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NOTES AND COMMENTS.

British Columbia produced about 36,000 oz. less of gold in 1907 than in 1906.

In 1906 British Columbia produced 2,990,000 oz. of silver, and in 1907, 2,784,000 oz.

British Columbia's production of copper in 1907 was about 41,690,000 lb. In 1906 it was 42,990,000 lb.

It is reported that placer mining for gold is being successfully carried on at Hall Creek, in the Duncan section of Ainsworth mining division.

The copper output of Butte, Montana, for the year 1907 is estimated to have been 240,887,516 lb., as compared with 342,688,809 lb. in 1906, a decrease of 101,801,293 lb.

The *Kootenaiian* says "the recent change in smelting rates, while being more advantageous to ore shippers, still includes the 90-day final settlement clause."

From the *Kaslo Kootenaiian* it is learned that the more men are being employed at the Blue Bell concentrator so as to get it completed and in working order as soon as practicable.

The Centre Star group of mines at Rossland, owned by the Consolidated Mining and Smelting Company of Canada, Limited, shipped to Trail during the latter half of 1907, 87,451 tons of ore.

Mr. C. F. Lindmark, mayor of Revelstoke, is reported to have said in Vancouver recently: "Mining, and particularly hydraulic mining, is giving excellent results in the Big Bend country, north of Revelstoke."

It is understood that the Geological Survey of Canada is planning for increased work in western Canada during the coming season, the need for which is fully realized by the responsible officials of the department.

A recent test treatment of a car of Whitewater zinc concentrate at the Kootenay Ore Company's sampling works at Kaslo is stated to have proved very satisfactory. The zinc contents were increased from 44 to 57 per cent.

It is reported that a good body of concentrating ore has lately been encountered in the Montezuma mine, on south fork of Kaslo Creek, and that preparations are being made to resume running the concentrating mill early in the spring.

Ore shipments from Boundary District mines for two months to February 29, according to the *Phoenix Pioneer*, totalled 146,398 tons, of which 431 tons were from several smaller mines and the remainder from the Granby Company's mines at Phoenix.

"Although things in the mining line are supposed to be quiet, we are informed," says the *Kootenaiian*, "there are more men at work in the hills now than at the same period a year ago. Sandon in general expects mining operations to be brisk in the summer."

It is noteworthy that during the last week of February 22,919 tons of ore were received at the Granby Company's smelter at Grand Forks, Boundary district. This gives a daily average of 3,274 tons, which is certainly a big tonnage to be treated daily by one smelter.

Late in February the Crescent mine, situated between Phoenix and Greenwood, was added to the list of shipping mines in the Boundary district. Its initial shipment consisted of one carload—about 20 tons. The property is owned chiefly by Chicago men, who recently equipped it with a power plant.

On February 8 the *London Mining Journal* published the following among other Canadian news notes: "Lord Stratheona, High Commissioner for Canada, is informed by cablegram from the Minister of the Interior at Ottawa that a discovery of gold is reported on the Findlay River, in Northern British Columbia: the prospects are said to be good."

On February 28 the *Nelson Daily News* said: The Second Relief mine, situated about 13 miles from Erie, on the north fork of Salmon River, shipped a carload of ore to the Northport smelter yesterday. The mine is now being operated by J. E. Reed, who is also assignee for the late lessees. A number of men are at work and some good ore is being taken out.

A press despatch from Phoenix, Boundary district, says: The 20 seven-ton steel mine ore "dumps" have been safely lowered to the 400-ft. level of the Granby mines, where they will be used in sending out a heavy tonnage through the Victoria shaft. The 75-h.p. electric engine is running on that level, and another

week or so should see that opening sending out a large tonnage of ore.

The Flint mineral claim, situated well up the south fork of Kaslo Creek, is reported by the local newspaper to be looking well. A drift started last autumn from the lower tunnel is stated to now have 5 ft. of ore in the face, of which 10 in. are solid steel galena. Today the Flint is regarded as giving promise of becoming one of the best of the high-grade ore shippers of the Kaslo-Slocan district.

Vancouver is to be the headquarters of the Alaska & Yukon Consolidated Gold Dredging Company. The capital of the company is about \$4,000,000. George M. Gibbs, formerly manager of the Dawson City branch of the Canadian Bank of Commerce, will act as western manager and will have his office at Vancouver. Mr. Gibbs has done the banking for the company for several years, and is therefore familiar with the character of its business.

In Yukon Territory, copper locations of not more than 160 acres in a square block are granted to applicants, but not more than one location within an area of 10 miles. The grant for such location does not give the right to mine any other minerals (except those that are combined or mixed with copper or copper ore), and in no case include free milling gold or silver. The fee payable for such location of 160 acres is \$20, and a similar fee for each renewal.

At the Richmond-Eureka mine, near Sandon, Slocan district, an aerial tramway has been completed, giving necessary facilities for the transportation of ore from the mine to the railway, so shipment of ore to the Trail smelter will, it is expected, be hereafter regularly made. Development work has proved the occurrence in the mine of silver-lead ore of good grade and in considerable quantity, so that production should proceed with little or no interruption.

On February 8 the *London Mining Journal*, in its "Mining Market" comments, had the following note: "Le Roi No. 2 came into request on Thursday, and jumped 3-16 to 1 9-16. The mine has been doing well, and the interest in the Queensland Exploration is of considerable promise." On February 27 a cable was received at Rossland intimating that Le Roi No. 2, Ltd., had declared a dividend of two shillings per share, making a total of fourteen shillings paid since 1905.

A clause (2) in "An Act respecting the Grand Trunk Pacific Railway," brought in to the Provincial Legislature recently, provides that: "As soon as the plan of the townsite referred to in said agreement has been approved, as provided by said agreement, the provisions of the Mineral Act, the Placer Mining Act, and the Coal Mines Act, and of all amend-

ments to said acts, shall cease to apply to the lands embraced in said townsite." Presumably the townsite referred to is Prince Rupert.

In the course of an editorial on "Copper Production," the *Mining and Scientific Press*, San Francisco, makes the following statement: "The mines of the Boundary district of British Columbia during the year 1907 produced 35,500,000 lb. of copper at a cost ranging from 10 $\frac{1}{4}$ cents at the Granby to 14 cents at the Dominion mines, and at the present time, even with the help of the precious metals contained in the ore, any large production looks like exhaustion of resources without adequate profit."

The *Vancouver News-Advertiser* says: A miner who has had years of experience in Cariboo and other parts of the Province, writing from Hazelton under date of February 10, is not very sanguine over the reported strike of gold on the Findlay River. He says two Swedes came in with some gold, but from their account they never went to bedrock, and anyway got little. Miners in and about Hazelton are putting little faith in the find, and do not favour the glowing accounts which have been sent to the press on the lower Coast.

A strike of high-grade ore has been made on the Queen mine at Salmo, in the southern part of Nelson mining division. The ore is in new workings being situated at the bottom of the new shaft, about 80 ft. below the fourth level. It is the characteristic rock of the property, zinc blende, pyrites and galena, carrying high values in gold, running about 6 ft. in width, widening from 4 ft. discovered above. In all likelihood the ore will not be put through the mill as it is good enough to ship clean, the zinc contents being of too small a percentage to adversely affect the smelter returns.

From its Ottawa correspondent the *London Mining Journal* has received the following: "A New Bonanza.—Dr. Alfred Thompson, M.P. for the Yukon, has received here information that Black Hills Creek (about 40 miles from Dawson), upon which is new discovery was made last summer, is turning out to be a winner. The creek is 33 miles long, and is now staked from end to end, while many of its tributaries are also staked. Some of these claims are held for \$5,000, while owners of others would not sell their claims for \$300,000. It therefore looks as if the Yukon had taken on a new lease of life."

The representations of Neil E. Mackay, member for Kaslo district, to the Provincial Government, regarding the needs of the Duncan section of Ainsworth mining division, have been successful to the extent of having secured the inclusion in the estimates of \$5,000 for the extension of the Hall Creek trail, and \$1,500 which it is understood is intended as a subsidy for a steamboat to ply on Duncan River.

The *Kootenian* states that the appropriation for the Hall Creek section will admit of the trail, part of which has already been constructed, being extended to Poreupine Flats, which includes the mineral belt so far developed.

Speaking of the Giant mine, in the Golden mining division, Capt. F. P. Armstrong, of Golden, after a recent visit to the property, said that it was ready for operation, the Elmore vacuum oil plant having been installed, tested and found in good working order. It was about to be put in motion and work would be continued without interruption. It has a capacity for handling 40 tons of ore a day. As the mineral is on the surface requiring no expert mining to get at it, it is possible to operate at a minimum of expense. Capt. Armstrong informed the *Golden Star* that he is confident the venture will prove highly successful.

The statement of ore values made by the provincial mineralogist in his recently published bulletin on Moresby Island of the Queen Charlotte group is of particular interest, since it is the first public official announcement on this subject. It is stated that the Awaya-Ikeda Company shipped some 700 tons of ore assaying about 9 per cent. copper, and 3.5 oz. silver and 0.25 oz. gold to the ton. This was sorted ore. The results of sampling other properties were not nearly so good, yet conditions as to occurrence of ore and facilities for cheap transportation were such as suggest the probability of their being profitably worked.

A mining journal published in the United States recently gave its readers the following item of British Columbia news (?): "The amount of lead produced by the mines of the Slovan-Kootenay and Nelson districts for the year 1907 is given by the dispenser of the Dominion Government lead bounty as 115,000 tons." Oh, no, Mr. Scissors-and-paste, it is not. The "dispenser of the Dominion Government lead bounty" in British Columbia is not given to such wild flights of imagination: he is a truthful man. The quantity of lead produced in British Columbia in 1907 was less than 24,000 tons—not much more than one-fifth of that first above stated.

To his acknowledgment of receipt of a copy of the resolution passed at the recent meeting of the Western Branch of the Canadian Mining Institute, which resolution concluded with a recommendation that the field-work of the Dominion Department of Mines be continued on an adequate scale, so that the enormous resources of the western part of Canada may be further encouraged and facilitated, Hon. Wm. Templeman, minister of mines, added: "I beg to assure you that the resolution has my full approval, and that an effort will be made to at least continue, if we cannot increase, the amount of the field-work and investigation in British Columbia during the current year."

Developments at the 2,000-ft. level of the St. Eugene mine at Moyie, East Kootenay, are stated to have resulted in the opening up of a larger body of lead-silver ore that it had been earlier anticipated would be met with in that part of the mine. It has been announced that the production of the mine during six months to December 31, 1907, was 75,104 tons, from which 12,110 tons of concentrates were produced. Some of this product was shipped to Europe and some to the Sullivan smelter at Marysville, East Kootenay, but the greater part was smelted and refined at the Trail works, which, as well as the mine, are owned by the Consolidated Mining and Smelting Company of Canada, Limited.

Among the "hot-air" items recently sent out from Grand Forks, Boundary district, as mining news is the misstatement that at Hedley, Similkameen, "the Nickel Plate is now operating 110 stamps and is making daily shipments by freight teams of its high-grade concentrates to Keremeos, where they are shipped by rail to the East. The ore runs about \$80 per ton in gold and silver." The Daly Reduction Company's mill at Hedley has only 40 stamps and the average value of Nickel Plate ore as sent to the mill in comparatively large quantity has in the past been officially recorded as from \$12 to \$14 per ton. Yet influential daily newspapers published in the Province continue to print the gross exaggerations of some irresponsible and reckless press correspondent at Grand Forks.

The Nelson *Daily News* lately quoted a visitor from Moyie, East Kootenay, as having given the following information relative to the enterprise of the Cambrian Mining Company: "The project is to follow the St. Eugene lead under Moyie Lake. First a shaft had to be sunk about 200 ft. in depth, after which drifting would be started. The great difficulty is the making of water in the first 30 or 40 ft., where the shaft had to run through layers of loose earth until the blue clay is reached just above bedrock. This is being overcome by building a casing to the shaft, which is of two compartments, of 12-in. bolted timbers, dovetailed and grooved together. This has clay on the outside. Then follows rough lumber, then a coating of peroxide and then matched lumber. The whole is built from the top and sunk into the opening. The shaft is now 30 ft. deep and nearly down to bedrock.

