point, at the northwest entrance to Cartwright Sound. The distance between Masset Village on the north and Skidegate on the south is about 48 miles measured directly across the island, while from the north end of North Island to the western entrance of Skidegate Channel along the west coast is about 77 miles. The area of the island, roughly speaking, is somewhat more than 2,000 sq. miles.

The northern interior of the island is accessible by water through Masset Inlet, a deep and narrow tidal water-way, which, after a distance of 17 miles, expands into a large lake-like sheet of water, with a length, from east to west, of 18 miles, and a breadth north from the mouth of Yakoum River, which is near the southeast angle, of about seven miles. On the south side of this inland lake a narrow passage, through which the tide rushes with great force, connects with another inland salt water lake known as Tsooskati, which is nine miles long, one to two and a half miles wide, and contains many small islands.

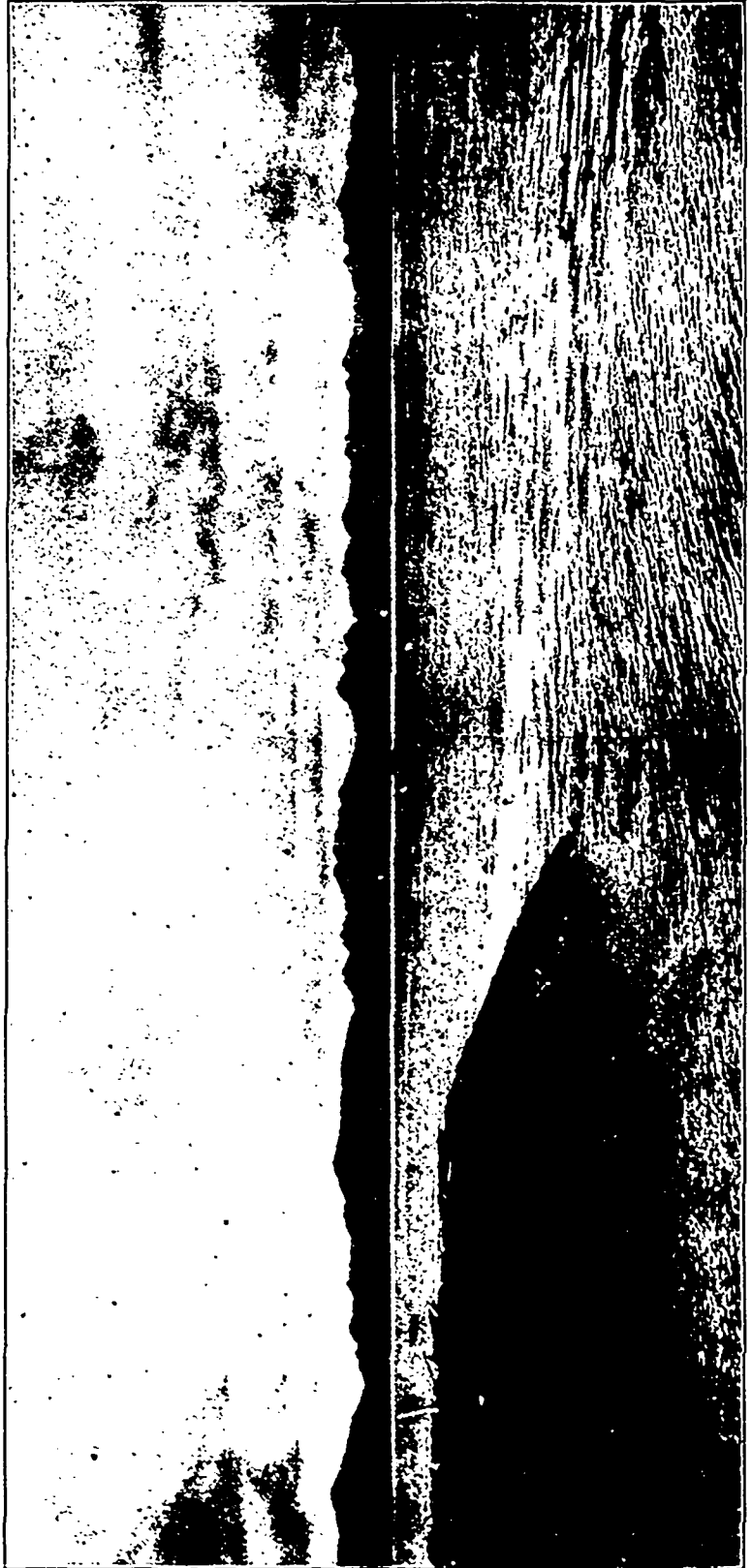
The time of high water in this inland lake is about four hours and a half later than at Masset harbour. inland for about seven miles. At its entrance the width from point to point is about three miles, and

To the north of the main expansion of Masset Inlet there is a fresh water lake about 14 miles long from east to west, with a maximum breadth of one mile and a half, known as Iintsua Lake, which connects with the inlet by the Ain River. All these inland lakes are bordered by high ranges of mountains, including many cone-shaped peaks. All are composed of igneous rocks, portions of which are Pre-Cretaceous, and part of later Tertiary age. By the Iintsua Lake a water-way extends nearly across this part of the island, west of Masset Inlet, a ridge of scarcely more than a mile in width separating it from the waters of the Pacific Ocean in Kiokathli Inlet, on the west coast of the island.

The island affords but few good harbours. On the west coast, the only really good seaport, which however, has never been surveyed by the Admiralty, is near the southern end and is known as Rennell Sound. It has a broad, clear entrance from the sea and extends inland about eight to nine miles, curving, towards the inner half, to the southward and thus forming excellent shelter from westerly gales. It can be readily recognized along the shore by the presence, at its entrance, of a bold hill, which rises somewhat abruptly from the beach on the south side to an elevation of over 1,000 ft. The inner end of this sound contains several islands, the largest of which was named Shields by Mr. W. A. Robertson, the original discoverer of the Graham Island coal areas; from opposite this island a trail was partially constructed eastward for about four miles to the shores of Yakoun Lake. This lake at the head of Yakoun River is practically on the line of contact between the coal-measure rocks of the east half of the island and the igneous rocks of the west coast. The trail passes over a ridge about 600 ft. high or 390 ft. above the surface of the lake, as measured by aneroid.

Kano Inlet, sometimes called Cartwright Sound, which is a few miles south of Rennell Sound, extends

three miles inland, narrows to two miles. There is a cove on the south shore with a small island where good shelter can be obtained for fishing boats, though



Queen Charlotte Islands — Looking West from Ramsay Island.

the inlet, seaward, presents no other shelter from westerly gales. During the past season a fishing station for halibut was established here by Capt. Bradford. The inner half of the inlet is more narrow and terminates in two small coves, that to the southeast being bordered by high-peaked mountains which reach elevations of 3,000 to 4,000 ft., the summits, in July, being covered with snow. At the northeast angle of this inlet, the shores are lower, and a small creek enters from the east.

To the north of Rennell Sound the inlets are small. The shores are uniformly rough, often with ragged ledges, and good beaches are rarely seen. Several small islets are found near the entrance of the smaller indentations. The largest of these inlets, known as Kiokathili, is about 25 miles north of Rennell Sound, but the entrance is bad and there are ledges inside which make it dangerous for vessels in its present unsurveyed state. Good anchorage for boats can be had in the sheltered coves, but care must be exercised, owing to sunken rocks.

There are three principal islands on the west coast, the most southerly being Marble Island, in the western entrance to Skidegate Channel. Of the other two, the more southerly is known on the charts as Nesta or Hippo Island and is about 18 miles northwest of Rennell Sound; the other, Frederick Island, is 26 miles further north, or 14 miles south of Cape Knox, which forms the northwest angle of Graham Island. Hippo Island has a length from east to west of about two miles, is high nearest the shore and slopes gradually to the west end. Shelter for small vessels can be found in the small bay on the east. Frederick Island is somewhat similar in shape and size but the shelter is not so good.

The southern channel, between Graham and Moresby Islands, is open to the sea on the west, with practically no shelter except Marble Island. On the north side of this channel, known originally as Cartwright Sound, are two bays; the outer one, due north from Marble Island, extends inland for a mile or more; the other, near the entrance to the channel proper, is known as Dawson Inlet and divides into two arms that extend inland for two to three miles.

The point north of Cartwright Sound or the western entrance of Skidegate Channel is very rough with jagged ledges and reefs stretching to the southwest for several miles. On Vancouver's plan, this is known as Hunter's Point, but on Dawson's map this name is changed to Buck Point, which is the name given by Vancouver to the northwest corner of Moresby Island. The channel round the large island at the western entrance to Skidegate Channel is partially dry, except at high tide, when it can be traversed by small boats only. Eastward of this island, Skidegate Channel is also navigable for small boats only, and by these only at high water, owing to shallows and heavy tidal currents at what is known as the East and West Narrows. The shores are rocky and bordered by high hills throughout the whole distance.

The eastern part of this channel opens out into

South Bay, and thence it gradually widens into Skidegate Harbour, at the southeast corner of the island. This is practically the only harbour on the south and east coasts of Graham Island or along the north shore till Masset is reached.

The western part of Skidegate Harbour contains a number of islands, some of which are of considerable size, including Maude, South, Lena, etc. Around the head or western end of the harbour, near Cowgitz, the land is high, rising on the north into mountains 3,000 to 4,000 ft. above the sea. On the Moresby Island side, adjacent to the south, similar high peaks are seen, some of which are apparently perpetually snow capped.

The only harbours along the east coast east of Skidegate Village are three shelters, for small boats only, at the mouths of small streams and accessible only at high state of the tide. At low water they are entirely dry. These are at the mouth of Tlal River about 25 miles north of Skidegate; at a small creek south of Cape Ball; and at a small lagoon near Cape Fife, about eight miles south of Rose Point. Inside the bends of the creeks at these places boats can lie safely sheltered from east winds, but are aground at low water. On the north side a similar high-water shelter for boats is found in Hiellan Creek at Tow Hill, ten miles west of Rose Point. In bad weather, therefore, boat navigation along this coast is very dangerous and many lives have been lost in the vain attempt to reach a shelter in some one of these small harbours.

Along the north shore, Masset and Virago Sound are the only harbours of consequence. The entrance to the former is somewhat obstructed by a bar on which the water has a reported depth at low tide of three fathoms, but the position of this bar is not fixed, owing to heavy storms and tidal currents. In the inlet, good water extends all the way to the lake expansion though there are heavy tidal currents throughout the entire seventeen miles of the narrow approach.

At Virago Sound, about 12 miles west, the entrance is somewhat narrow but there is plenty of water, and once inside the points there is a perfect shelter and good anchorage.

These shores are practically uncharted except in the vicinity of Skidegate and, to some extent, at Masset, and the charts of the west coast are useless for navigation. No soundings have been taken, the coast line is merely sketched in, and is fringed in places for some miles seaward by jagged reefs, on which the seas are constantly breaking in rough weather. No reliable information could be obtained as to the character of this shore except that it was very rough, and no one could be found at the time of our visit who could act as pilot or who knew very much about this portion of the island.

The shores of the North Island also are without harbours, but shelter from west winds can be found on the east side, near the entrance to Parry Passage, which separates this island from Graham Island.

About nine miles farther east there is a good high-water boat harbour at the mouth of the Jalm River.

In the absence of a pilot, or of definite information as to the features of the west coast, we had to depend upon our own resources, aided by a rough sketch of the Crown land plan of the island. The one man, apparently, who had been around the shores with Dr. Newcombe, of Victoria, some years before, had gone with the rest of his tribe to the mainland for the salmon fishing.