In making up for this issue the form containing the provincial mineralogist's report on "Mineral Locations on Moresby Island, Queen Charlotte Group," it was found necessary to cut out of page 69 the following paragraph :

Game on the island is unusually scarce, there being no deer, rabbits or even squirrels, while grouse are not plentiful, which fact is strange, seeing that the natural enemies of these animals, the wolves, coyotes

and foxes, are also unknown on the island. Bear are present, but not plentiful. There is no area in the Province so well suited for a game preserve—the climate, topography, vegetation and position are ideal—and the island should be stocked and placed under reserve. Nature has, however, somewhat compensated for the dearth of land game by the bounteous supply of fish found in the sea and small streams, and the clams, rock oysters, abalones and other shell-fish along the sea-shore.

The following despatch from Phoenix, Boundary district was shown to A. B. W. Hodges, manager for the Granby Company, when he was in Victoria on February 29, and he affirmed its accuracy: "Following the new high record smelting made by the Granby Consolidated on Wednesday of this week, when 3,450 tons were put through the eight blast furnaces of that plant at Grand Forks in one day, it is learned that the record for the next day was but little less, running up to 3,350 tons, and then the ore supply ran short and the furnaces were banked for a couple of hours until two trains arrived with more ore. This is a total of 6,800 tons of Phoenix ore smelted in two days, or 48 hours, and is a record never before attained in the Boundary or elsewhere in British Columbia. Indeed, the ore ran so well that the daily order at the mines of 3,200 tons for the smelter when it is operating eight furnaces has been increased to 3,400 tons, so that in future there shall be no shortage at the reduction works. As it is well known, at the company's mines there is no difficulty in getting out 5,000 tons of ore daily, if the order from the smelter calls for that much."

A perusal of the list of papers prepared for reading at the tenth annual meeting of the Canadian Mining Institute at Ottawa, Ontario, on March 4-6, should serve to impress readers with the fact that the Institute is doing very valuable work in giving publicity to prominent features of the mining and smelting industries of British Columbia, quite a large proportion being on subjects directly connected with mining or smelting in the West, chiefly in this Province. When it is remembered that these papers are all printed for inclusion in the annual "Transactions of the Institute," and consequently become available for reference, beside most of them being reprinted in widely-circulated mining journals, it becomes evident that effective advertising of the mining industry of the Province is thus obtained, and that, too, at no charge on the public revenue. It would, therefore, seem good policy on the part of the Provincial Government to in some way assist the Institute in its useful work. It is now an institution deserving of the encouragement and active co-operation of all connected with mining, whether directly or indirectly, especially as the allied industries it represents show an annual production much greater in money value than that of any other industry being carried on in British Columbia.

The report of the president of the British Columbia Copper Company to the annual meeting of stockholders, held recently, owing to exceptional conditions which unfortunately very materially reduced the profits obtained during the period under review, was not nearly so satisfactory to stockholders as, during the early part of the year, had been expected it would be. There is, however, this much encouragement to be derived from it—the fiscal year's accounts show a surplus of \$176,041 (including cash on hand and in bank \$56,409); the company owns one of the latest and best equipped smelters, having three blast furnaces and copper converting plant, and a treatment capacity of 2,000 tons of ore per day; and its mines, which are equipped with sufficient modern machinery to regularly maintain a production of ore in excess of the capacity of the smelting works, have been so thoroughly developed that there is blocked out in them more ore than the large quantity heretofore taken out. Given a moderate advance in the price of copper and the necessary "honest co-operation of employees" referred to in last month's *MINING RECORD*, with other conditions as above stated, and a much larger measure of financial success may reasonably be looked for. The company's management and methods have throughout been such as to merit abundant success, and it is hoped it will soon achieve and thereafter long enjoy it.

The board of directors of the Tye Copper Company, Limited, in London, England, have appointed Mr. W. H. Trewartha James (who is a member of the well-known firm of James Brothers, consulting mining engineers, of London) the company's general manager, and he will take charge of its affairs from the beginning of April. His headquarters in British Columbia will be at the company's offices, Bank of Montreal Chambers, Victoria. The action of the directors of the Tye Copper Company in appointing to that position a mining engineer of such high professional standing and acknowledged ability may be regarded as indicating an earnest intention to maintain the excellent name the company enjoys, and well merits, as a thoroughly business-like and successful mining and smelting organization. Further, it is no secret that it is actively seeking another good mining property, so that it may ensure a sufficient supply of ore to keep its smelting works in regular operation and, as well, has arranged for the early enlargement of the treatment capacity of the smelter, so as to be in a position to also smelt all custom ores obtainable on conditions that will allow of its earning a reasonable profit thereon. Mr. W. Gardner, who has been acting general manager pending the appointment of a successor to the late Mr. Clermont Livingston, will shortly after the arrival of Mr. Trewartha James, leave Victoria on his return to London to there resume his ordinary duties as secretary of the company.

DEPARTMENT OF LABOUR REVIEW OF MINING IN THE WEST IN 1907.

REVIEWING industrial and labour conditions in Canada during 1907, the *Labour Gazette*, published by the Dominion Department of Labour, says of mining in Alberta and British Columbia:

Conditions varied considerably at different periods of the year. After an exceptionally busy winter season in the collieries, a stoppage of work which occurred during April, as a result of the failure of negotiations between the operators and workmen employed in the coal mines of Alberta and Eastern British Columbia, was the cause of widespread embarrassment. The domestic fuel supply was low in the districts dependent on these mines; the railway lines were in a congested condition from a prevailing shortage of cars and the heavy immigration and freight movement, and were urgently in need of steam-coal; and the smelters which treat the ores of the metalliferous mines of British Columbia were short of coke. The dispute was settled under the "Industrial Disputes Investigation Act, 1907," which had gone into effect during March. Immediately thereafter, production in the collieries became very heavy, being limited only by the supply of labour and cars obtainable, the former, in particular, being exceedingly limited. The smelters and metal miners were also enabled to resume activity. Wages in these branches in view of the prevailing scarcity of men, were materially advanced on July 1.

On Vancouver Island the collieries were worked to full capacity throughout the summer and autumn seasons, with labour in demand. The payroll in all of these was heavier during this period than in any previous year, notwithstanding that a shortage of coke caused considerable embarrassment at the smelters during September and October. This was later made the subject of an investigation by the Provincial Department of Mines, but as the supply was by that time adequate no further action was taken.

In the closing months of the year, fluctuations in the prices of copper and silver caused a marked falling off in activity in the Kootenay districts. A number of mines and smelters closed down, and the staffs of others were reduced. Wages, also, at Rossland and elsewhere were reduced to the rates in force prior to July 1. With the increase in the supply of labour thus obtainable the shortage at the Crow's Nest Pass and Vancouver Island collieries was relieved.

Reports with regard to the gold output of the Atlin Lake mines were favourable, but returns from the Yukon were smaller than in 1906.

A Royal Commission was appointed by the Government of Alberta to investigate and report on all matters concerning the relations of employers and employees in the coal mining industry of the province.

A CANADIAN BANK PRESIDENT'S VIEWS ON MINING IN 1907.

At Annual Meeting of Canadian Bank of Commerce.

PRESIDENT B. E. WALKER, addressing the shareholders of the Canadian Bank of Commerce at their annual general meeting held in Toronto on January 14, ulto., gave an interesting review of financial, commercial, and industrial conditions throughout the wide area over which the business connections and interests of the bank extend. In regard to mining he made the remarks contained in the following excerpts:

IN ONTARIO.

"In mining, the Cobalt district is likely to give Canada a definite rank among the silver-producing countries. Of course, the bulk of the world's silver is produced by Mexico and the United States, and we cannot hope to reach the rank of these countries. We hold now, however, the fifth place among the silver-producing countries, and a little further development might easily put us in the third or fourth position. The product for 1907 from the Cobalt district is valued at about \$6,000,000, against about \$5,500,000 altogether for the years 1904-5-6, that is, since the foundation of the camp. Satisfactory development work continues, and many of the mines are working lower levels with success. Much excellent machinery is being installed and very substantial buildings are being erected. Indeed, the camp appears to have settled down to legitimate mining on a comparatively large scale. We have not as yet the figures for 1907, but the total value of minerals of all kinds, metallic and non-metallic, produced in Canada in 1906, was about \$80,000,000, a very considerable advance over previous years."

IN BRITISH COLUMBIA.

"In coal mining we see enlargement of output and opening of new areas, not only in the coast and inland districts of British Columbia, but in the Prairie provinces. For smelting, to operate railway trains, for domestic and power purposes, and for export, coal is wanted in an increasing quantity, and so long as capital is difficult to obtain it is not likely that production will run ahead of consumption, unless very temporarily."

"Copper mining and smelting is now firmly established on a large scale as one of the great industries of the Province, yet but a small part of the known area awaiting the advent of capital is being worked. At the recent high prices the business was very profitable, but the sensational drop in price has caused an adjustment of wages, which, because of the large profits, had been upon an unusually high scale. The great underlying fact, however, is that copper can be produced here at a profit even should most of the world's mines have to shut down. The smelting, coal-mining and railroad businesses are intimately connected, and have been growing so fast that they have shown a frequent tendency to get out of line

through shortage of cars and coke supply, or strikes and general labour troubles. The volume of smelting should have greatly increased over 1906, but because of lack of coal supply and of cars it remained stationary."

CANADIAN BRANCH OF ROYAL MINT.

CANADIAN SILVER COINAGE was discussed at length by Mr. A. H. W. Cleve, superintendent of the branch of the Royal Mint in his address to members of the Canadian Institute, Ottawa, on Saturday, February 29, on "The Equipment and Work of the Ottawa Mint."

Mr. Cleve believes that the Mint at Ottawa will eventually result in the deportation of all foreign silver from Canada. The demand for silver had increased perceptibly in Canada since the B. N. A. Act. For the ten years beginning 1870 the average demand was \$284,000 annually. For the seven years commencing 1900 it was \$502,428 worth. For this service the amount coined in England was \$850,460.

Mr. Cleve said that considering the present market value of silver made the face value of coin about two and a half times its intrinsic value, the new Mint would soon be a source of revenue to the country. A Canadian 50-cent piece contains only about 19¾ cents' worth of pure silver. The coinage of bronze was even more profitable, the face value of a cent being about 4½ times its intrinsic worth.

There are three other branches of the Royal Mint, all in Australia, viz., the Sydney branch, established 1853; the Melbourne branch, 1869, and the Perth branch, 1897. There are Mints in India, at Bombay and Calcutta, but they are under the control of the Indian Office.

The Canadian branch is the first to coin silver and bronze, and to manufacture dies. At the other three, only gold is coined.

A shipment of 17,000 sq. ft. of merchantable slate, the first from the Jervis Inlet quarries, was recently received in this city from the property of the Pacific Slate Company, says the *Western Investor*, published in Victoria. The following sizes of roofing slate are being placed on the market at the present time: 20x10 in., 16x10 in., 14x10 in. It is of tough grain and, containing comparatively little iron, is easily worked. In colour it is a pleasing blue-black, which will not fade under any circumstances. Tests of the quality have shown it to be equal to the product of the renowned Welsh quarries and superior to that produced in Pennsylvania and Vermont. As a roofing material, slate possesses many valuable advantages over other forms of roof covering. In older cities it is used almost exclusively for this purpose, and with the many substantial structures now being erected among the Coast cities, a large demand is practically assured. The holdings of the company are situated about 80 miles north of Victoria and cover an area of 625 acres.

COAL MINING CONDITIONS AT NANAIMO.

Cause of Curtailment of Output of Local Mines.

PROTECTION ISLAND MINE of the Western Fuel Company, at Nanaimo, has not been employing so many men lately as it did at the close of last year. The company's Brechin mine (No. 4 Northfield) has also fewer men at work. Concerning the local situation the *Nanaimo Herald* on January 30 published the following statement: "While a number of men have been laid off work in the local mines during the past two weeks, the output of coal for the month of January will be up to the normal output prevailing before the rush came on some time ago. While there are a number of idle men, and while the output of coal for the present month will not equal that of the past few months, it must not be thought for a moment that Nanaimo has seen its best days or that the days of the city's prosperity are over. It must be remembered that the past year has been a record-breaking one in the history of coal mining in the city. It was almost a weekly occurrence for the newspapers to chronicle broken records, and the demand for coal was something unprecedented in years. In order to meet this demand the management of the local mines was forced to employ more labour, and so more men were brought here, with the result that ere long a vacant house was not to be found in the city and the population of the town was almost, if not quite, the biggest in its history.

"During the past month or so, due to several causes, the principal of which was the flooding of the San Francisco market by speculators with Australian coal, there has been a falling-off in the demand for Nanaimo coal, with the result that the local collieries were forced to curtail their output, and in consequence lay off a number of men.

"Mr. T. R. Stockett, manager of the Western Fuel Company's collieries, asked by a *Herald* reporter yesterday as to the outlook for the future, replied that the company expected that the Australian coal would all be off the market in a short time, and that in the course of three or four months normal conditions would prevail in Nanaimo.

"We were not expecting this depression in the coal trade," Mr. Stockett remarked, "but far from being pessimistic over the outlook, we are looking forward to a renewal within a very short time of the conditions that prevailed in the local trade a month ago, and are making preparations for extensive improvements in and about our works."

A day or two earlier the *Nanaimo Free Press* said: "Asked by the *Free Press* about the situation in the local mines in view of the general depression on the Pacific Coast, Mr. Stockett, manager of the Western Fuel Company, stated this morning that it was impossible for any man to give a forecast on it. It would probably be a couple of months before things assumed their normal aspect again. The situation was no better industrially at any other point on the Coast, and

the Nanaimo mines were doing fairly well, better, in fact, than many other enterprises on the Coast. The most direct cause of the depression in the local coal trade was the presence of foreign coal on the Pacific Coast market, which was being sold at almost nothing. Whether things would get slacker here it was impossible for him to tell. Any forecast given by anybody on the general situation was mere conjecture at the best."

THE OPEN-SHOP POLICY ADOPTED AT GOLDFIELD, NEVADA, U. S. A.

Rules Formulated by Local Mine Operators' Association.

AT GOLDFIELD, NEVADA, the Mine Operators' Association, which has had a long and costly struggle with the Western Federation of Miners, has formulated the following rules and regulations, which recent experience has shown mine and smelter operators in the Boundary District of British Columbia might well be adopted by them also:

"This mine is to be worked under the open-shop policy of the Goldfield Mine Operators' Association, hiring and discharging men without regard to whether they do or do not belong to any labour organization, and under the following rules and regulations:

"1. The time of each man on every shift belongs to this company and to no one else.

"2. No walking delegate or other representative of any labour organization is to be allowed upon these premises at any time or for any purpose.

"3. No soliciting of membership in any labour organization is to be allowed upon these premises at any time by an employee of this company or by any one else.

"4. No discussion of labour questions, either for or against unions, or in any way connected therewith, is to be allowed during working hours, or upon these premises at any time or under any circumstances.

"5. No employee of this company is to be annoyed or interfered with by any other employee in his work in any way whatsoever because he may or may not belong to any labour organization, or for any other reason, and all employees are to work together harmoniously for the best interests of the company.

"6. No employee of this company is to harass, intimidate, or interfere with any working man of the Goldfield mining district because he does or does not belong to any labour organization.

"7. All employees are requested to report any violation of these regulations to the management, and any employee found guilty of violating them, or any part of them, will be immediately discharged and be disqualified from any further employment by this company.

"8. Any outsider violating any of these rules will be immediately ejected from the premises and prosecuted by law for trespass."

GEOLOGICAL SURVEY WORK IN WESTERN
CANADA IN 1907.

Short Synopsis of Field-work Performed.

WESTERN CANADA received considerable attention in 1907 from field officers of the Geological Survey branch of the Dominion Department of Mines. In his "Summary Report" for the year, received during January, the acting director, Mr. R. W. Brock, states that there were in the field last season 20 parties. In addition to the regular officers of the Survey, three gentlemen were engaged for the summer on special work. Of these, Mr. Bancroft was assigned work in British Columbia. It is interesting to note that the acting director reported concerning field assistants:

"The system, inaugurated last year, of employing as field assistants, chosen students from the scientific schools of Canada, worked very satisfactorily and promises well, both for the Geological Survey, which gains promising recruits for future employment, and for the men themselves, who are enabled to obtain practical experience in the field while pursuing their college courses."

The following is a short synopsis of the work performed in the field by those officers who were engaged in the West. The summary reports of some of these field officers themselves appear on other pages of this month's *MINING RECORD*:

"With the exception of a short period spent in the Rocky Mountains, Mr. R. G. McConnell was engaged in investigating the geology and economic features of the copper-bearing rocks in the vicinity of Whitehorse, Yukon. In this work he was assisted by Mr. F. H. Maclaren, topographer, who obtained data for, and is now compiling, a contour map of the district. Mr. Haughton acted as geological assistant. A report on the district, illustrated by maps and sections, is now being prepared and will be sent to press shortly.

"Mr. D. D. Cairnes continued his explorations in the southern portion of the Yukon, chiefly between Whitehorse and Tantalus, where coal and copper were being largely developed. The serious fall in the price of copper will temporarily, at least, retard mining in this district.

"Mr. Joseph Keele was commissioned to make an exploratory investigation of a hitherto little-known region situated for the most part between lat. 62 and 63 deg., but which also includes that portion of the Yukon drained by the Upper Pelly and its tributaries, the Hoole, Ross and Kitzu Rivers. Mr. Keele, who is wintering on the Upper Pelly, writes that he can find no trace of an active volcano that prospectors, returning from this district, have reported among the mountains near the source of the Pelly.

"Mr. J. Austen Bancroft was engaged to explore that portion of the coast of British Columbia extending from Powell River to Kingcome Inlet, including the adjacent islands. This survey is a continuation

of that carried on by Mr. O. E. LeRoy during the summer of 1906. At the time of Mr. Bancroft's visit a considerable amount of copper prospecting was in progress.

"Mr. W. W. Leach continued his investigations in the Bulkley Valley, British Columbia. He reports that of the comparatively few mineral locations taken up, the majority are situated on the headwaters of the Zymoetz River or in the Babine Mountains. Work on the coal properties of the Telkwa River has practically been stopped until the route of the Grand Trunk Pacific has been definitely decided on. Several new areas of coal land have been discovered, one in particular on Goldstream giving promise of becoming of importance. Owing to the wrecking of all the steamers on the Skeena, provisions were scarce and expensive, adding much to the difficulties of prospecting.

"Mr. Charles Camsell was engaged entirely in work of an economic nature in the gold mining camp at Hedley, Similkameen District, British Columbia. The Nickel Plate mine near Hedley is the most important mine in this part of southern British Columbia, and is at present the largest producer of gold only in the whole Province. Besides preparing a topographical map of the camp, the geological work was devoted primarily to a study of the ore deposits and the examination of mineral claims. It is hoped to complete this work early next season.

"Mr. R. W. Brock and Mr. W. H. Boyd were employed in extending the mapping of the Lardeau District and in completing the 1,200-ft. sheet of the Rossland Camp. Mr. Boyd also paid a visit to the Similkameen District to start a topographical survey of that region.

"Mr. D. B. Dowling was mainly engaged in obtaining more details of the coal areas north of the Saskatchewan River, Alberta, where he had discovered several seams of coal the previous season. He also made an examination of the Athabaska Valley.

"Mr. G. S. Malloch was engaged in completing the photo-topographic survey of the Cascade, Palliser, and Costigan coal basins, in which work he had been engaged while acting as Mr. D. B. Dowling's assistant in the previous year. The survey was carried northwest from Panther Creek to the Clearwater River.

"Mr. William McInnes was instructed to make an exploration of the tract of country in the Province of Saskatchewan lying south of the Saskatchewan River and north of the Prince Albert branch of the Canadian Southern railway. This was virtually an extension of the work done last year along the proposed Hudson Bay railway route. Mr. McInnes reports large areas of very excellent agricultural land that is now not too far from a railway to be available for settlement. The interesting beds of bituminous shales referred to, though not, probably, where seen, of present economic value, may lead to discoveries of greater commercial interest."

THE BULKLEY VALLEY DISTRICT, IN SKEENA MINING DIVISION.

Official Report by W. W. Leach.

BULKLEY VALLEY was reported on, at the close of 1906, by Mr. W. W. Leach, whose official report, under the heading of "The Telkwa Mining District, B. C.," appeared in the "Summary Report of the Geological Survey Department of Canada" for that year, pp. 35-42. In the "Summary Report" for 1907 the following additional information is given:

According to instructions work was continued in the Bulkley Valley and vicinity during the past season. The topographical map, compiled last year, and now in the engraver's hands, was used as a base, being extended both to the north and south, but

TOPOGRAPHY.

The Telkwa, above the south fork, occupies a wide, flat valley, the river meandering through swampy meadows; its course here is approximately northeast and southwest. About 12 miles from the south fork, near Mill Creek, the valley turns sharply to the south and at the bend an unexpected and low pass leads off to the west to Summit Creek, a branch of the Zymoetz; this pass may be of great importance, for it has been occupied by one of the several surveyed lines of the Grand Trunk Pacific.

Milk Creek rises in a high and rugged range of mountains forming the divide between the Zymoetz and the Telkwa Rivers; this range rapidly decreases in height to the eastward, forming a plateau-like country, where the highest point reaches an elevation of only 6,600 ft., finally dropping down to a low pass,



View on the Skeena, on the way up that river to the Bulkley Valley District.

chiefly to the north, including the Bulkley Valley as far as Moricetown, the Hudson Bay Mountains and the headwaters of the Zymoetz (Copper) River, as well as some work done on the head of Paint Creek and the Morice River.

A carefully-made transit and chain traverse was run from the town of Telkwa to Moricetown as a check on the triangulation of last year.

The season, on the whole, was unfavourable for topographical work, a late wet spring having been followed by an exceptionally dry, hot summer, with, as the result, many forest fires and a dense smoky atmosphere during the short season in which work was possible in the higher mountains.

The greater part of the season was spent in the upper part of Telkwa River and the country lying between that river and the Zymoetz; this district has been very little prospected and the absence of trails made progress slow.

in which Pass Creek rises, and which separates it from the Hudson Bay Mountains.

The last-named range though quite rugged, the highest points reaching at least 8,000 ft., is cut off on all sides by low country, and, therefore, forms a very conspicuous feature of the district.

In most cases the headwaters of the Zymoetz occupy wide, flat valleys interspersed with many small lakes and much meadow land.

The country, as a whole, with the exception of the Coast Range, is characterized by a series of isolated groups of mountains, surrounded by low valleys in which the river and creek systems have little regularity.

GEOLOGY.

By far the greater part of the country traversed is underlain, as described in last year's report, by rocks of the Porphyrite group, mainly composed of

andesites, tuffs, and agglomerates, and almost entirely of volcanic origin.

From the head of Milk Creek westward the rocks which are all of the Coast crystalline series, have not been studied in detail, no minerals of economic importance having yet been discovered in them.

The most important rocks, from the miner's point of view, are those which have been called "the later eruptives," as all the important mineral discoveries of the district are situated in the volcanics near their contact with these rocks or in or alongside dykes from their main bodies. These eruptives have also had an important influence on the quality of the coal. They constitute the youngest rocks of the country, cutting both the volcanics and the coal formation, and are found usually either as a pinkish syenite porphyry,

a group of claims have been located by Messrs. Loring, Forrest and the Haukin Brothers. These are among the oldest mineral locations in the district, and much prospecting, consisting of open-cuts and several short tunnels, has been done on them.

The country rock consists of typical beds of volcanics, tuffs, agglomerates, andesites, etc., belonging to the Porphyrite group and here lying nearly horizontal and well exposed at many places on both sides of the rather deep, narrow valley. These beds are cut by a number of roughly parallel, light-coloured quartzose dykes, with a nearly vertical dip and crossing the valley approximately at right angles.

The mineral deposits occur in nearly horizontal beds following the bedding planes of the volcanics, and show decided enrichment in the immediate vicin-



Bridge across Bulkley River at Ahwillgate: constructed by Indians of round poles and telegraph wire.

or as a light greyish granite porphyry, the dykes from them varying greatly in appearance.

Two important areas, one on Scallon Creek, the other at the head of Glacier Creek, were referred to last year. Another small area was noted on the ridge between Morice River and Goldstream, and yet another near the head of the north fork of the Telkwa. Little or no prospecting has been done in the neighbourhood of either. A large area of these eruptives was found on the western ridges of the Hudson Bay Mountains. This locality has received much attention of late and many mineral claims have been located.

MINERAL CLAIMS.