The whole island is densely wooded down to the sea-beach. There are no roads or cleared areas in any part and the only trails are those from the shore of Skidegate Harbour inland to the coal areas at Camps Robertson and Wilson, the first eight miles in length, and the second about the same distance farther north. The Robertson trail has been carried west to the shore of Yakoun Lake about three miles distant. A horse trail is now being made between Skidegate post office and the ranch at the mouth of Tlal River about 25 miles north. Communication between Masset and Skidegate settlements is made either by traversing the beach, a distance of more than 100 miles, or by sail-boat round by Rose Spit. A few horses are kept at Masset by Indians and by Rev. Charles Harrison, who has a small ranch called Delkatha three miles east of the Indian village, while a Mr. Hodge at the Tlal has a few head of cattle and horses and a fine piece of natural ranch-land. These animals pick up a living on the wild grasses along the borders of the beaches or in glades in the woods, while on the ranch lands at Masset and Tlal considerable quantities of hay are made from the wild grass on the marsh lands along the creeks. A number of fine cows are also kept at these places and the Indians, both at Masset and Skidegate, own a quantity of cattle which run practically wild in the woods for a good part of the year.

In the northeast part of the island, towards Rose Point and in rear of Cape Fife, there is also a considerable herd of wild cattle. These are being hunted down for the sake of the meat, which is taken to Port Simpson or to one of the Alaskan ports for sale. The herd was reported as very large, but from close inquiries, it appears that the number of animals at present in this part of the island in a wild state is probably less than 100.

The forest being generally dense, ranching can only be carried on, with any chance of success, at widely separated points. With the exception of the above-named, no other attempts have yet been made at ranching on Graham Island, though on the adjacent island, (Moresby) at Spit Point across from Skidegate, a ranch of large size has quite recently been started under favourable conditions. Owing to the fact that severe winter weather never visits these islands, the stock can be kept in the open all the year round.

The islands of the Queen Charlotte group held, some 30 years ago, a large Indian population, variously stated at from 5,000 to 7,000 persons (Haidas), who were scattered in villages along the

entire coast line. They have gradually decreased—through sickness or removal—and the number of persons in this group is now reported to be about 700. Gradually, also, the entire Indian population has removed from the once widely-separated villages, the remains of which can still be seen at many places, until they are all now concentrated at the village of Masset at the north end of Graham Island, and at Skidegate at the south end. At both places the Indians are comfortably situated, having good houses and boats, a co-operative store and a factory for the manufacture of dog-fish oil under their own control and management (the last-named two industries being located at Skidegate), while there is another factory, usually known as the oil works, located at Skidegate post office, two miles west of the Indian village, where employment can also be obtained, if desired. In point of comfort and physical well-being, the Indians of this island appear to be fortunate. They are also musical and there is a good brass band, entirely managed by themselves, in each village. During the summer months—from the middle of June to the middle or end of August—the island is practically deserted by the Indians, the whole population migrating to the mainland of British Columbia, where they are employed in the numerous salmon canneries along the coast from Portland Canal south to Fraser River. In ordinary seasons, the earnings for this time are sufficient for the family's comfort and support for the rest of the year, so that, with the exception of providing what few fish are required for home consumption, there appears to be but small incentive for hard physical work.

During the winter months certain members of the tribe engage in hunting, principally the bear, which appeared to be quite numerous, especially in the country around Yakoun River and lake, and in the southern half of the island. Of other large animals there appears to be a scarcity, though Rev. Charles Harrison of Masset asserts that caribou have been found in the country adjacent to Virago Sound. As few white persons have ever attempted to penetrate the dense forest of the interior the presence of this animal might easily escape notice. During our boat journey along the north shore, west of Virago Sound, several forms, like deer, were observed feeding along the beach. It was supposed at the time that these might be wild cattle, but as the herd of these is, so far as known, confined to the area east of Masset Inlet, and as no trace of them has been reported from this part of the island, it is quite possible that the animals seen may have been deer. Our boat was, at the time, too far from the land to definitely determine this point.

The forest growth is remarkable in several ways. Apart from its dense character, the trees are often very large, reaching, in some cases, a circumference of thirty feet, with a height of 250 to 300 ft. According to Bull. No. 21 (U. S. Dept. of Agriculture, Washington,) "North American Fauna, 1901," Osgood, the principal species of trees which occur in

the island are the Sitka spruce (*Picea sitchensis*), the Western hemlock (*Tsuga heterophylla*), the alpine hemlock (*Tsuga mertensiana*), the Giant cedar (*Thuja plicata*), the yellow cedar (*Chamaecyparis nootkatensis*), the northwest coast pine (*Pinus contorta*) and the Pacific yew (*Taxus brevifolia*). In addition to these, the alder (*Alnus oregonia*) grows to a large size, often having a diameter of from 12 to 20 in., or even larger; the willow (*Salix scouleriana*), is often of fair size, and the Oregon crab-apple (*Pyrus rivularis*), grows along some of the inland streams and on the beaches, and forms a great impediment to travel, owing to its spiky or thorny character.

Among berries, the most abundant seen by us were the sallal (*Gaultheria shallon*), salmon berry (*Rubus spectabilis*), especially plentiful and laden with large yellow and red berries, elderberry (*Sambucus racemosa*), dogwood (*Cornus occidentalis*), honeysuckle (*Lonicera involucrata*), and wild currant (*Ribes*). Throughout the forest progress is greatly impeded by thickets of sallals and salmon berry, a thick growth of the devil's club (*Echinopanax horridum*), and large quantities of the rank skunk cabbage (*Lysichiton kamschatcense*), the fleshy succulent roots of which are a favourite food of the bears; the leaves sometimes measure 3 ft. in length by 18 in. in breadth. The great amount of moisture which prevails for a large part of the year develops an abundant undergrowth of shrubs and ferns, that often occur in great clustering bunches and are almost impossible to penetrate. Through many centuries of decay numbers of huge trees have become imbedded in the soil which is probably largely composed of decayed vegetation; the usually very rough ground surface is often covered with large prostrate tree-trunks from 5 to 8 ft. in diameter, which lie in all directions and are thus practically impassable. Upon these fallen trunks, numerous examples of wonderful forest growth are seen in the presence of large cedars or other trees which grow entirely from the upper surface of the fallen timber, the huge roots of the latter growth clasping the trunk beneath. The newer tree sometimes has a diameter of 4 to 6 ft. and a height of 200 ft.; the prostrate log, when cut into, is in many cases, apparently quite sound in spite of the long interval that must have elapsed during the growth of the newer tree.

The whole of the island west of Masset Inlet in the northern half, and a line drawn through the valley of the Yakoun River and Lake and thence to the shore of Skidegate Harbour east of Slate Chuck Creek, is occupied by igneous rocks, and is exceedingly rough, with many mountains, the peaks of which rise to elevations of 2,000 to 5,000 ft. above the sea. Some of these are cone-shaped and snow can be seen in their summits for the greater part of the year. These hills are all densely wooded, except where occasional patches of heath appear along the sides on their upper portions. It may be imagined that the whole of the country in this direction is exceedingly hard to traverse or to prospect.

East of the line referred to through the centre of the island the surface is comparatively low, and over large portions quite level. Forest fires have destroyed much of the original timber growth, more especially throughout the eastern part, but the second growth is dense everywhere. There are no tracts of clear land, but extensive swamps are found. Several comparatively low ridges are seen in the northeast corner of the island which extend southerly from Tow Hill and in rear of Cape Fife, and these may represent masses of igneous rocks of which however no definite statement can be made owing to the absence of outcrops in that area; but masses of basaltic rock of the later Tertiary age, in places columnar in character, are found at Tow Hill on the north and at Lawn Hill on the southeast coast. To the north of Skidegate high ridges are seen, which, according to the chart, reach a height of 1,400 ft. These are in part igneous and in part conglomerate.

The exposed rocks of this eastern area are generally sandstone and shale of Cretaceous and Tertiary age. Rock outcrops are seldom seen except on a few of the streams in the southern part of the island, while merely surface exposures are rarely visible owing to the thickness of the soil covering. Some of the streams cut deep channels, but the banks are usually of sand and gravel with occasional thick beds of clay. These streams are difficult to traverse owing to the quantity of drift tree trunks and the abundance of boulders, which make walking very dangerous. In the Yakoun River the drift trees render the stream impassable for long distances and in places entirely choke up the channel.

The literature relating to the island may be briefly stated. It has been reviewed by Dr. J. F. Whiteaves in his "Report on Mesozoic Fossils, 1876," and later by Dr. G. M. Dawson in the Geological Survey "Report of Progress, 1878-79," pp. 8 to 14. It extends from the expedition under Juan Perez in 1774 down to Pender's survey of Skidegate Inlet in the "Hecate" in 1866. On the part of the Geological Survey, Mr. James Richardson, in 1872, paid a visit to the south side of Graham Island, and examined the deposit of anthracite at the west end of Skidegate Harbour, known as the Cowgitz mine, the report on which is contained in the volume for 1872-73. In 1878, Dr. G. M. Dawson, in the small schooner "Wanderer" of 20 tons, examined the eastern shores of the several islands in the group as far as North Island, and also the inland waters of Masset Inlet. The western shores were not, however, visited on this trip. The report on this expedition will be found in the annual volume above-mentioned.

Various papers relating to the archaeology and natural history of the islands have appeared from time to time between the years 1868 and 1901. Among the excursions undertaken for this purpose Dr. C. F. Newcombe made two voyages in 1895 and 1897, respectively, with reference principally to archaeological researches among the Haida Indians. Collections of fossils were made from a number of places, and these have helped to more definitely settle

the age of the sedimentary rocks of Graham Island, though collections had previously been made by Mr. Richardson and by Dr. Dawson. These collections are all from points along the shores.

The interior of the island was, however, almost entirely unexplored, the only information relative to it being obtained from the brief trip of Dr. Dawson in 1878. In 1885 Mr. W. A. Robertson of Victoria, while making an exploration on behalf of the Provincial Government in connection with the timber resources of the island, ascended the Yakoun River to the lake at its head. Thence, crossing the country he reached the harbour of Skidegate at the mouth of the Honna River. In this trip, while examining some of the small streams to the east of the Yakoun, pieces of bituminous coal of excellent quality were observed, and on tracing these upward to their source a seam of large size was discovered which was afterward opened up to some extent along the outcrop and is known as the "Wilson seam." Farther to the south drift coal was also seen on the east branch of the Yakoun which flows into the main stream a short distance below its exit from the north end of the lake. Tracing these pieces to their source, another large and valuable deposit was disclosed, situated about three miles east of Yakoun Lake and some eight miles inland from the mouth of the Honna. This outcrop was subsequently styled the Robertson seam—after its discoverer. This seam has also been opened up along the outcrop for a short distance, under the direction of several mining engineers who have visited the locality at different times in the interest of the owners.

Owing to the desirability of ascertaining something definite, if possible, as to the structure of this coal field, it was decided early in 1905, by the acting director of the Geological Survey of Canada, to send a party to Graham Island for that purpose. In the carrying out of this work an examination was made of the interior as far as was possible, and of the entire shore line, starting with Skidegate and going west through the boat channel which separates Graham from Moresby Islands, and thence by the west coast to the north end of North Island. From this point the north shore was examined, including the harbour of Virago Sound where lignite had been reported as occurring. A trip was taken inland to the heads of the several lake expansions. At Masset Inlet the party divided. My assistant, with one man, ascended Yakoun River to the lake, partly by small canoe and partly on foot through the woods, whence they followed the trail to Robertson Camp and thence out to Skidegate by way of the Honna trail. This was a very difficult trip, owing to the low state of the water in the river, and the number and extent of the log-jams which compelled them to abandon the canoe before the lake was reached.