Immediately on arriving at Telkwa (at the mouth of the Telkwa River) a short trip was made to Haukin's camp, situated at the head of Goat Creek, where

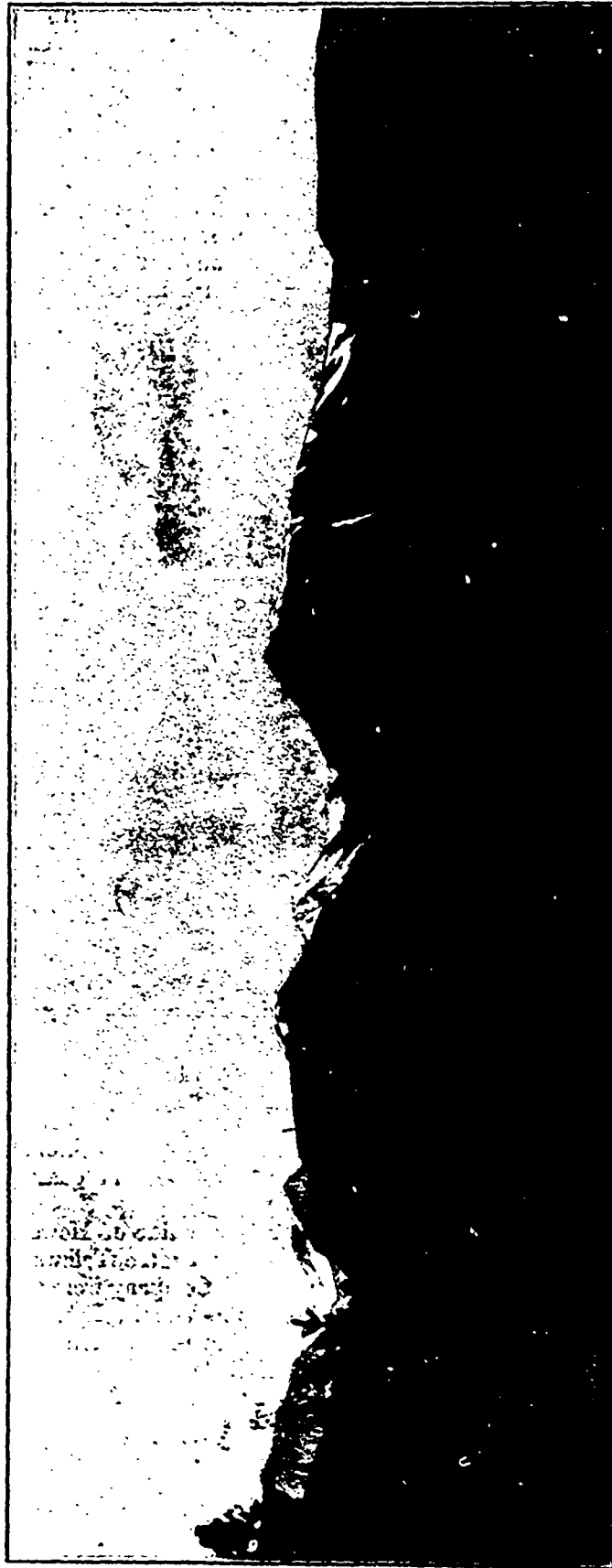
ity of the dykes; the mineral bearing solutions have apparently ascended along the walls of the dykes and thence, following the bedding planes, have decomposed the more readily attacked volcanic beds.

On the Eldorado, Naiad and Telkwa claims the best showings of mineral are to be met with; here at least two beds of ore, each about 5 ft. in thickness, may be seen, consisting of iron pyrites, copper pyrites, a little pyrrhotite, and magnetite, in a gangue of altered country rock, epidote, quartz, etc. The percentage of copper is small, but, according to the owners, fair values in gold are to be found. The ore bodies are very much thicker in places, more particularly immediately alongside of the dykes.

Many of the claims on Howson Creek were described in last year's "Summary," but this locality was again visited this year, considerable development

work having been done and various new claims located.

70 ft. in low-grade ore, the main body, exposed by cuts on surface, not yet having been reached.



GOAT CREEK, TELKWA, LOOKING SOUTH.—HUNTER'S BASIN ON RIGHT; HANKIN'S BASIN ON LEFT

In his report for 1906 Mr. W. W. Lench says: Hunter Basin is situated at the head of Cabin or Fourmile Creek, a tributary of Goat Creek. Across the ridge to the south, at the head of Glacier and Webster Creeks, an intrusive area of coarsely crystalline granitic rocks is found which seems to have had an important relationship to the mineralization of the district, as it is along the borders of this area that many claims have been staked, notably in Hunter Basin, Hankin Basin, Dominion Basin (at the head of Goldstream), and various locations on the heads of Sunrise and Glacier Creeks. The eruptive mass is itself in places impregnated with iron pyrites, which has resulted in the weathering of the rocks to a bright rusty yellow, giving a characteristic coloring to the mountains.

At the Evening claim a cross-cut has been run for

On the Duchess a tunnel has been driven for 60 ft.,

starting at a very good exposure of copper ore and following the foot-wall of the ore-bearing dyke. The ore is continuous for the length of the tunnel. Several open-cuts have been made up the hill on what is supposed to be the Duchess dyke; one of these shows 6 ft. of good ore, the others very little, but the dyke is much decomposed and iron-stained.

There are a number of paralalled dykes here, some of them ore-bearing, which have a general north and south strike, about at right angles to the direction of the valley. As the ground is mostly drift-covered, and the dykes are often quite close to one another, it is a difficult problem to ascertain for any distance, which dyke one is following.

In this basin, as at the Evening and Duchess, a number of parallel dykes occur, with approximate north and south strikes, and cutting the bedded volcanics; the ore is found in the dykes, usually near the walls, and at times extends into the country rock.

The Telkwa Mining, Milling and Development Company have also a number of claims here, among others the Whispering Wind and Silver Heels. On the latter a large dyke from 50 to 60 ft. wide exists, striking north and south and dipping 75 to 80 deg. east; on the easterly or hanging-wall about 4 ft. of chalcopryrite and specular iron ore was seen, but no work had been done; on the westerly wall, however,



A copper-silver mine in Skeena District that was worked in 1901.

The Countess claim, owned by the same company as the Duchess (the Telkwa Mines, Limited), is situated near the top of the ridge on what is probably a similar and parallel dyke. An open-cut has been made here, but not much ore is in sight; a small cut, however, on the same dyke at the top of the ridge has a much better appearance, the ore there being similar to that at the Duchess.

Across the ridge, to the north, in a small basin in which rises a branch of Howson Creek, a number of claims have been staked. Among these the Standard, Princess and Contention are also owned by the Telkwa Mines, Limited; on only one of these, the Standard, was any work seen. It consisted of a small open-cut showing from 18 to 20 in. of good ore, composed of chalcopryrite and specular iron with a little quartz. The ore occurs in a dyke along the hanging wall.

a large open-cut showed 15 ft. of good ore, consisting of chalcopryrite, specular iron, and a little iron pyrites, with a gangue of quartz and altered country rock.

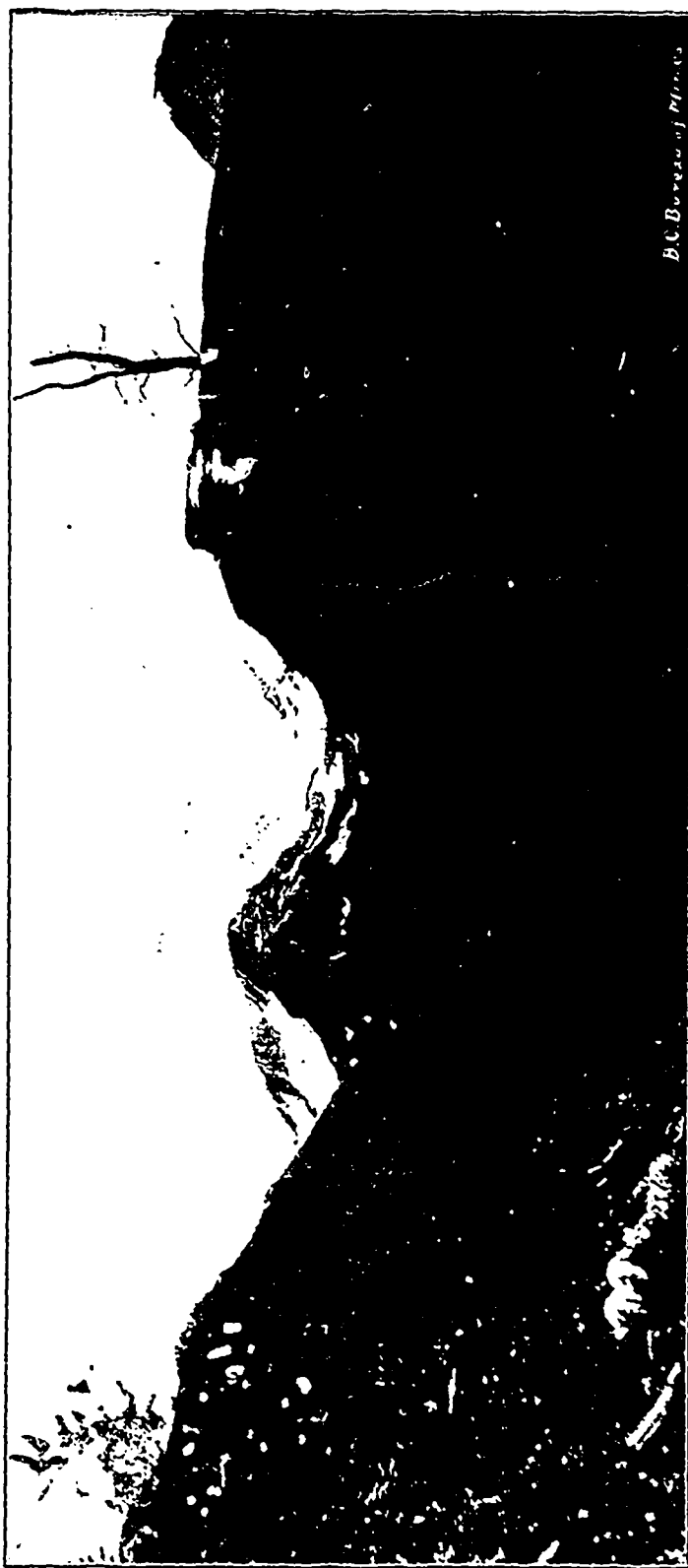
On the south side of Howson Creek a number of claims owned by the Telkwa Mining, Milling and Development Company were visited, the most important being the Walter, Iron Colt, Granville, Strathcona and Anna-Eva. All of these were seen last year, and little has been done on them since. The ore occurs in dykes from the large porphyry area on Scallon Creek, cutting the rocks of the Porphyry group, and is generally much decomposed. A sample of black, earthy material from the Strathcona was found to consist of oxides of copper, manganese and iron.

Most work has been done on the Anna-Eva, an open-cut more than 150 ft. in length having been

made across the face of the dyke. The mineralization is irregular and not very heavy, and the whole dyke is much decomposed, the ore consisting of copper

chiefly chalcopyrite and specular iron with a good deal of quartz, across a width of about 25 ft.

The Hudson Bay Mountains were visited late in



LOOKING UP GOAT CREEK, TELKWA, TO BASIN AT ITS HEAD.

Of this locality the Provincial Mineralogist, who visited it in 1905, reported: "About four miles up the trail (from the Telkwa) crosses over Goat Creek by a ford known as the 'first crossing of Goat Creek,' and follows up the opposite side of the creek for about four miles to the 'second crossing,' a distance from the Bulkley of about 10 miles. The trail is very good up to the first crossing, being over gravel bench land, but after making the crossing it continues on the creek bottom, through spruce woods, for two miles, at an altitude of 2,500 ft. It then climbs a long, steep, clayey hill, reaching a bench with an altitude of 3,300 ft., a rise of 800 ft. in about two miles—about as bad a trail as could be."

carbonates, chalcopyrite, iron pyrites and specular iron. A short distance to the south, on top of the hill, where the ground is heavily drift-covered, a new cut had been started, showing much higher grade ore,

the summer, but as all the prospectors had left for the season, it was almost impossible to find where the chief claims were situated. However, a few were seen.

At the head of Lyons Creek, on the eastern slope of the range, two claims, the Copper Queen and Iron Mask, are near the edge of a small granite area cutting the volcanics, and the mineralization appears to follow the bedding of the decomposed andesites. The ore consists almost entirely of arsenical pyrites in a quartzose gangue, but not enough work has been done to show the extent of the deposit. A specimen of this ore gave by assay: gold, \$8; silver, 0.52 oz. to the ton.

About one mile down Lyons Creek, on the south side, some work had been done, but the name of the claim could not be ascertained. The ore occurs in a large dyke, about 75 ft. wide, near the hanging-wall,

COAL.

During the past year practically nothing has been done on the coal properties of the Kitimat Development Syndicate, the Cassiar Coal Company, or the Transcontinental Exploration Syndicate, all situated on Telkwa River or on Goat Creek, one of its tributaries. Until the route of the Grand Trunk Pacific Railway shall be finally decided on it is not probable that much development will be undertaken.

On the property of the Telkwa Mining, Milling and Development Company, located on Coal Creek, at the headwaters of the Morice River, a little exploration work has been carried on, and the limits of this are fairly closely defined. Although the area is



Coal seam outcropping on Goat Creek, Telkwa.

and shows about 3 ft. of fairly well mineralized material consisting of arsenical pyrites, some copper carbonates, and a very rusty quartz in bands parallel to the dyke wall.

On the western slope of the mountains, near the head of a small stream running into the Zymoetz River, the Tower Hill claim is situated. The country rock here, consisting chiefly of red and greenish andesites, has been tremendously disturbed, and some splendid samples of folding on a large scale may be seen. A number of open-cuts have been made in what appears to be a thin bed of greenish andesite, much altered and containing some copper carbonates, a very little bornite, some quartz, calcite, epidote, etc.

There are said to be other and better showings in this neighbourhood, but the writer was unable to find them.

small the coal is of very high grade, as the following analyses show:

All Non-Coking.	Moisture.	Volatile		Fixed Carbon.	Ash.
		Combustible	Matter.		
1.—5 ft. 6 in. seam.....	1.36	10.87	80.82	6.95	
2.—7 ft. 3 in. seam.....	0.80	11.10	78.90	9.20	
3.—4 ft. 0 in. seam.....	0.58	10.80	82.70	5.90	

The anthracite quality of this coal may be explained by its contiguity to two areas of later eruptive rocks, one at the head of Glacier Creek and the other on the north side of Goldstream, and to the great heat and pressure consequent on their intrusion.

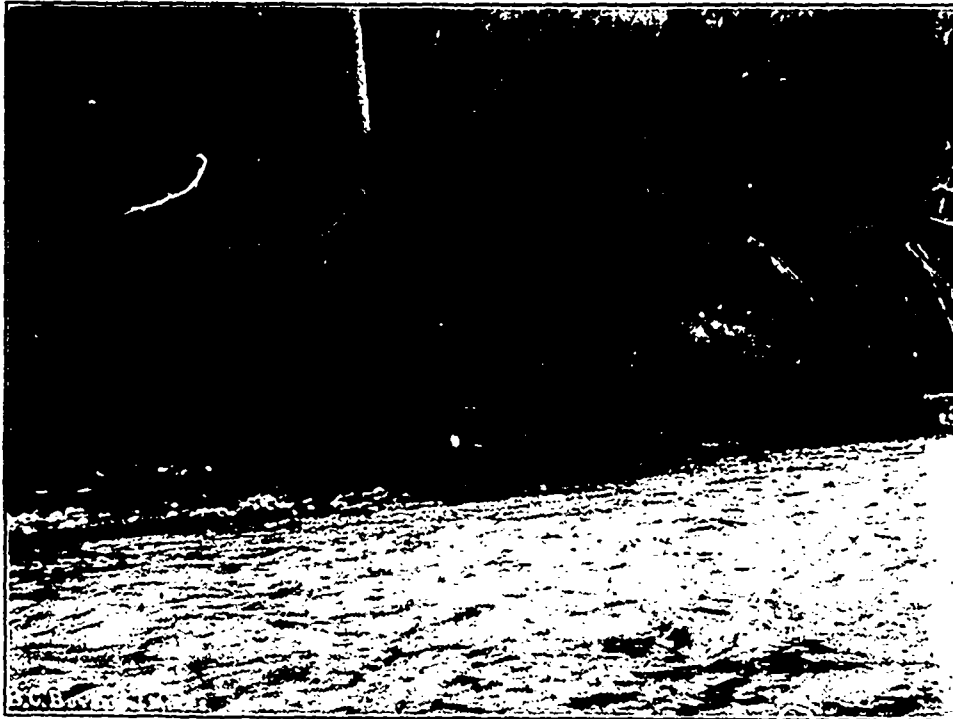
On Goldstream, a little below its junction with Coal Creek, and separated from the above area by a short distance only, a new coal area was discovered this year. This area, about two by two miles and one-half, at its greatest diameters, is in the form of a

basin, the coal outcropping on both sides, and from 400 to 500 ft. above the floor of the valley. The coal dips towards the creek from both sides with a slope rather greater than that of the hills, so that it underlies the bed of the stream, although at no great depth.

Up Goldstream this area is separated from that on Coal Creek—probably by an anticline, the coal measures having been removed from its axis by denudation. At the lower end the limits of the coal-bearing strata are not so clearly defined, but, in all probability the creek has there cut through the coal measures to the underlying volcanics, this cutting being accentuated by another anticlinal fold.

Zymoetz River, and on Hudson Bay Mountain, but at none of these localities has any workable seam been found yet, and it seems probable that the seams reach their maximum thickness in the Telkwa-Morice River district, and thin out rapidly, at least towards the north.

It is now fairly certain that no great coal field exists in the Bulkley Valley district from Hazelton to the headwaters of the Morice, but many comparatively small, isolated areas are known in which the coal varies from a lignitic to a semi-anthracite. In some of these areas the strata are greatly disturbed, much faulting and folding being in evidence.



Coal outcrop on claim of Kitimat Development Syndicate, Telkwa River.

The coal has been opened up at only one place, where two seams have been uncovered, the upper one showing 5 ft. 6 in. of clean coal overlain by about 18 in. of soft impure coaly material, the cut not having been extended far enough to locate the roof clearly. The lower seam shows 3 ft. 6 in. of clean bright coal. No analyses have as yet been made of these coals, but in appearance they closely resemble the coal from Coal Creek, analyses of which have been given above. At several other points across the basin the coal outcrop was noted, but no time was available to open up the seams. No evidences of local disturbances or faulting of any great extent were noted.

Another and smaller area was seen about two miles farther down Goldstream, but it had not been opened up.

Other areas of the coal-bearing rocks were noted at Driftwood Creek, Moricetown, at the head of the

The quality of the coal seems to depend on the proximity of the measures to the newer eruptive rocks which are younger than the coal, and in places have sent out dykes cutting the seams.

A number of fossils were collected from the coal measures and adjacent beds; although none of these have as yet been determined, there is sufficient evidence to state that these rocks are probably Lower Cretaceous, though possibly Jurassic.

The Snowshoe mine in Phoenix camp, Boundary district, was operated four months and a half during the latter half of 1907. In that period 86,109 tons of ore were mined and shipped to the smelters at Greenwood and Trail. There are large reserves of ore available for shipment, but until the price of copper shall be high enough to leave a margin of profit the suspension of operations will be prolonged.

YUKON TERRITORY, BETWEEN WHITEHORSE AND TANTALUS.

Official Report by D. D. Cairnes.

IN YUKON TERRITORY, or portions of it, chiefly between Whitehorse and Tantalus, Mr. D. D. Cairnes, of the Geological Survey of Canada, spent the field-work season of 1907. His report on the work done in that part of the Yukon, published in the "Summary Report" for 1907, is as follows:

This season also was spent in Yukon Territory, chiefly along Lewes River, between Whitehorse and Tantalus. I was again ably assisted by Mr. H. Matheson, who did a considerable portion of the topographical branch of the work.

Yukon Territory was reached about May 25, by the usual route via Vancouver and Skagway, and those properties on Windy Arm which had been worked during the winter, were first visited. After arriving at Whitehorse and completing the necessary arrangements, we left on June 1 and proceeded by canoe down Lewes River towards Tantalus, having to remain, however, at the upper end of Lake Laberge a few days to allow the remaining ice on the lake to thaw or shift sufficiently for us to get through with our canoe.

Owing to instructions received during the latter part of the season to collect statistical information for the Mines Branch, geological explorations were somewhat curtailed.

The double object of the expedition included further surveys of the coal seams examined last year, some samples of which coked successfully in the laboratory, and of the copper deposits of the Whitehorse District, where successful working is largely dependent on accessible coal suitable for producing a metallurgical coke.

Discoveries of coal were reported at a number of points along Lake Laberge, Lewes River, and its tributaries the Teslin and Big Salmon Rivers. These were examined, as well as the geological formations, generally, along the river to Tantalus.

Except within a few miles of Tantalus, where the Tantalus coal measures cross the river, this so-called coal proved in most cases to be dark or black shales, sometimes more or less bituminous; in other instances the seams of coal, where they did exist, were only a few inches in thickness and of no present economic importance.

AREAS EXAMINED.

Along the river to Lake Laberge, on the lake shores and westward for a few miles, none of the known coal-bearing horizons were met and no coal was seen. The formations here have a general northwesterly and southeasterly trend and the Tantalus coal measures were believed to extend in a southerly direction from Tantalus and to lie to the west of Lake Laberge. A map sheet was therefore projected covering an area about 10 miles wide in a north and south

direction and extending to the west from lower Laberge for a distance of about 25 miles. The coal measures lie just to the west of this map sheet, but for the reason above mentioned the map was not extended far enough to actually include them.

From Lake Laberge the geological work was continued along the river to Tantalus, after which the auriferous veins and placer deposits of Livingstone Creek were examined, as also the reported coal outcrops up Salmon River.

After arrival at Tantalus, another map was commenced which was intended to include the Tantalus and Five Fingers mines and the coal measures in their vicinity. Having completed the work along the river, pack-horses were procured and the survey was continued to the south away from the river.

In addition to the above work, quartz properties were examined in the vicinity of Dawson and on Williams Creek, which enters Lewes River six miles below Yukon crossing.

TOPOGRAPHY AND FLORA.

Lewes River, between Whitehorse and Tantalus, flows in a wide valley having a general north and south trend, and is extremely tortuous in most places, particularly below Lake Laberge, which is a portion of the river that has acquired considerable width and possesses very little grade.

The district examined this season is a typical representative of an uplifted plateau of erosion and is a portion of the Yukon Plateau province. To the west and east, and particularly toward the north of the district, there is an abrupt change from the plateau to the mountain provinces of the Coast Range and Rocky Mountain Range, respectively.

To the west of the lower end of Lake Laberge, and about 1,000 ft. higher, the valleys, which often contain chains of lakes, are characterized by muskegs. The hills, as a rule, are mostly covered with underbrush and small timber, chiefly spruce, aspen and poplar.

To the north there is a particularly long chain of lakes, which is drained for the greater part by Mandanna Creek, a stream about four miles long that joins the Lewes from the south, nearly opposite Eagle Nest. The most southerly of these lakes, Frank Lake, is more than five miles long and has an average width of a mile. One branch of this chain continues west towards Montague, on the Dawson-Whitehorse wagon road; the other branch continues about 15 miles in a direction about S.S.E. The valleys of this portion of the country generally contain lakes of considerable size, and the hills, which are well rounded, are covered with small spruce, poplar, willow, and shrubbery of different sorts. Rock outcrops are very scarce.

Continuing down the river towards Tantalus the hills on the north slopes are chiefly covered with spruce and Banksian pine. Patches of poplars and willow are occasionally seen. The south slopes along the river are more open, some being quite bare; the little timber seen is chiefly poplar and willow. The

country farther back from the river here, and that just west of the river between Tantalus and Five Fingers, is practically all covered with spruce, Banksian pine, poplar, and willow, the greater part being spruce. The river flats generally support a growth of poplar, willow and a species of scrub alder.

GEOLOGY.