Returning with the boat to the mouth of the inlet the coast was followed to Rose Point, where much difficulty was experienced in rounding Rose Spit and where one boat was lost owing to heavy seas. A gale from the west also detained the party for 10 days at

Tow Hill. Thence the shore was followed south to Skidegate.

The journey around the coast was made by means of a Columbia River fishing-boat having a length of 25 ft. over all, by 7 ft. beam. These boats are fitted with centre-boards and carry a mainsail and jib. They are usually very seaworthy and are fairly easily handled in calm weather, being arranged for four oars. The carrying capacity is about five tons.

This plan of exploration, the best that could be had at that time, is far from satisfactory on a coast like that of British Columbia, abounding in deep fiords, strong tidal currents, and subject to long intervals of calm weather, alternating with heavy gales. The necessity of seeking a safe shelter every night, especially along an uncharted coast, without a pilot familiar with the shores, involved a certain amount of anxiety, especially when on the west and north coast, where the danger from heavy westerly or northerly gales is great, owing to the scarcity of sheltered coves or harbours. For this kind of exploration, a good staunch gasoline or steam launch is almost necessary, would obviate many exasperating delays, and, on the whole, would be more economical—to say nothing of the more important element of safety—than the ordinary sailing craft.

The rivers on the islands are few and, generally, of small size. The Yakoun is the largest, connecting Yakoun Lake in the southwest part of the island with the head of Masset Inlet. This river has a length of about 18 miles in a direct line, though, with the windings in its course, the actual length is probably not far from 25 miles. It flows, largely, through banks of sand or clay for the lower half of its course, but several rock ledges outcrop in the upper portion. No detailed survey of this stream had ever been made and but little information could be obtained as to its character, beyond the fact that in spite of considerable obstruction in the channel, due to drift logs, it had been ascended, at certain stages of water, in small canoes. A compass survey was made by my assistant during the latter part of July, the distances being determined by pacing where possible or by estimation where pacing was impracticable. The water was very low, and the canoe could not be taken to the lake, but the several log-jams were located, and measured, and the positions of the shallows were fixed. The log-jams in the river are more than 30 in number, some of large dimensions.

The first jams were found about two miles from the mouth of the stream and, in the next stretch of two miles, ten jams were located, including several logs with diameters of from 12 to 30 in. The next three miles were comparatively free from logs, but the stream was shallow, with banks of clay and sand. Jams are frequent in the next three miles, 10 being seen, several of which were marked as "bad," with drift logs up to 60 in. in diameter. In the next six miles, up stream, these jams are comparatively rare; occasional ledges of sandstone outcrop, cutting in places directly across the river. In the next stretch of three miles there are 10 log-jams, several of which

are very bad, to within about four miles of the foot of the lake where it was found necessary to leave the canoe, the last distance to the lake being almost clear, with the exception of one large jam. For a couple of miles there is dead water below the outlet. At about six miles below the lake, the stream flows through a channel cut in the sandstone for a distance of about half a mile, the passage being from 12 to 20 ft. in width.

Many of these jams are old and solid, the lower trees being partially buried in the sand. At a high stage of water some of them would be covered sufficiently to pass boats of 2 to 3 ft. draught, but the greater part would have to be removed to obtain a passage for small boats from salt water to the lake. They could, however, quite readily be removed by proper appliances, when the water in the river is high by means of a small steam engine, a tug or steam scow and dynamite for the large logs. Besides the log-jams, the number of shallows in the stream would seriously interfere with navigation except in high water stages.

Owing to the generally low condition of the banks and the almost impenetrable tangle of roots, small bush and rank vegetation, it is almost impossible to traverse this part of the country during the summer months, the water in time of flood being dammed back and spreading through the surrounding flat country in small and swampy channels, which in time also become choked with drift wood and form an impassable jungle.

The importance of this stream as a means of inland communication is, however, very considerable. In any attempt to work the coal seams, especially at the Wilson camp, the facilities of transport by this route—if it could be rendered navigable—would be much greater than by trails cut from Skidegate, a distance of 17 miles. With the jams removed and the shallows dredged at the worst points it would be possible to take up light-draught stern-wheel boats or scows as far as the mouth of Wilson Creek, which is only one mile from the outcrop of the coal; or to the lake itself, where the east branch of the Yakoum comes in and where boring operations should be carried on in the valley of this stream to the north of the Robertson camp outcrops. In this way, also, machinery for sawmills which will be necessary for mining operations, can be placed on the ground in the vicinity of both camps with comparative ease.

The mining investment business is in better shape today than it has been in years. Listed stocks are the most attractive to investors, but the straight investments put out by honest promoters continue to appeal to the more conservative investors. What the public wants is stock that can be sold as well as bought. The investment business in mining may be said to be going through an educational period which will result in much good for the industry. Mining is the greatest business in the world, and the honest promoters are educating the investing public up to this fact.—*Bonds and Mortgages.*

COAL MINE OPERATORS AND MINERS MEET IN JOINT CONFERENCE.

Unsuccessful Endeavour to Establish Uniform Conditions at Crow's Nest Pass and Alberta Collieries.

THE COAL MINES of the Crow's Nest Pass and Western Alberta will be closed down for an indefinite period unless an agreement between the operators and their employees be soon arrived at. Early in March the first of a series of meetings was held at Calgary, Alberta, and thereafter until the close of the month the differences between the two parties were very fully discussed with the object of coming to a settlement. Unfortunately, the protracted conference ended without the hoped-for result of a mutually satisfactory understanding having been reached, so that there does not now seem to be a favourable prospect of the production of coal and coke being regularly maintained until after such time as a solution of existing difficulties shall have been found.

The opening meeting was held on March 4. Mr. G. G. S. Lindsey, general manager of the Crow's Nest Pass Coal Company and president of the Western Coal Operators' Association, was chosen as permanent chairman of the conference. After the chairman's opening address a committee on credentials was selected. The report of this committee showed that the operators present were: G. G. S. Lindsey, R. G. Drinman, A. C. Flumerfelt, H. N. Galer, S. M. Moore, G. L. Fraser, O. E. S. Whiteside, J. A. Breckenridge, W. F. McNeill, W. H. Aldridge, and L. Stockett. The miners' delegates present were: Thos. Briggs, James Lancaster, John Lorensen, James Douglas, Charles Brooks, W. Graham, James Chapman, A. McLeod, C. Stubbs, H. Evans, A. Granger, O. Barber and H. Morgan.

Several officers of the U. M. W. of A. district board were also in attendance.

Rules and regulations were decided on to govern the meetings and then the scale committee was chosen for the operators as follows: Pacific Coal Company, L. Stockett, alternative, W. H. Aldridge; H. W. McNeill Coal Company, W. F. McNeill, alternative, W. F. Little; Breckenridge-Lund Coal and Coke Company, John Breckenridge, no alternative; West Canadian Collieries, O. E. S. Whiteside; International Coal and Coke Company, H. N. Galer, alternative, A. C. Flumerfelt; Canadian-American Coal and Coke Company, S. M. Moore, alternative, G. L. Fraser; Crow's Nest Pass Coal Company, G. G. S. Lindsey, alternative, R. G. Drinman.

The miners on the committee were: Thomas Briggs, Fernie; J. Lorensen, Michel; J. Chapman, Frank; C. Brooks, Coleman; H. Evans, Lundbreck; O. Barber, Bankhead; G. Granger, Canmore; C. Stubbs, Bellevue; A. McLeod, Lille.

The result of the conference, as already stated, was that no arrangement was finally made. The

views of the operators and miners, respectively, as expressed for publication, are given below:

THE POSITION OF THE OPERATORS.

The position of the Operators' Association was stated by President G. G. S. Lindsey as follows:

"I regret that after so much time has been devoted to this matter it should prove to have been thrown away. I regret, too, that the miners could not adhere to what they had agreed to. The miners agreed to leave the whole matter to a committee of four of their number, namely, President Sherman, Vice-President Galvin, and John McDonald and International Board Member Patterson, undertaking to endorse all that they did. This committee consisting of the officers of the district union, agreed with the operators, but went back to the miners' delegates and asked them to reject the agreement arrived at, but in many respects to my mind the result is desirable. In a competitive field, working under different laws in two provinces, there have grown up necessarily many inequalities, and the fair way to deal with such a situation is to endeavour to make conditions and wage scales uniform; this necessarily means some decreases and some adjustments. Mr. Sherman was very strongly of the opinion this was not the time when uniformity could be arrived at, because his men would not consider decreases. Personally I was guided by his statement as to that and was willing that some arrangement in the nature of a *modus vivendi* should be come to for a year. As we progressed the inequalities of the position became daily more pronounced; still an agreement was come to, but it is perhaps, after all, better things should be thoroughly harmonized now. To do this, as Mr. Sherman said, would be impossible on his side at the present time. Outsiders viewing the position dispassionately may do it.

"The Dominion Government has just passed an act constituting a board of conciliation before which such questions and difficulties as the present can be taken and disposed of, and it is there that these matters will probably go. The decision of the board is not binding unless the parties agree, but their quasi-judicial determination would be hard to disregard and probably neither side would wish to do so. Pending such inquiry and decision things remain as they are, neither side can take the advantage and there is no reason to think either side will not abide by the law."

THE MINERS' POSITION.

The miners' side of the case is given in a statement issued by President Sherman, as follows:

"The joint convention adjourned because the miners' delegates unanimously refused to instruct their officers to accept the final offer of the Western Coal Operators' Association, on the ground that the proposed contract sought to bind them to certain conditions, harsher in their nature than any agreements now in existence under the United Mine Workers of America. The hours of labour in the Crow's Nest mines of Alberta were to be increased in some cases,

the increase of wages offered only applied to drivers and others engaged in the transportation of coal underground in Alberta. We were refused an eight-hour day, bank to bank, as in British Columbia. We were offered no increase in wages for contract miners and day men underground. The underground men who would benefit by the slight increase would be but 10 per cent. of the number employed.

"The wages of some men would be decreased under the proposed agreement. The general advance offered on all outside rates was 25 cents per day for men receiving at present \$2 for 10 hours, which would still leave them less than common labourers now receive in the Northwest. Five per cent. was offered on all other outside rates excepting boys. Coke-oven men were to get no increase on contract rates. The special committee did not agree to everything the operators proposed, it being distinctly understood that the delegates had the right to reject any and every clause of the proposed agreement.

"With regard to the discrimination clause, it never protected the miners and was seldom observed by the operators, many of our men being victimized and refused employment. The operators want this clause because they want to encourage and protect men who desire to fight out union while benefiting by the better conditions and higher wages obtained by organized labour."

MINERS GIVE OPERATORS 30 DAYS' NOTICE.

The following notice signed by Messrs. Sherman, Patterson and McDonald, officers of the district board, U. M. W. of A., and all delegates of the miners attending the recent conference, was afterwards handed to W. F. Little, as secretary of the Operators' Association:

"To the Western Coal Operators' Association, comprising the Crow's Nest Pass Coal Company, the International Coal and Coke Company, the West Canadian Collieries, Limited, the Canadian-American Coal and Coke Company, the Breckenridge-Land Coal and Coke Company, the H. W. McNeill Coal Company and the Pacific Coal Company, Ltd.:

"We, the undersigned, acting on behalf of your employees, hereby give you 30 days' notice that a change of wages, hours and conditions of labour is demanded by your employees at the various mines, coke ovens and outside plants owned and controlled by your respective companies."