From the upper end of Lake Laberge to Five Fingers, the formations seen are similar to those in the more southerly portions of the Yukon. The oldest rocks exposed are Carboniferous limestones, which belong in all probability to the Upper Cache Creek series. Above these are porphyrites, tuffs, tuffaceous sandstones, shales, etc., corresponding to the Windy Arm and Tutshi series. Towards the north, however, the porphyrites, tuffs, etc., gradually give place to true sediments. Overlying these latter rocks are the coal-bearing Jurassic-Cretaceous beds, which are buried under more recent sediments and Tertiary flows of lava, etc. Intrusive granites, syenite-porphyrates, and porphyry dykes also occur.

Along the east shore of Laberge the rocks belong chiefly to the limestone series, although some of the more recent rocks, similar to those on the west shore of the lake, are found overlying these unconformably. Along the west side of the lake the rocks, which are chiefly bedded and dip at high angles, are generally coloured tuffs and tuffaceous sandstones. These are either finely-bedded or coarse greenish and massive. They are associated with dark, almost black, shaly rocks with occasional brownish bands. Heavy massive beds of very coarse conglomerate also occur, the contained boulders being often one to two feet in diameter. This whole series, lithologically, closely resembles the Tutshi series farther south.

South and east of lower Laberge are some porphyrites, tuffs, etc., closely resembling the rocks of the Windy Arm series and cut by dykes of typical syenite-porphyrates. To the west the outcrops largely consist of coarse, massive beds of conglomerate, from 600 to 700 ft. thick, the component pebbles and boulders being chiefly porphyrites and granite. Underlying these are thinly-bedded greenish and brownish sandstones and some dark-coloured clays. This series is here seen to overlie the limestone series unconformably. Farther west, towards the Whitehorse-Dawson road, there are more tuffs and tuffaceous sandstones and shales, generally quite massive, resembling those along the greater part of the west side of Lake Laberge. Outcrops are very scarce in this district.

From lower Laberge to Hootalinqua the outcrops are chiefly limestone and rocks resembling the Tutshi series.

On the left of Lewes River, just above Five Creek, conglomerates similar to those at the Tantalus coal mine occur for four or five miles. Though no coal was found here it will probably be discovered in the future. This was the only place at which this formation was noticed along the river until near Tantalus.

West of Salmon River an outcrop of the coast

granite was seen, but the greater part of the outcrops here and along the Semenow Range consists of generally greenish, fine-grained, and often quite calcareous porphyrites and tuffs. Below Salmon River these porphyrites, etc., continue to near Little Salmon where true sediments commence. Below Little Salmon River to Tantalus practically all the exposures are limestones or other sedimentaries.

On the right limit of Lewes River, below Little Salmon, the hills are conglomerate and sandstone to Eagle Nest, which is limestone. Just below, an almost perfect section of the sedimentaries occurring in this vicinity is to be seen unconformably overlying the limestone. Immediately above the limestones are the coarse massive sandstones like those causing the rapids at Five Fingers and elsewhere, and here called the Laberge conglomerate. Overlying these conformably is a series about 1,200 ft. thick, which consists of dark shales and lighter-coloured sandstones. The dark shale beds which are at times somewhat carbonaceous and contain small areas of lignite, comprise a considerable portion of this series. No lignite seams more than one to two inches in thickness were seen. In addition to these shales there are some thick beds of light grey, yellow and brownish sandstones, the light beds being soft, coarsely bedded and somewhat calcareous. They weather easily and are quite noticeable horizon markers. Some of the beds are more thinly bedded, harder and more silicious. Remains of tree trunks are of frequent occurrence, particularly in the lighter coloured strata. This whole formation, with the exception of the dark shale bands, presents a coarse-grained, light-coloured appearance. Above this is a reddish series, in the lower portions of which are some narrow seams of lignite on which some prospecting has been done near Eagle Nest. Wider seams may yet be found. These reddish sedimentaries, which are generally coarse-grained, often thinly-bedded and quite calcareous, decompose readily by weathering. A heavy conglomerate bed of the same material occurs near the top of the series here. Though at least 200 ft. were observed, the uppermost series were not seen in this section.

These beds in this section outcrop continuously along the river bank to within ten or twelve miles of Tantalus. Their strike is roughly parallel with the river, and the dips being away from the river the outcrop of the different beds shows an apparently horizontal stratification.

Nearer Tantalus are outcrops of the conglomerate formation, or beds, in which the coal at the Tantalus mine occurs. These conglomerate beds are here at least 500 ft. in thickness; the top strata in particular shows distinct bedding, the beds being generally two to ten feet thick and very similar in appearance and composition. Chert, black quartz and slate pebbles, apparently derived from the Cache Creek beds, are the chief components. These conglomerates, though not seen in contact with any other formations, are considered to be probably the oldest sediments in the

district. Overlying them are some massive, quite coarse, and very light-coloured sandstone beds somewhat resembling the coal conglomerates, but derived, apparently, chiefly from the coast granites.

Extending for several miles along the left limit of the river below Tantalus are basalt, melaphyres, etc., which are very recent and are associated and interbedded with some of the later sediments around the Five Fingers mine and elsewhere. These lavas, etc., are the newest geological formation in this district, except the glacial and post-glacial silts, boulder-clays, etc.

ECONOMICS.

In addition to the districts mapped this season, properties were examined in the following localities: Windy Arm, Livingstone Creek, Dawson and Williams Creek.

WINDY ARM.

The only properties that have been working on Windy Arm, to any extent, since last season, are the Vault, Venus, and some of those controlled by the Anglo-American Consolidated Mining Company.

Owing to internal dissensions and other causes, the development of the properties on Windy Arm has been much retarded. In most cases the promising properties have continued to improve with development.

Owing to difficulties arising between the owners and the Anglo-American Consolidated Mining Company, work has been curtailed on the claims bonded by the latter.

On the Vault, which has been worked continuously for more than two years, a long tunnel is being driven, but the ore had not yet been tapped when the mine was visited about October 1.

On the Venus, approximately 1,800 ft. of work has been done this season, with the most promising results. A considerable quantity of ore is blocked out, and 100 tons shipped to the Tacoma smelter this fall (1907) netted more than \$60 per ton after all smelting charges and deductions were made. It is a concentrating ore, and it is the reported intention of the company to erect a mill on the ground in the near future.

LIVINGSTONE CREEK.

A description of the geology and topography of Livingstone Creek is given in Mr. R. G. McConnell's report and map on the "Big Salmon Gold Fields," in the "Summary Report of the Geological Survey" for 1901. Since that time the old creek channel has been discovered and is being worked.

The gold is, or was, chiefly in this pre-glacial channel. Since glacial times the present creek has been cutting farther and farther into the thawed south bank, the gravels on the north bank being frozen, so that now, above the canyon near the mouth of the creek, the old channel is on the left limit of the present creek valley. Near Discovery the two channels apparently coincide, and the present creek having the greater grade has worn down the older channel, into which it has concentrated its values.

Above Discovery the gold is practically all in the old channel and is recovered by tunnelling from the present creek bed through the rock rim to the old channel and drifting on it. The pay on the old channel averages about 30 ft. in width and 2 ft. in depth, although it is considerably wider in places. There is quite enough grade to the creek for sluicing. The hillside claims, *i.e.*, those on the old channel gravels, have produced, on an average, about \$25,000 each. About \$90,000 was taken out of this creek last season and there will probably be more than \$100,000 taken out this season (1907).

Similar conditions exist on the parallel creeks, Summit Lake, Cottonova and Little Velvet, but owing to scarcity of water only a small amount of work has been done on them. What has been done has given very encouraging results, and it will probably pay to bring water from Mendocina Creek or elsewhere.

TANTALUS MINE.

Since reporting on this property last season considerable progress has been made. The two main tunnels had, by August 1, 1907, been driven in more than 1,800 ft., and 23 rooms had been opened up on No. 2 and eight on No. 1 seam.

There were shipped last summer 5,173½ tons of coal; it is expected that about 9,000 tons will be shipped this summer.

TANTALUS COAL MEASURES.

At Tantalus mine the formations dip to the east and on Tantalus Butte, across the river, they dip to the west, showing the presence of a synclinal fold. The continuation of the eastern wing of this fold was noticed about a mile to the east of Tantalus on the left bank of the river. On account of heavy wash the coal is here not exposed, but a small amount of stripping should uncover the seams.

These measures, which cross the river at Tantalus, are known to extend in a northerly direction for several miles at least, and in a southerly direction more than 50 miles, crossing the Whitehorse-Dawson wagon road 70 miles from Whitehorse. In all probability they extend considerably farther. Throughout a distance of 60 miles they have been traced, and wherever a section has been made two or more workable seams of good bituminous coal has been found. In the only places from which it has been obtained at a depth the coal cokes quite satisfactorily.

TANTALUS BUTTE.

At Tantalus Butte and just across the river from Tantalus, only assessment work has been done. A section was examined this season and the following seams were measured and sampled:

		Feet. Inches.	
No. 1	Coal	0	7
	Shale	0	3
	Coal	6	1
	Shale	0	6
	Coal	0	10
No. 2	Coal	9	10
No. 3	Coal	8	10

Three smaller seams, 14 in., 10 in., and 6 in., respectively, were also measured.

All this coal is bituminous and of about the same quality as at Tantalus; when clean it yields a firm,



First mining camp in Windy Arm District.—Near the glacier in March.

coherent, coke, *i.e.*, if obtained at a sufficient distance from the surface to be free from weathering.



First mining camp in Windy Arm District.—Near the glacier in summer.

WILLIAMS CREEK.

A number of mineral claims have been staked this season on and near Williams Creek. The Bonanza King, which was about the first staked, and which

was the only one on which any work had been performed, was visited in August. It is situated about one and a-half miles up Williams Creek, a stream flowing into Lewes River about six miles below Yukon Crossing.

The ore is quartz, carrying chiefly the copper minerals bornite, chalcopyrite, and malachite. The vein is about 6 ft. wide from wall to wall, including, in this thickness, one to two feet of the country rock. The ore is in a fissure, or fissures, in granite, near its contact with older, much altered diabase, now quite schistose in structure.



Near view of glacier under which a mineral vein was cut by cross-cut tunnel.

When seen, a shaft had been sunk about 20 ft. on the ore and a tunnel had been driven about 40 ft. to cut the vein. It is claimed the ore carries values in gold, silver and copper; however, average samples obtained by the writer gave only traces of gold and silver, and 3.29 to 4.21 per cent. copper.

CONCLUSION.

The chief result of this season's geological work has been the locating of enormous quantities of available bituminous coal in this portion of Yukon Territory. Full particulars, accompanied by contoured geological and topographical maps, will be published in the writer's detailed report.

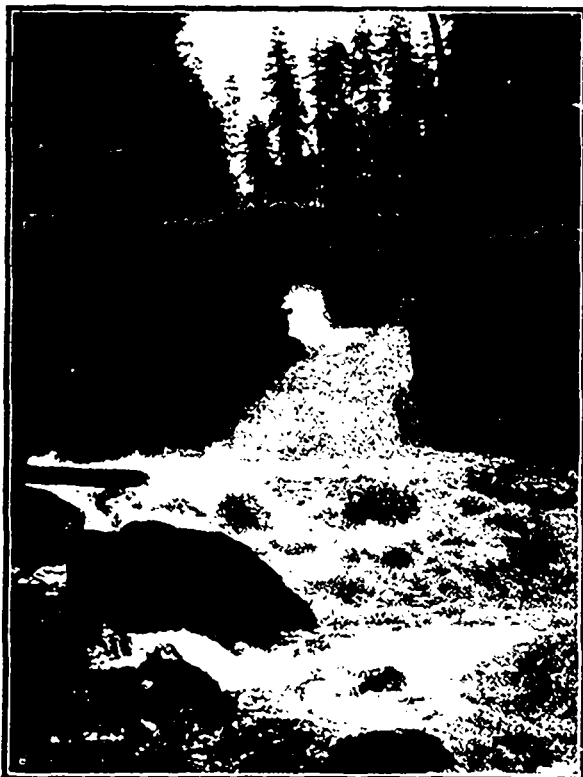
Alberta's production of coal in 1907 is stated to have been, approximately, 2,000,000 tons.

Pumping has been discontinued at Willow River Mining Company's deep-drift gold mine in Cariboo.

POWELL RIVER TO KINGCOME INLET, AND ADJACENT ISLANDS.

Geological Survey Report, by J. Austen Bancroft.