THE COAL MINE OPERATORS' PROPOSED AGREEMENT.

After the conference had adjourned *sine die*, the Fernie *Free Press* published the operators' proposition in full, as follows:

ARTICLE 1.—INTERPRETATION.

It is hereby agreed between the undersigned companies, hereinafter called "the companies" on the one hand, and their respective employees as represented by the United Mine Workers of America, District No. 18, hereinafter called "the men" on the other hand, that the following scale of prices and the following terms and conditions shall be in effect and govern the parties for _____ years, commencing April

1, 1907, it being understood and agreed that the parties thereto will meet in conference 60 days prior to the expiration of the agreement and discuss the renewal thereof. This agreement shall cover all the mines, coke ovens and outside plant operated by the companies.

2.—ADJUSTMENT OF DISPUTES.

(a) Wherever it is made to appear that a member or members of the United Mine Workers of America has or have not been fairly treated, or that any dispute or grievance has arisen under this agreement, whether the dispute or grievance is preferred at the instance of the company or any member or members of the United Mine Workers of America, or the men as a whole, then the company will, through its official, meet the proper officials appointed by the United Mine Workers of America and endeavour to settle the matter as hereafter provided.

(b) In case of any local trouble arising in any mine through failure to agree between the pit boss, or mine labourer, or mine labourers, the pit committee and the pit boss are empowered to adjust it.

(c) Before any grievance or dispute shall be submitted to the pit committee the person or persons aggrieved shall endeavour by personal application to the pit boss to settle the matter.

(d) The pit committee in the discharge of its duties shall, under no circumstance, go around the mine for any cause whatever unless called upon by the pit boss or by a miner or miners, or company man or men who may have a grievance that he or they has or have first tried to and cannot settle with the boss or foreman. Members of the pit committee employed as day men shall not leave their places of duty during the working hours except by permission of the pit boss. The duties of the pit committee shall be confined to the adjustment of disputes between the pit boss or other foreman and any member of the United Mine Workers of America working in and around the mines, arising out of this agreement, the pit boss or other foreman and said miner or miners, or labourer or labourers having failed to agree.

(e) In the event of the failure of the pit committee and the pit boss to settle any dispute properly referred to them, and in that event only except in the event of any other dispute arising under this agreement, or grievance preferred by either the company or the United Mine Workers of America, or the men as a whole, the matter in dispute shall be reduced to writing and referred to the superintendent or mine manager, and the local president of the union for their settlement, and should they fail to agree it shall be referred to the president or general manager of the company and the national president of the United Mine Workers of America or his representative, but the local national board member shall be excluded from being the representative of the president.

(f) In all the cases heretofore, under this section referred to, the miners, mine labourers and other parties, involved must continue at work pending the said investigation, adjustments and arbitration, and until a final decision or award has been reached in

the manner hereinbefore set out, but where a miner or miners, or mine labourer or labourers has or have been discharged by the company, he or they shall not remain in the employ of the company while his or their case is being investigated and adjusted as aforesaid.

(g) Any breach of this agreement by any of the parties hereto is not to void the said agreement, but the same is to continue in full force and effect.

the companies signing this agreement shall at any above-mentioned methods of settlement, concede that strikes, lockouts and boycotts shall be absolutely abrogated, and that this agreement is made on the distinct understanding that no strike, lockout or boycott against any individual member of the union as a body, or as against any individual, or as against the companies signing this agreement shall at any time occur or be permitted.

3.—NON-DISCRIMINATION.

No person shall be refused employment or in any way discriminated against on account of membership or non-membership in any labour organization, and there shall be no discrimination against or interference with any employee who is not a member of any labour organization by members of such organization.

4.—SPECIAL RULES, ETC.

The right to hire and discharge, the management of the mine and the direction of the working forces are vested exclusively in the company, and the United Mine Workers of America shall not abridge this right. It is understood and agreed that this agreement shall not conflict in any way with the special rules of the company now in force, provided that the special rules shall not interfere with the rates of wages, or the work to be performed under this agreement.

5.—HOURS OF WORK.

All mine and inside labourers shall work eight hours per day, it being distinctly understood that this means eight hours work at their working place, exclusive of one-half hour for lunch, with the exception of miners working by contract, who are to work eight hours at their working place, outside men to work ten hours except where otherwise provided by the scale. The company has the right to put inside men on at such hours as may be required to keep the breaker or tipples running to full ten hours, and if any day man is required to work overtime, it is agreed that he will do so, the company paying him overtime for the same. Locomotive engineers, motormen, switchmen and others whose duties are both inside and outside the mine, shall be considered as outside employees and work ten hours per day, but in the case of locomotive engineers, motormen and switchmen, they are paid an increased compensation for the same, provided, however, that the foregoing provisions are subject to and modified in British Columbia by the existing laws of that Province.

6.—PENALTY FOR ABSENCE FROM WORK.

To prevent men from absenting themselves from work without proper cause, no employee shall absent

himself from his work unless through sickness or by first having previously arranged with the pit boss or his foreman and obtained his consent. If any employee absents himself from work without proper cause or without first obtaining the consent of the foreman or pit boss, he may be discharged.

7.—PENALTY FOR STOPPAGE OF WORK.

If any employee or employees shall cause a stoppage of work in violation of this agreement, he or they shall be subject to discharge by the company without recourse.

If any man or men refuse to continue work because of a grievance which has or has not been taken up for adjustment in the manner provided herein, the pit committee shall immediately, if requested by the company, furnish a man or men to take such vacant places at the scale rate, in order that the mine may continue at work, and it shall be the duty of any member or members of the United Mine Workers of America who may be called upon by the pit boss or pit committee to immediately take the place or places assigned to him or them in pursuance thereof.

8.—DELIVERY OF TIMBER.

The company will deliver all timber as near the working place as practicable, or at the mouth of the room.

9.—TURN OF CARS.

Men in breasts and rooms shall receive, as far as possible, an equal turn of cars, and men in pillars a proportionate turn.

10.—MINERS AS PARTNERS, ETC.

It shall be optional with the management of the mine to work the mines with a miner and a back hand or with miners working as partners. On all company work the company shall employ such classes of men as the work requires, and at the rate of wages provided for in this agreement. The company shall pay the sum of three dollars (\$3) per day to all miners only taken from contract work to do company work. Any miner failing to earn the minimum rate of three dollars (\$3) per shift owing to a deficient condition of his working place, shall be paid by the company a sufficient amount to secure him the said minimum, provided he is a capable man and has done a fair day's work.

11.—CONSTRUCTION OR EXTENSIVE REPAIRS.

No scale of wages shall be made by the United Mine Workers of America, for mine manager, mine manager's assistant, pit boss, breaker boss, company's weightman, boss driver, night boss, head machinist, head boilermaker, head carpenter, head electrician, night watchman, stable boss and all foremen, timekeepers and coal inspector.

It is agreed that all men working on improvements and extensive repairs, and also all employees of the electrical department are not included in the jurisdiction of the United Mine Workers of America.

12.—CHINESE LABOUR.

The companies agree not to employ Chinamen underground, but have the right to work same above

ground, and the United Mine Workers of America agree not to interfere in any way with such employment. The employment of such labour shall not entitle the United Mine Workers of America to call a strike or stop work.

13.—NO INCREASE IN COST EXCEPT AS PROVIDED, AND THE EFFECT OF NEW LEGISLATION.

No change of conditions shall be imposed in Eastern British Columbia and Western Alberta scale for the coming years that increase the cost of production of coal or coke in any districts in British Columbia and Western Alberta, to which this agreement applies, except as may be provided.

This agreement is made and executed, having regard to and in reliance upon the consideration of the present law and conditions regarding the various matters herein disposed of, and if in any time hereafter, and during the life of this agreement the laws are altered or varied or new laws are made so as to impose any new or further burdens upon the company, the company is to be at liberty to modify the terms of this agreement so as to meet the new, varied or altered conditions created by the statute law.

14.—HOLIDAYS.

The following days only shall be observed as holidays: New Year's Day, Victoria Day, Dominion Day, Labour Day, Thanksgiving Day, Christmas Day, Provincial election day, but there shall be no holiday after payday.

15.—FUNERALS.

In the event of an instantaneous death by an accident in the mine or outside the mine, the miners underground and all other employees shall continue at work until the afternoon of the day of the funeral. On the day of the funeral (which must always be held on the afternoon shift) all employees may cease work for the purpose of attending the funeral, it being optional with them whether they shall work or not.

16.—NEW WORK.

Whenever any new work arises, a price for which has not been provided for in this agreement, on the request of the company and the miners, the scale committee of the Western Coal Operators' Association and a properly constituted committee of the miners shall meet within 30 days after the said request and arrange a price. Meantime and until such price has been arranged, all men shall be paid upon the day wage scale.

17.—BRUSHING.

Brushing is understood to be taking down rock from the hanging or foot walls only.

18.—NO MARKET RESTRICTION.

Any operator paying the scale rate of mining, and day labour under this agreement, shall at all times be at liberty to load any railroad cars whatever, regardless of their ownership, with coal, and sell and deliver such coal in any market, and to any person, firm or corporation that he may desire.

MINING ON OBSERVATORY INLET, SKEENA MINING DIVISION.

Local Geology of Prominent Mineral Claims.

OBSERVATORY INLET is again receiving the attention of mining men, chiefly as a result of the work done since last July by S. S. Raymond and J. T. Hillis, who have further developed a large body of low-grade copper ore on the Union Jack group (or Hidden Creek) group of eight Crown-granted claims. The brief information concerning the operations referred to, supplied a few weeks ago to the *MINING RECORD*, was to the effect that four tunnels, 35 to 85 ft. in length, had been driven into a bluff 400 ft. high in which occurs a body of ore about 350 ft. wide. These tunnels were at different elevations, about 100 ft. apart and all in ore. From 10 to 12 men were employed on the property all last season.

A company (the Hidden Creek Mines, Ltd., with an authorized capital of \$300,000) has been incorporated with the object of acquiring and working these mines. It is understood that efforts are being made to obtain sufficient cash capital to admit of smelting works, to include a copper converting plant as well as blast furnaces for smelting the ore to matte, being erected and equipped; failing this, a plank road will be constructed from the mine to deep water and 1,200 to 1,500 tons of sorted ore will be shipped monthly to a custom smelter until such time as the company shall be in a position financially to establish its own reduction works.

In January of the current year the *MINING RECORD* reprinted (on pp. 9-13) an official report, by Mr. H. Carmichael, provincial assayer, on "Mineral Locations, Portland Canal District." This, however, did not give any information relative to those on Observatory Inlet, an arm of the canal mentioned. In 1902 Dr. T. Rhymer Marshall reported on the Bonanza and Hidden Creek groups, and his report was included in the "Annual Report of the Minister of Mines" for that year. As this is the only official information concerning the geology of these properties published by the Provincial Bureau of Mines it is here reprinted as probably being of as much interest today as when development on a considerable scale was previously undertaken in that locality.

It may be premised that the mining recorder for Skeena mining division (a division of Cassiar district at that time under the jurisdiction of the Victoria gold commissioner), in his report for 1900, mentioned the Bonanza group of seven mineral claims as "a new discovery made this season, situated about half a mile from the inlet." In his report for 1901 he mentioned that "since midsummer 35 new locations have been made within a radius of five miles of the Bonanza, some of them showing high-grade copper ore." By this time the Bonanza group had been bonded to Mr. M. K. Rodgers and a considerable amount of development work done. In his re-

port for 1902 the same official gave this information: "The idea is widely prevalent that the northern coast of British Columbia is locked up with ice and snow during the greater part of the year with a consequent very short working season. This is a very great mistake. With the exception of a few days in mid-winter, there is not any portion of the Dominion, or northern or eastern United States, where a longer working season obtains. The snowfall at Port Simpson, the most northerly point on the coast of British Columbia, is much less than at Vancouver, the register for last winter, which was an average one, having been 14 in. Mr. J. H. Rodgers, who spent the winter of 1901-2 at the Bonanza mine on Observatory Inlet, and who had a gang of miners working continuously, informs me there was only one day from January 1 until the day I saw him—July 23—on which his men could not work out of doors, and that was on the occasion of a heavy snowstorm in March."

Dr. Marshall reported:*

BONANZA GROUP.

The Bonanza group of mineral claims is situated on a small stream called Mineral Creek, which flows into Goose Bay, Observatory Inlet. The group comprises the North Star, Emma, Emerald, Bonanza, and Princess Louise (all Crown-granted mineral claims), as well as several extension claims, and is owned by the Bonanza Mining Company of Port Simpson. The property was bonded to Mr. M. K. Rodgers, who, however, threw up the option last summer, after having prospected the ground by 800 ft. of tunnels and upraises, as it was found that at inconsiderable depths the ore became of too low a grade. It was accordingly thought important to study the local geology, in order to find out the reason why so promising a prospect, with rich and widespread outcroppings of copper, should yield, on prospecting, such disappointing results.

The Bonanza group lies near the base of a granite mountain more than 4,500 ft. high, with the rounded top characteristic of the district. Immediately above the 3,000-ft. level, islands of argillitic schists lie on the bare granite. These are the remains of the sedimentaries which were carried up in the great mountain uplift. Below the 3,000-ft. level the flanks of the granite boss are covered by a small thickness of argillitic schists. On the property these schists dip flatly down the mountain side (N. 30 deg. E. magnetic), and are traversed by a belt of mica schists. Spurs from the granite cut through the metamorphic sedimentaries in the form of pale granitic dykes, generally mineralized by molybdenite. (One dyke had a strike N. W. and a dip of 45 deg. S. W.) A later disturbance caused fracturing of the strata and the intrusion of a number of narrow parallel dykes of diabase, the general strike of which is N. E. (magnetic). The evidence in the field is very strong that these basic dykes are of later origin than the

*"Annual Report of the Minister of Mines for 1902," pp. II 49-51.

granitic dykes, as the latter cross and fault the former. In the vicinity of the basic dykes the mica schist carries 1 to 2 per cent. of copper. At or near the contact of the dykes and close to the surface, lenses of associated chalcopyrite and pyrrhotite occur. Four of the richest lenses are about 4 ft. thick at the belly, and contain from 6 to 8 per cent. of copper. The long axes of these lenses follow the dip of the strata, which is practically the same as the general slope of the hill and in the same direction. The lenses are found to lie in a very soft mica schist. The mineralized zone crosses Mineral Creek and dips into the hill on the other side, where the mineral near the surface is chiefly secondary iron pyrites.

This property affords an interesting example of the phenomenon of secondary surface enrichment. The schists, which were evidently mineralized with minute quantities of sulphides of copper and iron, during the process of contact metamorphism, were disturbed at a later period with intrusions of basic igneous material in the form of dykes. Open channels were thus made in which "bonanzas" were formed by concentration of sulphide from the surrounding schists. Naturally, in such rock as mica schist, these openings would only occur to a marked extent at or near the surface. Although the property does not give much promise of ore in depth, still a considerable amount of shipping ore could be secured at and near the surface and transported cheaply, owing to natural facilities of location.

A specimen, taken from a grayish white dyke exposed in the bed of Bonanza Creek, near the foot of the ore dump, was sent to the Geological Survey Department at Ottawa for microscopical examination. The following report was made by Dr. Barlow: "The hand specimen represents a hard, compact rock of a light gray colour and porphyritic structure. Under the microscope the rock is seen to consist of phenocrysts of feldspar and biotite imbedded in a microcrystalline quartz-feldspar-calcite ground mass. The feldspar is a plagioclase, probably oligoclase. It is very turbid from alteration to kaolin, epidote and calcite, the former product largely predominating. The form, as a rule, is good, but varies from idiomorphic to very irregular and corroded ones. The biotite is present in relatively small amount, and occurs in irregular individuals and oblong forms. It is much altered either to chlorite or by leaching to a green and then coloured mica, which still retains the high double refraction. A few grains and cubes of pyrite, a grain or two of zinc and apatite complete the section. The rock is an andesite and somewhat altered." Although the rock differs in character from the other granitic dykes, it is undoubtedly associated with the underlying biotite granite.

HIDDEN CREEK GROUP.

The Hidden Creek group, situated on Goose Bay, includes the Manson, Rudge, McKinley, Donald, Alpha, Beta, Gamma, and Caroline mineral claims, owned by the Union Jack Company. The property has been bonded to Mr. M. K. Rodgers. Work on the outcrops has been stopped for the present, but

will be resumed in the spring, when a shaft will be sunk by contract work. The claims are situated on and around Red Mountain, which lies 16 miles N. 30 deg. W. from Hidden Creek Falls. These falls, which will in future prove of immense service as a source of cheap power, are close to the shore of Goose Bay, but are separated from deep water by extended gravel flats. Red Mountain stands out prominently in the landscape and presents one of those extraordinary examples of extensive rock replacements by silica and metallic sulphides. The mountain ridge has a direction N. 30 deg. W., with an elevation of about 700 ft. It is intersected by a number of parallel dykes, more or less vertical and composed of diabase rock, their general strike being N. 10 deg. W. (magnetic). These dykes have been intruded through the mountain mass after the mineralization of the rock, but, nevertheless, they have played an important part by giving rise to conditions causing secondary concentration of the sulphides of iron and copper in rich lenses. The country rocks of the district are black argillitic schists, the schistosity of which is not so well marked as in those found near the mica schist belt on the Bonanza property. The granite underlies the schists on the Hidden Creek property at considerable depth, and the nearest surface exposures are three miles distant from Red Mountain, at Hastings Arm. Red Mountain marks the position of a great fracture zone, the brecciated rocks of which have been subjected to intense alteration by mineral waters ascending from great depths. The ore mass has been traced for 900 ft. along the crests and bluffs of the mountain. The ore is pyrrhotite and chalcopyrite, associated with a quartz gangue. Valuing the entire mass, the ore is very low grade, but in the vicinity of the dykes the lenses are fairly rich, assaying 6 per cent. of copper on the average. As the amount of development work is very small (100 ft. of tunnel work), it is impossible to say how far these enrichments extend into the mountain, but the indications are such as to warrant further development. The southwest side of the mountain slopes steeply to the valley below; near the top the ore is exposed, but the lower 400 ft. are covered with detritus. The mountain drains into a small swampy lake which lies to the immediate south. The mud of the lake is rich ferric hydroxide, which has been formed by the weathering of the great mass above. The silicification of the rock of Red Mountain, however, has been the means of the escape of the mass from the effects of the general erosion of the district, which has proved a useful agent to man by carrying away the surrounding country rock, leaving the great ore core uncovered ready for mining, when means shall have been discovered for handling it at a profit.

An official statement of the Selby Smelting Works shows that a recent shipment of 47 tons of ore from the Hayes-Monette lease on the Mohawk mine at Goldfield, Nevada, netted the shippers more than \$574,000. The ore was therefore worth more than \$6 per lb.

COAL MINING ON VANCOUVER ISLAND.

Information Relating to Nanaimo and Ladysmith Coal Fields.

VANCOUVER ISLAND COAL has always held, on its merits, first place among the coals produced on the Pacific Coast of America. It is not often, though that men fully qualified to speak on the subject, can be induced to give for publication information concerning the coal fields of the Island and their productive coal measures. When interviewed lately by a representative of the *Nanaimo Herald*, Mr. Frank D. Little, general manager of the Wellington Colliery Company, owning the coal mines on Vancouver Island known as the Dunsmuir mines, according to that newspaper stated that the coal measures tributary to Nanaimo and Ladysmith were very extensive. Just how great they were no one could say, but many years would elapse with active mining before the measures now explored and positively known to be reserves could be exhausted, with other large and promising sections yet to be opened up. People are apt, said Mr. Little, to get erroneous impressions about the working out of mines. He instanced Nanaimo in 1864 when it was the common talk even among old miners, that with the working out of the Douglas seam, then exposed, all coal mining would be at an end at Nanaimo, which would be in not to exceed 18 months. It is a long while since then, said Mr. Little, and a great deal of coal has been taken out of the Nanaimo mines, but they still lack many decades of being worked out, and what exploration at greater depth will yet show no one can tell.

Regarding Extension mine and others tributary to Ladysmith, he stated that the Wellington Colliery Company expected within from six to twelve months to be shipping from the mines now being opened up on the "short line." About a mile of track would have to be put down and hoisting works erected, as all coal mined at that point would be hoisted instead of being run out by a tunnel. The grade of coal is similar in the mines to that from Extension, and the quantity practically in sight large.

Mr. Little also spoke favourably of conditions at Cedar and thought operations should result in opening up new fields there, or rather a combination of Nanaimo and Extension fields. At Englishman's River the indications are good, but not enough is yet learned regarding the underlying beds of coal to judge of values there. The extensive coal measures of this section were, Mr. Little stated, pushed up from a great depth, probably at the time Mount Benson upraised its head. Gabriola Island at one time was very likely overlying the spot where Nanaimo now is, but was crowded down, either by glacial or volcanic action. For many millions of years, erosion of the surface of this portion of the Island has been slowly going on, until the coal measures, upraised as they were, and with perhaps thousands of feet of the surface ground down and

washed into the sea, the coal was left near enough to the surface to be worked.

One thing relative to coal trade conditions is most gratifying, viz., fuel oil has passed its limit. It is now selling at \$1 per barrel instead of 30 cents. The Southern Pacific lately gave a single order for \$1,000,000 worth of coal for its Texas business. The Treadwell Gold Mining Company has not installed oil burners as announced it intended doing, and probably never will. Many steamers are discarding oil tanks, and outside of some small craft, little more will be heard of steamships using oil for fuel.

Mr. Little was asked if there would be any reduction in the present wage scale in his company's mines, or if the 10 per cent. put on in January would be considered a permanent advance. He unhesitatingly stated that from the present outlook the coal trade would continue good for years, perhaps for many years. If so, there would be no reduction in the wages paid by the Wellington Colliery Company.

GOVERNMENT ASSISTANCE TO MINERS AND PROSPECTORS.

IN AUSTRALIA much more is done to assist miners and prospectors in the development of mining properties than in Canada. In New Zealand too, beside operating state coal mines, the government contributes freely to the cost of establishing, equipping and maintaining schools of mines, of which there are at least eight in that colony, in which connection the government had paid during 21 years to March 31, 1906, £43,746 (\$218,730), or an average of about \$10,000 a year during the whole period mentioned.