GEOLOGICAL SURVEY WORK on the coast of British Columbia, commenced in 1906 by Mr. O. E. LeRoy, was continued last summer by Mr. J. Austen Bancroft. Mr. LeRoy's official report, which was published in the "Summary Report of the Geological Survey Department of Canada" for 1906, pp. 31-34, was reprinted in the *MINING RECORD* of February, 1907, pp. 51-54. Mr. Bancroft's report, prepared for the "Summary Report of the Department of Mines, Geological Survey," for 1907, is now given, having been taken from that publication:



Middle Falls on Powell River

The work outlined in the following report is a continuation of that which was carried on by Mr. O. E. LeRoy during the summer of 1906. A week less than three months was spent during the summer of 1907 in actual field operations on the coast by the writer, who had with a most efficient assistant in Mr. R. P. D. Graham, demonstrator in mineralogy at McGill University. That portion of the coast extending from the mouth of Powell River to the entrance of Kingcome Inlet, was covered, an examination being also made of the islands, within this stretch, between Vancouver Island and the mainland.

The general trend of the coast is here N. 52 deg. W., corresponding to a line drawn between these

points, and along such a line the distance traversed was 112 miles. An idea can, however, be gained of the irregular nature of this coast by the statement that 1,540 miles of coast were examined, 680 of this being mainland and the remainder representing the extent of shore line presented by the numerous islands. This is as fine an example as exists in the world of a deeply dissected land area which has been submerged. Vancouver Island once was connected with the continent, and in the intermediate lowland there then existed at least one or two river systems, receiving tributaries chiefly from the east. Submergence drowned the river valleys, thus accounting for the salt water straits and inlets of to-day, while the many rugged islands represent former inter-stream areas.

During Triassic, and probably late Palaeozoic, times this region formed a portion of the ocean floor, and sedimentation was taking place. The latter part of the Triassic was marked by intense volcanic action, probably subaqueous in origin. This history is expressed in the isolated area of argillites, quartzites, and limestones, and the many varieties of volcanic rocks, such as amygdaloidal diabase, porphyrites, agglomerates, and tufas.

During Upper Jurassic times these stratified rocks, which once covered the region, were intruded in a widespread manner by granite and allied rocks. This vast intrusion, known as the Coast Range batholith, is largely composed of granite, but over wide areas it passes in basic facies which are most interesting. Diorites and gabbros are very common, while in Bute and Knight Inlets it exists over quite large areas as almost pure hornblende. On a few small islands to the west of Midsummer, and north of Fire Island, there is a beautiful development of an orbicular or kugel diorite.

The stratified rocks, then, formed the roof of this batholith. During the intrusion of the latter, portions of the roof were stopped off and engulfed within the magma; others, partially attached to the roof, draped themselves into it as "roof pendants," while, in other places, the stratified rocks may have been actually folded into the magma. Especially up the deeper inlets, that is, towards the axis of the Coast Range, the granite is locally gneissoid, and a schistose structure has been developed in some of the areas of stratified rocks. The strike of such gneissoid and schistose structures corresponds in general with the axial direction of the range. Two sets of dark dykes have cut the region since the cooling down of the batholith.

To-day, erosion has removed the roof, with the exception of a few isolated patches, and has truncated the included stratified masses. It is exceedingly important that these scattered areas of stratified rocks be located and mapped, for it is within them, and especially along their contact with the intrusive batholith, that the prospector should look for minerals of economic value. Within the region examined about 50 areas of such rocks were located.

Though only one fossil specimen had hitherto been found within the whole of this area, we were fortunate enough to discover five localities that contained among them at least four species.

in the district at the time of visitation. From Kelly Point to Quathiasca Cove this island is underlain by volcanic rocks. These represent a portion of one of the roof remnants of the batholith. Once



HEAD OF FREDERICK ARM, SITUATED OPPOSITE NORTH END OF VALDES ISLAND.

This arm is in a locality which some years ago received much attention from prospectors but has been neglected since. Mr. Herbert Carmichael, Provincial Assayer, in his report on the district as he saw it in 1901, made mention of Frederick arm. He wrote: At the head of this arm is a deep inlet called Estero Basin, connected with the former by a shallow channel which might be called a reversible river, flowing out when the tide is falling and in when it is rising.

About 35 prospects were visited during the course of the summer. South Valdez Island was the only locality where mining operations were being carried

floating on the plastic magma, during the adjustment upon cooling down, small faults formed in these volcanics. Heated waters and vapours passing up the

fault and joint-planes deposited copper minerals along these cracks, and where the adjacent rock was very porous, because of its amygdaloidal character, it became impregnated, chiefly with chalcocite, and with less quantities of bornite and native copper. This accounts for the stringers of chalcocite along a zone of shearing in the Ajax claim, situated on the north of Deepwater Bay (at an altitude of 950 ft. above sea-level and about one mile from the shore), and for the irregular vein on the Ingersoll, situated about two miles from Copper Cliff. On the Ingersoll a very irregular vein of chalcocite with a gangue of calcite and quartz may be traced for 350 ft., with a maximum width of 15 in., the country rock being unevenly impregnated for a width of 34 ft. The Copper Cliff, Commodore, and Steep Island mining properties are situated on highly amygdaloidal beds through which are disseminated over wide areas, chalcocite, a little native copper, and, on the Commodore, some bornite.

From Open Bay, on the east of South Valdez Island, to within a mile and a half of Granite Bay on the west side, there extends a series of limestones and interbedded greenstones having a maximum width of a little over a mile. In this area, which deserves the most careful prospecting, a number of claims have been located. On the Lucky Jim, along a contact between the limestone and a greenstone layer, chalcopyrite, pyrrhotite, pyrite, and some magnetite have been deposited. On the Geiler, a shaft 20 ft. deep sunk on a similar contact, displays a very good showing of chalcopyrite. A speck of free gold was noticed in a specimen taken from the Geiler. This area is, of course, not yet sufficiently examined to properly determine its possibilities, for at no point has it been opened up to a greater depth than 25 ft.

On the north of Rodonda Island the Elsie claim is staked on a deposit of magnetite that occurs between the granite and a patch of marble. At an altitude of 500 ft. one open-cut has exposed 54 ft. of magnetite, with a width of 35 ft., and at two other points smaller amounts have been uncovered. This property should be tested in depth, for the ore is high-grade and shipping facilities, although the ascent from the water is steep, could be quite easily arranged.

The Shoal Bay area, which is now deserted, is associated with contact phenomena between the granite and stratified series.

On Mars Island, to the southwest of Baker Island, small quantities of bornite and galena were found in a limited area of argillites and limestones. On one of the joint planes of a quartzite layer flecks of leaf gold were seen.

On the northwest of Village Island, in another area of argillites, a small amount of chalcopyrite and bornite was noticed.

Granite, suitable for building stone, may be found at a number of different localities with excellent opportunity for immediate shipment by water. At Squirrel Cove, Walsh Cove, towards the head of Pendrell Sound, and at Kwatsi Bay, the granite af-

fords such commercial possibilities. The area of orbicular diorite above mentioned would furnish a unique and very beautiful ornamental stone.

In certain depressions on South Valdez Island, Manrelle Island, and especially Reade Island, the finer grained glacial clays should make excellent material for the manufacture of bricks.

MINING COAL ON THE ARCTIC SLOPE.

Hauling Coal Over Ice 600 Miles to Nome.

IN ARCTIC REGIONS, at Cape Lisburne, coal is being mined, and hauled thence to Nome. Cape Lisburne is situated some 250 miles, by water, north of Bering Strait, in about lat. 69 N. and long. 166 W. An Alaskan correspondent of the *Mining and Scientific Press* informs that journal that "a consignment of Cape Lisburne coal arrived in Nome on December 10. It was freighted over the ice a distance of 600 miles in 16 days. Latest developments disclose three new veins of coal, which equals the best of that article imported from Seattle and British Columbia."

In United States Geological Survey Bulletin No. 314, "Report on Progress of Investigations of Mineral Resources of Alaska in 1906," p. 44, the following mention is made of the occurrence of coal in the Bering Sea and Arctic slope region: "The coal of the Bering Sea and Arctic slope region includes great range in geologic age and great variety in character. Coal is present in the Carboniferous, Jurassic, Cretaceous, and Tertiary. The Cape Lisburne coal includes Carboniferous semibituminous and Jurassic bituminous, and in the Colville basin Cretaceous bituminous coal and Tertiary lignite are present. The other coal, as far as is now known (except the Wainwright Inlet coal, which is Jurassic), is all lignite of Tertiary age. It is not likely that any of this coal is of immediate value for other than local use. The high-grade coal at Cape Lisburne may find an extensive market at Nome, but the shipping problems are serious. The other coal is of such character that its market must be restricted to local regions in which the cost of better imported coal is high. It may be of extreme importance and of great value in local operations, but it is not good enough to ship very far from the mines."

The following analyses show the approximate character and value of Cape Lisburne coal: Semibituminous; average of three analyses: Moisture, 3.66; volatile matter, 17.47; fixed carbon, 75.95; ash, 2.92; sulphur, 0.96; fuel ratio, 4.46. Subbituminous; average of 11 analyses: Moisture, 9.35; volatile matter, 38.01; fixed carbon, 47.19; ash, 5.45; sulphur, 0.35; fuel ratio, 1.24.

February 12 was the fifty-seventh anniversary of the discovery of gold, by Hargraves, in New South Wales, Australia.

IN THE ROCKY MOUNTAINS.

Official Report by D. B. Dowling.

ANOTHER SEASON'S WORK was done in the Rocky Mountains in 1907 by Mr. D. B. Dowling, who made the following Geological Survey report:

The work of the past season was directed mainly to obtaining more details of the coal areas north of the Saskatchewan and to an examination of the Athabaska Valley. The explorations of the previous summer define in a general way the coal areas in the mountains between the main line of the Canadian Pacific railway and Saskatchewan River. The route this spring lay outside this area, and some additional information was thus gained. The foothill country which was traversed was found to have few exposures of rock; enough, however, were noted to show that in many places the tilted rocks forming the foothill ridges were not all of the Upper Cretaceous but that many belonged to the Belly River series. A few indications of coal were seen, but nothing that appeared of economic value. The difficulty of approach naturally tends to diminish the value of measures in this vicinity. The foothills in this region are a series of very high ridges running with the general trend of the mountains and dissected by deep transverse valleys.

The problem of accessibility will be an important factor not only for the coal of the foothills but also for those fields situated within the mountain ranges to the west. An outlet for those just south of the Saskatchewan may be found by a devious course via the valley of a small stream north of Sheep River, but the grade to reach the Saskatchewan Valley may be high.

While passing from James River to the Clearwater, behind a very high ridge, rocks were noticed closely resembling those of the Kootanie. Should this resemblance prove real, there may be found on the canyon of the Clearwater better coals than the majority of the foothill fuels.

The uplift of the Bighorn Range appears to have reached its maximum but a short distance from the Saskatchewan to the Brazeau, but evidence of an extension to the south is seen in the higher foothill ridges. Northward they are not so pronounced, and fortunately for the future fuel supply of the northern roads they are more easily approached.

The development of mines in this district will both extend settlement to another large fertile area west of the Saskatchewan and open up a large lumbering area.

As the Saskatchewan Valley is approached it presents a pleasing contrast to the rough country farther south. From high spruce-covered slopes we descend to poplar groves and rich grass-covered flats. The general report from Indian trappers and traders is that the only point north of Bow River near the mountains where surface features show prairie con-

ditions (modified by the addition of scattered forests), is in the Saskatchewan Valley. The wide river flats within the mountains are a famous resort for the Indians with their horses and cattle, and we found on our arrival there in the latter part of May that horses had wintered there better than near Morley. The snowfall is less within the mountains than to the east, but it is not likely that the outer part of the valley will prove much less valuable for ranching purposes than the part we saw.

COAL AREAS.

The outcrop of the Kootanic measures on the south bank of the Saskatchewan was again visited, and in addition to the seams found last year another of workable dimensions was discovered. This had a thickness of 7 ft. 6 in., and the coal has a slightly higher fuel ratio than the 5 ft. 6 in. seam found a year ago, but cokes much better. The analysis of the smaller seam was published in the "Summary Report" for 1906 (p. 72). These two seams would, therefore, appear to furnish the smaller steam coal and the larger coking.

On Bighorn River several seams were seen in the canyon below the falls, but were not visited. About half a mile below the fall three seams that are close together could be worked as two. The lower two, separated by soft shale, have altogether 10 ft. of coal that in the laboratory forms a firm coke. The fuel ratio is slightly higher than in the coal south of the valley, and on that account should make a higher percentage of coke per ton.