The following information relative to government aid to mining is from a report of D. H. Ross, commercial agent for Canada at Melbourne, Victoria, Australia, dated November 26, 1906:

The state of Victoria has for years been granting financial assistance to miners and prospecting parties. Under the "Victoria Mining Development Act," loans of any sum up to £10,000 (\$50,000) are made to registered companies, and loans up to £250 (\$1,250) to co-operative parties of miners—the party to consist of not less than two working miners. On application of a mining company being duly reported upon and approved, a mortgage and bill of sale are taken over the company's lease, machinery and plant in order to secure the government in the event of non-payment of the loan. In the case of prospecting parties, an agreement is required that the advance given will be repaid before dividing any profits accruing from the work done by the party in connection with the advance, but no security is asked or given, and in a very few cases has the money been repaid.

The procedure adopted by the state of Victoria in making monetary advances to prospectors and mining parties is usually upon the £1 for £1 basis. The instalments are made to the party or company as the work proceeds, and after the government inspector has satisfied himself that the work has been done, the

government then contributes half the cost and the party or company defrays the other half. Copies of the "Victoria Mining Development Act" under which the loans are made, together with the necessary forms required in connection with same, have been forwarded to the superintendent of commercial agencies, Ottawa, from whom further details are obtainable by those interested.

During the past three years, apart from the ordinary expenditure of the mines department, £43,000 has been voted out of surplus revenue by the Victorian government for aiding mining development by advances to mining companies and co-operative parties, boring for coal and gold, constructing new batteries (stamp mills), providing new and improved drills, and cutting and clearing prospectors' tracks (trails) in mountainous districts. A sum of £37,230 was voted from ordinary revenue for boring and batteries. Nineteen boring plants are at work in various parts of the state. In thirteen of these, foremen paid by the state are in charge. The net cost of working, as far as the department is concerned, after allowing for the crushing fees, amounts to £5,555. The remaining six batteries, which are managed by local committees, have been provided within the last 18 months, and are powerful 5-head plants of the most up-to-date pattern. Wilfley tables and Berdan pans being provided where necessary, the total capital cost of this new mining plant being £14,918.

The revenue of the Ontario bureau of mines during 1906 reached a total of \$250,090. In 1905 the total receipts were only \$61,560.

The statement was made lately in the Dominion House of Commons, by the minister in charge of the estimates, when the item "Ottawa—Royal Mint, \$55,000," was under consideration, that it will probably take another year to finish the building and install the apparatus; also that the supposed minting operations will be begun immediately after the plant shall have been installed. The estimated total cost of the mint, including site, was given as \$373,000.

According to a North Queensland (Australia) paper, one of the most interesting sights of Lightning Ridge opal field is a miner with one leg, the other having been amputated above the knee. This remarkable man, who is known locally by the misnomer of "Peggy," and who is fully 60 years of age, is working alone, and has bottomed a shaft no less than 40 ft. deep. It can be imagined what phenomenal strength and dogged determination are necessary to accomplish such a task under such circumstances single-handed. The descent and ascent are made by means of a rope securely fastened at the top, and down the miner goes hand over hand. He first lowers two coal oil cans into the shaft, then follows them down, and when they are filled with mullock he ascends, and draws the tins to the surface by means of a windlass. He continues this tedious process from early morn until dewy eve, his methods being dexterous and most ingenious.

COMPANY CABLES AND NOTES.

British Columbia.

Le Roi.—February: Shipments amount to 10,195 tons, containing 2,530 oz. gold, 4,500 oz. silver and 181,600 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, \$10,000. Expenditure on development work during the month, \$17,500.

Le Roi No. 2.—February: Josie mine report: Shipped 1,540 tons. The net receipts are \$20,203 (£6,020), being payment for 1,321 tons shipped, and \$2,940 (£605), being payment for 110 tons concentrates shipped—in all \$32,143 (£6,625). Vancouver mine report: Shipped 22 tons. The net receipts are \$1,847 (£380), being payment for 22 tons shipped.

Slough Creek.—Expect complete erection of new machinery, and have it running by March 22.

Tyce.—Smelter ran 12 days, and smelted—Tyce ore, 1,195 tons; custom ore, 1,073 tons; total, 2,268 tons. Matte produced from same, 135 tons; gross value of contents (copper, silver, and gold) after deducting costs of refining and purchase of custom ore, \$16,738.

Ymir.—The secretary writes: Cables have been received from British Columbia stating that all the company's liabilities have been discharged; that the large compressor is being moved, and that mining in the tenth level and the raise was to be resumed in a week in March. It will be remembered that Mr. Gilman Brown strongly recommended that the large compressor be removed to a lower level in order that the water power might be utilized, thereby effecting a large saving in fuel.

U. S. A.

Alaska Mexican.—February: 120-stamp mill ran 7½ days; crushed 5,822 tons ore; estimated realizable value of bullion, \$12,680. Saved 110 tons sulphurets; estimated realizable value \$8,547. Working expenses, \$21,796.

Alaska Tradeswell.—February: 240-stamp mill ran 9½ days; crushed 11,956 tons ore; estimated realizable value of bullion, \$19,800. Saved 240 tons sulphurets; estimated realizable value, \$16,466. Working expenses, \$45,296. Short run caused by coal shortage.

Alaska United.—February: Ready Bullion claim: 120 stamp mill ran 7½ days; crushed 5,380 tons ore; estimated realizable value of bullion, \$6,450. Saved 100 tons sulphurets; estimated realizable value, \$3,440. Working expenses, \$17,433.

DIVIDENDS.

On March 5 the directors of the Garby Consolidated Mining, Smelting and Power Company, Ltd., declared a regular quarterly dividend of two per cent. and an extra dividend of one per cent. upon the par value of the stock outstanding, payable on March 30 to all stockholders of record on March 15.

Notice has been given that the International Coal and Coke Company, Ltd., will, on May 1, 1907, pay a dividend of one per cent. on its issued and outstanding stock.

NOTES.

Notice has been gazetted of the appointment of James R. Hunnex, merchant and postmaster, of Eric, B. C., as attorney for the Gordon Mining and Milling Company, Ltd., in the place of Joseph Harrison.

A special meeting of the British Empire Gold Mines was called by D. R. Young to be held at his office Vernon, on March 9, "to arrange important business in connection with immediate incorporation." It does not appear that there are funds available for continuing mining operations. Mr. Young has gone into the real estate business in Victoria.

The mining and placer lease, the gold dredge, and all machinery, tools, plant, etc., of the Iowa Lillooet Gold Mining Company, Ltd. (in liquidation), are to be offered for sale by auction in Vancouver on May 10, prox.

The marble quarries at Nootka Sound, West coast of Vancouver Island, are to be opened at once by the Nootka

Marble Quarries, Ltd. The initial shipment of marble will be made to the United States. Arrangements were made to send up men with the necessary winches, derricks, etc., before the end of March, to commence to open up the quarries.

At the recently-held annual meeting of the Gold Reef Mining and Milling Company of Rossland, the following officers were elected for the ensuing year: President, E. Adams; vice-president, H. P. Renwick; secretary, W. H. Danby.

The Canadian Marble and Granite Company, which was recently incorporated for \$50,000, is about to commence operations upon its granite quarry at Granite siding and its marble quarry along the line of the Canadian Pacific Railway, between Lardo and Gerrard, says the *Nelson Daily News*. The directors of the company are William Shackleton, H. Simpson, Charles May (ex-mayor of Edmonton), and James Carruthers. A lot of machinery has been ordered and will arrive, it is hoped, almost immediately. The output from both quarries will be shipped chiefly to the new provinces for building uses, and it is the intention of the company to cut marble for ornamental purposes. When in full operation a large number of men will be employed by the company.

CERTIFICATES OF INCORPORATION.

- Hidden Creek Mining Company, Ltd.*, with a capital of \$300,000, divided into 300,000 shares of \$1 each.
- Bowen Island Copper Company, Ltd.*, with a capital of \$1,000,000, divided into 1,000,000 shares of \$1 each. Objects include the acquirement and working of mineral claims on Bowen Island, New Westminster district, B. C., and elsewhere.
- Ten Associates Company, Ltd.*, with a capital of \$100,000, divided into 100 shares of \$1,000 each. Objects include the acquirement of mineral claims, petroleum and coal-bearing lands, etc.
- Pacific Coal Company, Ltd.*, with a capital of \$10,000, divided into 10,000 shares of \$1 each.
- Perfection Pressed Stone Company, Ltd.*, with a capital of \$20,000, divided into 200 shares of \$100 each. Objects the manufacture of and dealing in building materials.
- British American Oil Refineries, Ltd.*, with a capital of \$500,000, divided into 100,000 shares of \$5 each. Objects include the acquirement of petroleum or oil-bearing lands and the searching for and winning petroleum and other oils and products thereof.

REGISTRATION OF EXTRA-PROVINCIAL COMPANIES.

- British Columbia Amalgamated Coal Company*.—Head office at Portland, Oregon, U. S. A. Capital, \$10,000,000, divided into 10,000,000 shares of \$1 each. Head office in British Columbia at Victoria. Attorney (not empowered to issue and transfer stock), Albert Leonard McPhillips, K. C., barrister, Victoria.
- Magnesia-Asbestos Supply Company of Washington*.—Head office at Seattle, Washington, U. S. A. Capital, \$30,000, divided into 600 shares of \$50 each. Head office in British Columbia at Vancouver. Attorney, David Gordon Marshall, barrister, Vancouver.
- Frasier River Copper Mining Company*.—Head office at Camden, New Jersey, U. S. A. Capital, \$1,200,000, divided into 1,200,000 shares of \$1 each. Head office in British Columbia at Kamloops. Attorney (not empowered to issue and transfer stock), Scott H. Richmond, manager of said company, Kamloops.
- Fremont Mining Company*.—Head office at Spokane, Washington, U. S. A. Capital, \$375,000, divided into 1,500,000 shares of 25 cents each. Head office in British Columbia, at Grand Forks, Boundary district. Attorney, Charles M. Kingston, physician.

Vancouver Portland Cement Company, Ltd.—Head office at Toronto, Ontario. Capital, \$1,500,000, divided into 15,000 shares of \$100 each. Head office in British Columbia at Victoria. Attorney, Harry A. Ross, accountant, Victoria.

Krao Silver-Lead Mining Company, Ltd.—Head office at Phoenix, Arizona, U. S. A. Capital, \$3,000,000, divided into 600,000 shares of \$5 each. Head office in British Columbia at Kaslo. Attorney, W. E. Zwicky, mining engineer, Kaslo.

Inland Empire Mining and Milling Company, Ltd.—Head office at Walla Walla, Washington, U. S. A. Capital, \$1,000,000, divided into 10,000 shares of \$100 each. Head office in British Columbia at Paulson, Trail Creek mining division. Attorney, Samuel F. Griswold, miner, Paulson.

TRADE NOTES AND CATALOGUES.

A catalogue descriptive of the Deister concentrator has been received from the Canadian agent for this machine.

The annual report of the Canadian General Electric Company of Toronto, Ontario, showed net earnings for the year 1906 of \$853,673.16, or about 18 per cent. on the capital cost.

The Wellman-Seaver-Morgan Company's Circular No. CA-3, "Mine Cages, Skips and Ore Cars, etc." is a well-printed and freely illustrated catalogue of some of the manufactures of the company named.

The annual report of the Canadian Westinghouse Company, Ltd., of Hamilton, Ontario, for the year 1906, showed net earnings of \$346,961, an increase of \$126,416 as compared with the previous year.

The Canadian Rand Drill Company, Ltd., of Montreal, Quebec, has published an interesting little booklet on "Compressed Air Appliances," containing useful information concerning hoists, trolleys, and other pneumatic lifting and conveying appliances, together with illustrations; also short notes on Rand air compressors and "Little Giant" drills. Full information and quotations are obtainable from either the company's head office, in Montreal, or its various branch offices, those in British Columbia being at Vancouver and Rossland, respectively.

The Canadian General Electric Company, Ltd., is about to erect in Toronto, a 5-story, steel-frame head office building, to cost about \$400,000. The building will have a frontage of 65 ft. and a depth of 185 ft. Work on the excavations has been commenced.

The increasing trade of the Canadian Westinghouse Company, Ltd., necessitates further additions to its already large establishment at Hamilton, Ontario. Foundations are being put in for a 3-story addition to the office building, and preparations are being made for adding another story to the air-brake plant building. These enlargements are estimated to cost about \$80,000.

Mussens, Limited, has issued its Catalogue No. 11, Metallurgical Machinery. This covers, in a general way, the latest designs in machinery and appliances for the treatment of ores, including sampling plants, concentrators, and concentrating tables, copper and lead furnaces, copper converters, stamp and other mills, cyanide plants, dredges and gold-saving tables, and much other plant and machinery. Full descriptions, specifications and prices, also illustrated special pamphlets on individual machines, will be supplied on request.

The construction and method of operation Davis Calyx diamondless core drill are described in the Canadian Rand Company, Ltd.'s catalogue K-53. It is claimed for this drill than in connection with the 100 chief factors involved in core drilling, viz., reliable record and reasonable cost, it does better than any similar device. The accompanying condensed specifications give brief particulars of plants driven by steam, gasoline, horse or hand power, while separate articles go into detail in regard to the several methods of operation.

"Conveying and Transmission" is the title of a periodical devoted to methods for the mechanical handling of materials and transmission of power, published by Stephens-Adamson Manufacturing Company, of Aurora, Illinois, the Canadian representatives of whom are Mussels Limited of Montreal.

Two leaflets received lately are on "Ironing by Electricity" and "Standard Fire Escapes," respectively. The former makes it clear that the electric flat iron, for sale by the Canadian General Electric Company, Ltd., of Toronto, wherever introduced has been found indispensable by reason of its convenience and efficiency. The latter shows types of standard fire escapes made by the Canada Foundry Company, Ltd., of Toronto, Ontario.

Fried Krupp Aktiengesellschaft Grusonwerk, of Magdeburg-Buckau, Germany, have added to their big manufacturing establishment a separate metallurgical department chiefly for the manufacture of furnaces, machines and apparatus, as well as complete installations for the recovery of metals from ores, either by metallurgical or electro-metallurgical processes, partly according to special systems. The new department will also undertake the working out of plants for metallurgical treatment of lead and zinc dust, waste products, and for the concentration of refractory ores. These old-established manufacturers invite enquiries from all requiring installations for the treatment of ores or machinery (presses and rolling mills) for the mechanical treatment of metals.

The latest publication of the Jeffrey Manufacturing Company of Columbus, Ohio, U. S. A., is its No. 57-B, an illustrated supplement of Jeffrey conveying machinery for saw mills, lumber mills, and wood-working industries. This catalogue contains 72 pages, freely illustrated by half-tone reproductions of photographs of Jeffrey machinery in operation, and demonstrating the numberless industries for which elevating and conveying machinery is adapted.

From Peacock Brothers of Montreal, Quebec, has been received a comprehensive catalogue (pp. 287) of the steel and iron castings of every description, either machined or un-machined, of Hadfield's Steel Foundry Company, Ltd., of Sheffield, England, the sole agents for Canada, for which well and widely known firm are Peacock Brothers. This catalogue has been issued at the suggestion of the Canadian agents for Hadfield's, who have the largest steel foundry in the world and have unequalled facilities for the manufacture of their gyratory crushers, manganese steel castings, wheels and axles, tool steel, picks and shovels, etc., for the mining industry. Mining engineers and mine managers can obtain this valuable catalogue gratis on application to the sole Canadian representatives of Hadfield's Co., Messrs. Peacock Brothers, Canada Life Building, Montreal.

MACHINERY AND CONSTRUCTION NOTES.

A Jeffrey Manufacturing Company's electric locomotive has been ordered for the Snowshoe mine at Phoenix, Boundary district. It will be used for hauling purposes on the tunnel level.

The high-pressure ball of a Canadian Rand Drill Company's compound duplex Corliss-valve 15-drill air compressor has been installed at the mill at Camborne of the Eva Gold Mines, Ltd., of Nelson. This engine is direct-connected to a water wheel of 13 ft. 2 in. diameter. The compressed air for operating machine drills will be conveyed up the mountain part of the way through the air pipe-line of the adjoining Oyster-Criterion mine and thence to the Eva mine by a branch line.

The installation of the 1,150-h.p. hoist at the Consolidated Mining and Smelting Company of Canada's Centre Star mine, Rossland, is being proceeded with. The cylinders of this engine are 28 by 60 in., drums 40 ft. diameter by 5 ft. face, capacity 1,350 tons in 10 hours, using 4 1/2-ton skips.

At the West Kootenay Power and Light Company's new hydro-electric generating station at upper Bonnington Falls, Kootenay River, near Nelson, one 8,000-h.p. unit is in operation and a second available whenever power beyond the capacity of the first one shall be needed. The voltage transmitted to the Boundary has been up to 40,000 volts since starting the new plant. The 80-mile transmission line has been constructed and equipped for 60,000 volts whenever this high voltage shall be required, but as yet there have been difficulties in the way of Boundary mines and smelters being operated to full capacity, so the demand for power has not thus far been nearly so high as it will be when all obstacles to a largely increased ore output and reduction shall have been overcome.

BOOKS, ETC., RECEIVED.

American Institute of Mining Engineers.—Bi-Monthly Bulletin, No. 14, March, 1907.

Ells, R. W., LL.D.—"Notes on the Mineral Fuel Supply of Canada." By R. W. Ells, LL.D. From the "Transactions of the Royal Society of Canada," second series—1906-1907. Vol. XII., Sec. IV.

Missouri Bureau of Geology and Mines.—Biennial Report of the State Geologist, Ernest Robertson Buckley, Ph.D.

New Zealand Geological Survey.—Bulletin No. 2 (new series), "The Geology of the Area Covered by the Alexandra Sheet, Central Otago Division." By James Park, Director of the Otago School of Mines. Pages 49. Illustrated by maps and half-tone surface views and reproductions of photographs of sections of rocks.

Ontario Department of Lands, Forests and Mines.—"Report of the Bureau of Mines, 1906." Vol. XV, Part 1. By Thos. W. Gibson, Director. Pages, 206; illustrated by about 60 half-tone views and two geologically-coloured maps of iron regions. This part of the "Fifteenth Annual Report" passes in statistical review the mining industries of Ontario for the year 1905, gives the reports of the instructors of Summer Mining Classes and of the Inspector of Mines upon the mining properties actually under operation, and presents articles upon "Natural Gas and Petroleum," "Exploration in Mattagami Valley," "Agricultural Resources of Mattagami," "The Animikie Iron Range," and "The Iron Ranges of Eastern Michipicoten."

Royal Colonial Institute, London, England.—Journal of the Institute. Vol. XXXVIII, Part IV, March, 1907.

Smithsonian Institution, Washington, D. C., U. S. A.—"Annual Report of the Smithsonian Institution, 1905." The official part of this report, which is for the year ended June 30, 1905, contains the customary reports of the proceedings of the board of regents, executive committee (with financial statement), and secretary. The appendix, which is by far the larger part of the volume, comprises a selection of miscellaneous memoirs of interest to collaborators and correspondents of the institution, teachers, and others engaged in the promotion of knowledge. These memoirs relate chiefly to the calendar year 1905.

COAL MINING NOTES.

The Nanaimo Herald states that "out in the Cedar district the bore hole is down 1,280 ft. The formation is good and several seams of coal from one inch to two and a half in thickness have been encountered. It is evident, say coal miners, that a regular seam of coal is not far below the drill hole now."

At Frank, Alberta, the cross-cut being driven by the Canadian-American Coal and Coke Company to open its west seam is in about 100 ft., and Manager Moore expects to cut the coal any day now. Plans are being laid to drive

both ways, when the seam shall be encountered, with a view to getting as large an output as practicable in a short time. The company also intends putting down a slope from the main entry and work will be started on this as soon as the necessary equipment can be installed.

Referring to the cement company in which John L. Howard, president of the Western Fuel Company, is interested at Bellingham, a special dispatch to the *Vancouver World*, after stating what arrangements are being made for transportation, continues: "The company also contemplates the extensive development of the Whatcom coal fields, recently acquired by it. This coal is a steam fuel of fair quality, can be mined and marketed cheaply, and it is likely it will be placed on the market in competition with the cheaper coals of the upper Sound. In this case Vancouver will also secure other steam coal than that now afforded by the mines of Vancouver Island."

The March number of the Dominion of Canada *Labour Gazette*, in its correspondence from Nanaimo, Vancouver Island, has the following note: "A number of miners have come to the Western Fuel Company's mines from the county of Cumberland, England. This has helped the company considerably, but in the district there is still a shortage of men."

The *Enderby Progress* is authority for the statement that "the results of the tunneling operations now in progress on the holding of the Enderby Coal Mines, Ltd., to date, have proved very encouraging. As the tunnel is driven further into the seam the quality of the coal improves, the deposit at the same time seeming to widen out. Already the tunnel is about 100 ft. long, and thus far it has been proved that, as depth is attained, the deposit develops into a fine quality coal, of first class steaming properties, and also that the field is an extensive one."

J. L. Stamford, formerly president of the Northwest Coal Company, having extensive holdings on the North Fork and whose interests have been transferred to F. H. Clergue of The Soo, lately spent several days in Frank, Southwest Alberta. He has been credited in district newspapers with the statement that "a syndicate in which he is interested has acquired another large tract of coal land on the North Fork, or the Livingston River and that he was there to arrange for the beginning of work to be carried on this season." He outfitted a few men and sent them out to begin preparations. He will follow as soon as the weather permits.

The Taber coal mine has been shut down under what the reports from Taber characterize as a lockout. The men had a contract with the company extending to November 1 and providing that the eight-hour day shall go into effect April 1. It is said the company locked the men out because they refused to continue working 10 hours. The matter may be investigated by the Government under the new law.

B. C. GAZETTE NOTICES.

Constable Owen F. Conley of Discovery, Atlin district, to be a deputy mining recorder for the Atlin Lake mining division, with sub-recording office at Discovery, in place of William H. Vickers.

William James Parham of Sandon, to be a deputy mining recorder for the Slocan mining division, with sub-recording office at Sandon, in place of E. M. Sandilands, resigned.

Hugh A. Butler of Wynnton, Atlin district, to be a deputy mining recorder for the Atlin Lake mining division, with sub-recording office at Wynnton, in place of Geoffrey Butler.

Harry Wright of Nelson, to be gold commissioner for the Nelson and Arrow Lake mining divisions, from March 25, 1907, in place of Robert A. Renwick, resigned.

Robert A. Renwick, deputy commissioner of lands and works, to be a gold commissioner for the province, from March 25, 1907.

MINING MEN AND AFFAIRS.

J. Laing Stocks has returned to Nelson after having been visiting in Great Britain, chiefly in Scotland, for about three months.

J. J. Campbell of Nelson, general manager for the Hall Mining and Smelting Company, was in Victoria on business about the close of March.

G. O. Buchanan of Kaslo, Dominion Government inspector under the Lead Bounty Act, has been spending some time in Victoria on personal business.

Otto Brenner, well known in connection with gold dredging in the Territory, has returned to the Yukon for the ensuing season's mining operations.

O. B. Smith, Jun., superintendent of the Granby M. & S. Company's mines at Phoenix, Boundary district, recently made a trip to the Coeur d'Alenes, Idaho.

James Cronin, who has been visiting his mother in Ireland, was expected to reach New York about March 20 on his return journey to British Columbia.

The "Placer Deposits of Alaska" was the subject of an address by Emil Weinheim before the Senior Mining Society, Columbia University, New York, U. S. A.

James McGregor, inspector of mines for West Kootenay and Boundary districts, made an inspection of a number of mines in the Boundary during the first half of March.

A. H. Gracey of Nelson, manager of the Eva Gold Mines, Ltd., is expected to shortly return from the East, whence he has been on a trip extending over several weeks.

R. C. Miller, assistant gold commissioner for the Whitehorse mining division, Yukon Territory, is having a three months' vacation. He will spend the greater part of his holiday time in eastern Canada.

Virgil H. Hewes, C. E., of New York City, recently proceeded to the Pacific Coal Company's colliery at Bankhead, Alberta, Canada, in connection with the installation there of a fine-coal briquetting plant.

W. Kirkwood, local manager for the syndicate it is understood intend placing a dredge or dredges on the Fraser River for gold-dredging purposes, now makes Clinton his headquarters instead of Lillooet.

T. F. Sutherland has gone north to superintend the carrying out of some development work the Tel-Kwa Mines, Ltd. purposes having done on its mineral claims in the Telkwa mineral belt, Skeena mining division.

James Finlay, lately reappointed superintendent of the Sullivan Group Company's lead-silver mine in East Kootenay, is actively pushing further development on the property, which is situated near Marysville.

L. E. Gooding has resigned from the position of chief chemist and assayer at the Britannia Smelting Company's works at Crofton, Vancouver Island, to go into the saw-milling business in which he is now a part proprietor.

T. R. Drummond, general manager of the Dominion Copper Company's properties in the Boundary district of British Columbia, has gone to Cobalt, New Ontario, where he will be assistant general manager of the Nipissing mines.

H. H. Claudet, of Claudet & Wynne, assayers and mining engineers of Rossland and Princeton, B. C., after having been in Sonora, Mexico, in connection with installations of the Elmore vacuum oil process plant, is in Mexico City on similar business.

H. H. Jones, manager of the Slocan-Cariboo Mining and Development Company, operating on Canadian Creek, has returned to Cariboo for the purpose of commencing the season's placer gold mining work immediately local conditions shall be favourable for doing so.

Smith Curtis of Rossland, for years actively interested in the development of the Oro Denoro mine, Boundary district, now owned by the British Columbia Copper Company, has arranged to proceed to Boston in connection with the sale of another mining property.

Eugene Coste of Toronto, Ontario, immediately after the return from Cobalt, New Ontario, of the Canadian Mining Institute party, of which he was a prominent member, went west, to resume the supervision of oil-boring operations in Saskatchewan and Alberta.

J. C. Gwillim, of the School of Mines, Kingston, Ontario, who for years was associated with mining in British Columbia and Alberta, will during the summer vacation be engaged in mining engineering work for the Consolidated Mining and Smelting Company of Canada, either in the West or in Ontario.

Frank N. Anderson, formerly of New Mexico, died last month at Golden, B. C., where he had been engaged in the capacity of mining engineer to the Laborers Co-operative Gold, Silver and Copper Mining Company, Ltd., of Chicago, Illinois. The body was taken to New Mexico for burial near the old home of the deceased.

A. Chester Beatty of Denver, Colorado, U. S. A., assistant general manager and consulting engineer for the Guggenheim Exploration Company, who last year visited the mining properties in Cariboo, Atlin and the Yukon acquired by the Guggenheim interests, has gone to Congo Free State, Africa. He is expected to be absent from America several months.

S. S. Griswold, superintendent of the Inland Empire Mining and Milling Company, working mining property in the Grenville Mountain section, between Rosslund and the Boundary, has been quoted as having stated that the company is in a good financial position and will shortly install a hoisting engine and do more development work.

Bruce R. Warden, one of the Canadian Pacific Railway Company's mining engineers for some time past engaged at that company's colliery at Bankhead, western Alberta, has been retained by the Nicola Coal and Coke Company to superintend the installation of machinery and plant at its Middlesboro' colliery, Coutlee, Nicola district of British Columbia.

Robert R. Hedley, late manager of the Hall Mining and Smelting Company's smelting works at Nelson, is accompanying Mrs. Hedley and children to Portland, Maine, going with them thus far on their journey to England. Prior to leaving Nelson both Mr. and Mrs. Hedley were the recipients of valedictory gifts made by a number of the old employees at the smelter.

Hon. Richard McBride, minister of mines, in his capacity of premier of British Columbia is proceeding to England for the purpose of making such representations in the proper official quarter as the Provincial Government deem necessary in connection with the question known as "better terms" from the Dominion of Canada in its financial relations with this Province.

Henry White, well known in the Boundary district as a pioneer, having for years had mining interests, both in the Old Ironsides and Knob Hill, two of the chief claims in the group now being operated on a large producing scale by the Granby Company, and in White's camp nearer the International Boundary line, is stated to be developing a copper property in the Inyo Mountains, California.

Henry Harris, who recently resigned as superintendent of the Hall Mining and Smelting Company's smelter at Nelson, British Columbia, has gone to Hadley, Prince of Wales Island, southeast Alaska, where he will be superintendent of the smelting works of the Alaska Smelting and Refining Company, of which Thos. Kiddie recently assumed the management in succession to Paul Johnson.

John Knox, Jun., formerly superintendent of the Eva group, near Camborne, Lardeau, is reported to have been appointed superintendent of the underground workings of the Calumet and Hecla group of copper mines, Houghton county, Michigan, U. S. A. These mines are described in Stevens' "Copper Handbook" as "the greatest copper producers of the world, and the most profitable mines of any metal."

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An Ottawa press dispatch states that Dr. Reginald A. Daly, geologist for the Canada International Boundary Commission, has accepted the professorship of physical geology of the Massachusetts Institute of Technology. As the position involved is one of the highest in that branch of learning in the United States it is an evidence of the appreciation felt for the ability of Dr. Daly. He will leave Ottawa in a few months' time, and commence his new duties on October 1. Dr. Daly came to Ottawa in 1901 to accept the position which he has held up to the present. Previous to that time he occupied a chair at Harvard University. At the Massachusetts he will take the place of Prof. W. O. Crosby, who retired on a pension from the Carnegie foundation. Professor Daly was born in Canada in 1871.

Beside the mining men principally concerned in the case—J. M. Harris of the plaintiff and Byron N. White of the defendant company—the following mining engineers have been subpoenaed to give expert evidence in the Star vs. White matter, which extra-lateral rights cause has been before the courts of British Columbia for six years: For the plaintiff, Frank L. Sizer of Helena, Montana, and S. S. Fowler of Nelson, B. C.; for the defendant, Max Boehmer of Denver, Colorado, and W. J. Elmendorf of Spokane, Washington. W. E. Zwicky of Kaslo, B. C., manager of the Rambler-Cariboo Mines, Ltd., who was appointed by the Supreme Court several months ago to do certain work to determine the facts in connection with the occurrence of what in this connection is known as the "black fissure," has also been notified to attend the Full Court sittings and report the results of that work.

An engine driver at the New Koh-i-noor mine in the State of Victoria, Australia, has invented an alarm to indicate to the driver cases of over-winding. The apparatus is simple in construction, and its cost is moderate, £5 10s. (about \$27) being sufficient to completely install it. The "traveller" on the indicator board, by coming into contact with a lever on the danger signal, completes an electric current, and causes a bell to ring. The alarm is on the brace, and sounds if the driver overwinds even 6 in.



EXAMINATION FOR ASSAYERS FOR LICENCE TO PRACTISE IN BRITISH COLUMBIA.

AN EXAMINATION for Assayers will be held in Victoria on the 27th May and following days.

Entrance for any examination must be made in writing to the Secretary of the Board of Examiners, at least ten days before the date set for beginning of examination, and must be accompanied by the prescribed fee (\$15).

Any additional information desired may be obtained from Herbert Carmichael, Secretary, Board of Examiners, Victoria.

RICHARD McBRIDE,
Minister of Mines,
Department of Mines,
Victoria, B. C., 15th April, 1907.

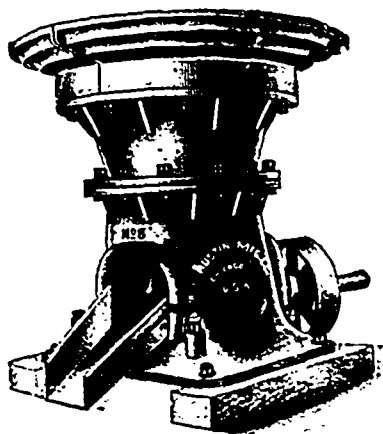
The Calumet & Hecla Mining Co. of Houghton, Michigan, U.S.A., which employs about 7,000 men, will by April next have paid in dividends \$100,000,000 or \$1,000 per share on its 100,000 shares. The amount of cash paid in on capital stock account was only \$1,200,000.

One of the largest single shipments of zinc ore from the Joplin district, Mo., was made recently. It consisted of 21 cars, containing in all 672 tons. It was sold on a basis price of \$45.50 per ton of ore assaying 60 per cent. Actual assays of carload samples ranged from 61 to 63.7 per cent.

The production of aluminium in the United States has increased more than tenfold in as many years, says *The Board of Trade Journal*. Two reasons explain this phenomenal growth—economic production, which has initiated lower prices, and increased consumption, especially in the electrical industry.

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HERBERT B. BROWN,
Hedley, Similkameen, B. C.



SYNOPSIS OF CANADIAN HOMESTEAD REGULATIONS.

Any available Dominion Lands within the Railway Belt in British Columbia, may be homesteaded by any person who is the sole head of a family, or any male over 18 years of age, to the extent of one-quarter section of 160 acres, more or less.

Entry must be made personally at the local land office for the district in which the land is situate.

The homesteader is required to perform the conditions connected therewith under one of the following plans.

(1) At least six months' residence upon and cultivation of the land in each year for three years.

(2) If the father (or mother, if the father is deceased), of the homesteader resides upon a farm in the vicinity of the land entered for, the requirements as to residence may be satisfied by such person residing with the father or mother.

(3) If the settler has his permanent residence upon farming land owned by him in the vicinity of his homestead, the requirements as to residence may be satisfied by residence upon the said land.

Six months' notice in writing should be given to the Commissioner of Dominion Lands at Ottawa of intention to apply for patent.

Coal lands may be purchased at \$10 per acre for soft coal and \$20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2000 lbs. shall be collected on the gross output.

W. W. CORY,

Deputy of the Minister of the Interior.

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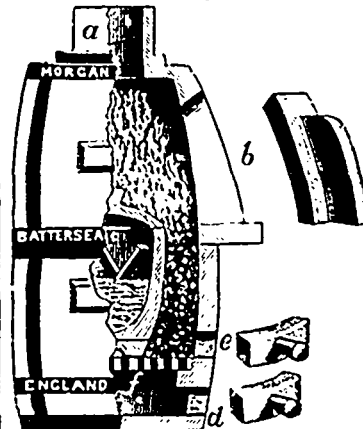
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