On the south branch of the Brazeau, behind the Bighorn Range, where the big seam was found last year, the prediction that other seams would be found in the same measures was borne out very fully. Several small ones, below workable size, were found, but eight in addition to the big seam contain sufficient coal to be workable. What was taken last year as another outcrop of the big seam is now thought to be a smaller additional one of 8 ft. A fine-looking seam at the top of the lower part of the measures had 11 ft. 9 in. of clean coal separated from a 5-ft. seam below by 3 ft. of rock.

The upper portion appears to have the best coal. It is higher in fixed carbon and lower in ash. This seam and a 5 ft. 10 in. seam about 500 ft. below it are the hardest coals of the district and have generally about three parts fixed carbon to one of volatile combustible matter.

The other seven known seams have an average fuel ratio as above of 2.5 parts to 1.0, and the big seam of last year is the lowest of the lot, with a ratio of 2.30.

The workable seams as far as known have the following thicknesses and come in the following order, beginning at the top. The figures are for the amount of coal in each: 14 ft. 5 in., 8 ft., 11 ft. 9 in., 4 ft. 10 in., 3 ft. 11 in., 5 ft. 10 in., 5 ft. 8 in., 8 ft. 5 in., and 3 ft. 6 in., giving a total of 66 ft. 4 in.

As only about half of the measures were prospected, there may be here as much coal as in the

measures south of the Saskatchewan in the extension of the Cascade basin, namely, 15 workable seams with 95 ft. of coal.

The generally wet weather of the past summer was very unfavourable for travel in the muskegs of the foothills. In order to reach the Athabaska Valley, therefore, we descended Rocky River and examined the exposures of coal on Prairie Creek, just beyond the mountains. These measures are in the upper part of the Cretaceous and do not compare very favourably with those just described. The analyses are not completed, but so far show that this coal is of about the grade of the Edmonton coal. The Prairie Creek coal will, however, be of value should an industry such as the making of cement be started near the mountains on the Transcontinental railway.

STRUCTURE OF THE RANGES.

The general type for the ranges as far north as the Brazeau has been likened to a series of long narrow blocks tilted up to form ridges—an imbricated structure. Northward this is modified in that the blocks are wider, but have suffered a great amount of folding. This lateral displacement becomes apparently greater toward the north, and many fine folds are to be seen in the Athabaska Valley.

The edges of the blocks are pushed up to form the mountain chains, and do not show as many folds as are to be seen in the exposures lower down the westward slopes in the valleys. This has important results, in that this folding has broken and pushed up the Cretaceous remnants, which contain coal in the mountains farther south, so that they have been carried away in the formation of the valleys. The highest rocks of this series that could be found were remnants of the black shales that lie below the Kootanie coal measures.

A notable example of this is to be seen in the first mountain at the gap of the Athabaska, called Folding Mountain on McEvoy's map of the Yellowhead route. This hill is an anticline of Carboniferous rocks with a mantle of Triassic and Jurassic rocks covering its southern extension. A fault running parallel to the range just outside brings these beds against the Middle Cretaceous, and another fault to the west discloses them over-ridden by Lower Carboniferous, so that in the immediate vicinity of the river there seems no hope of finding the true coal measures. Northward the conditions may change enough to allow of some of the higher beds being found still in place.

COAL MINES.

After the field-work was closed visits were made to several of the mines, and the following notes showing their progress may be of interest:

Bankhead mine is producing about 1,000 tons per day, 500 of which is sized for market and 300 is compressed into briquettes. Another unit of the briquetting plant will soon be installed, and the total output will then be utilized.

At Cammore the spur to the Sedlock prospect was nearly finished, and the additional mine will soon be

in operation. In the Cammore mine the main haulage way at the second level is being thoroughly re-timbered and widened to make room for compressed air haulage. A tunnel has been put through to No. 6, and the Cary seams, and mining on these will soon commence. The output should increase and is much needed for the railway.

At Lille, to which a short visit was paid, it was found that the output was reduced to 400 tons a day on account of a fault which cuts the main seam at a slight angle. The coal is all washed and coked, making about 240 tons of coke.

Bellevue is turning out about 700 tons, but an increase is expected shortly, when the management expects to handle 1,000 tons per day.

Coleman is mining from two of its best seams, one a coking coal and the other steam. The output is about 2,000 tons per day, and most of the steam coal is shipped to the roads north of the Canadian Pacific railway.

NATURAL GAS FOR LIGHTING TRAINS.

NNATURAL GAS is obtainable at Medicine Hat, Alberta, in considerable volume, and it is stated the Canadian Pacific Railway Company proposes using it for lighting purposes on its express trains. The following information on this subject was lately published:

The most important experiment yet tried by the Canadian Pacific Railway Company for improving the lighting of its trains, has been successfully carried out by the use of natural gas. The object was to ascertain if the Pintch gas tanks on the passenger coaches could be charged with natural gas for illuminating purposes. The gas proved that it accommodated itself perfectly to the Pintch gas fixtures and gave a far better light.

The car selected for the test was equipped with two standard Pintch gas tanks, with a joint equalized capacity of 1,160 cu. ft., and sent to Medicine Hat. The tanks were charged with natural gas to a pressure of 10 atmospheres at 140 lb., which with the Pintch gas would light the car for 36 hours. The tanks were charged on Tuesday at 2 o'clock p.m., and burned until 6 a.m. the following Thursday morning, thus demonstrating its superiority over the Pintch gas by four hours. The Pintch gas inverted mantles were used in the test.

The test was made of the two gases together, and this also proved successful. It is the intention of the C. P. R. to recharge all passenger coaches on the main line with natural gas. This will be the best advertisement possible for the wonderful gas fields of western Canada.

The C. P. R. officials in charge are much pleased with the experiment, as it involves an important economic question. It is said a large plant for charging these tanks will be erected at Medicine Hat in the near future.

MINERAL LOCATIONS ON MORESBY ISLAND, QUEEN CHARLOTTE GROUP.

Report by Wm. Fleet Robertson, Provincial Mineralogist.*

QUEEN CHARLOTTE ISLANDS lie between the 52nd and 54th degrees of north latitude and about 85 miles westward of the mainland, at the mouth of the Skeena River. The distance from these islands to the nearest of those lying adjacent to the coast of the mainland is from 60 to 70 miles across an open stretch of water—Hecate Straits—sufficiently open to the Pacific Ocean to share its waves and winds, which have proved enough of a barrier to prevent much intercourse by small boats between these islands and the mainland, while, until within the past year, communication by steamer was only to be had once a month. These islands, so commandingly situated off the main coast, have therefore remained sufficiently *terra incognita* to stimulate the imagination and create much interest.

In the earlier days the Queen Charlotte Islands were peopled by the Haida Indians—the finest and most warlike tribe in British Columbia—whose raids and incursions into the districts of the mainland and Georgia Straits, with, in many cases, the decimation of the tribes in these districts, form an important part of the Indian history of the province. The warlike character of the Haidas, coupled with the remote and insular position of the district, has undoubtedly deterred prospecting or any very close investigation, as is evidenced by the fact that the islands are to-day practically uncharted, save in a very approximate way.

The outline of the west coast of the islands, as shown on the Admiralty charts, is from a rough survey made by Vancouver in 1793, while cruising along the coast in a sailing ship. The east coast line is a little more accurately marked, as this was investigated in 1878 by the late Dr. G. M. Dawson, of the Geological Survey of Canada, who made a rough reconnaissance survey, the comparative accuracy of which, though a tribute to that wonderful explorer, still leaves much to be desired.

HISTORICAL.

The early voyages of discovery to the vicinity of the Queen Charlotte Islands, and in fact the entire northern Pacific coast, were all in search of a supposed northern passage for vessels from the Atlantic to the Pacific Ocean—in other words, a short waterway from Europe to China.

As early as 1592 the Spanish Viceroy of Mexico fitted out an expedition for this purpose under Juan de Fuca, who sailed as far north as Vancouver Island, although it is not known that he ever reached the Queen Charlotte Islands.

In 1639 the Court of Spain appointed Bartholo-

*In Bulletin No. 1, 1908, of the British Columbia Bureau of Mines.

mew de Fonte to command a squadron fitted out in Peru, which sailed in 1640. In June, 1640, he records entering an archipelago of very many islands, called by him St. Lazarus, in latitude N. 53 deg.—the latitude of the centre of the Queen Charlotte group—and that he sailed for many leagues through intricate channels between islands. These may have been the Queen Charlotte Islands, but some doubt has been entertained as to the accuracy of both these early voyagers.

In 1774, Juan Perez, in the Spanish corvette "Santiago," saw and named the north cape of Queen Charlotte Islands, Cape de S. Margarita, but, finding no anchorage, did not land.

In 1775, another Spanish expedition, under Bodega and Maurelle, coasted along the shores of the islands, but did not land.

In 1787, Dixon, in the British ship "Queen Charlotte," spent over a month on the coast of the islands, tracing the west coast from the north to the south end and sailing up the east coast as far as Gunshewa Inlet, and named the group of islands after his ship. He traded with the Indians, buying furs, etc., the real object of his voyage.

During the next few years the islands were frequently visited by fur traders in British, French, Spanish and American vessels.

In 1792, Capt. George Vancouver, in H.M.S. "Discovery," arrived on the west coast of America, and during the next three years was engaged in a series of surveys and explorations which to-day form the basis of our present charts of the west coast of these islands.

Attention seems to have been withdrawn from the islands with the abandonment of the search for the "North-West Passage," until 1852, when H.M.S. "Thetis" visited the islands on a surveying expedition, followed, in 1853, by H.M.S. "Virago," and by H.M.S. "Alert," in 1860.

"In 1852, the Hudson Bay Company despatched a party of men in the brig 'Una,' Capt. Mitchell, to discover the locality from which several specimens of gold had been brought by the Indians. This was found to be on Gold Harbour, in Kuper Inlet, on the western coast of Moresby Island. The gold was found in small irregular veins, which soon proved to 'run out' in every direction. The quantity of gold obtained by the expedition was considerable, but has been variously stated. The enterprise was soon abandoned, but the discovery for a time created quite a *furor*—the first gold excitement in British Columbia—and the locality was visited by a number of miners, but with no further success."

As to the amount of gold actually obtained in this first expedition, no very authentic data is obtainable; tradition makes it very large, but Major Downie, mentioned further on, who visited the locality a few years later on a similar errand, places the amount at \$5,000.

In 1859, Major William Downie, a miner, with a party of 27, in a schooner, under Capt. Robinson,

went to Gold Harbour, and he records in his book, "Hunting for Gold," that the party found quartz, but no amount of gold. They "examined the spot where a large quantity of gold had been taken out some time before, but could not find anything worth working." Major Downie, however, reports that he found coal on Skidegate Inlet, and he is the first to have mentioned its existence on the islands. He, however, did not follow up his discovery, but soon left for the mainland.

"About this time a Capt. Torrens also went with a party to prospect on the Queen Charlotte Islands, and narrowly escaped massacre by the Skidegate Indians."

In 1862 the "Queen Charlotte Mining Company" was formed in Victoria, and a party of men under Mr. Francis Poole—an Englishman claiming to be a mining engineer—was sent north, landing on Skinecuttle Island in the inlet of that name, on which island and the adjoining island, Burnaby, they remained until 1864, engaged in prospecting. Their prospect shafts, etc., are still visible to-day, and have been re-staked by present-day prospectors, more, it seems, on their historic fame than on the amount of mineral visible. Mr. Poole gives an account of his expedition in a book, "Queen Charlotte Islands," published in London in 1872.

So far as is known, this constitutes the sum of the recorded early prospecting ventures on the Queen Charlotte Islands. That there have been some unrecorded ventures is evidenced by the fact that at Copper Bay, some nine or ten miles south of the Sand Spit, there is the remains of an old shaft, now being unwatered and cleaned out, which has been proved to be at least 100 ft. deep, and of which there is no record. Even traders who have frequented the islands for 25 years say the Indians know nothing of its origin or by whom the work was done; a tree, growing on an old dump, would indicate that it was over 40 years ago.

Despite the fact that the early prospectors had all found enough to indicate the probability of extensive mineralization on the islands, for many years these early discoveries were not followed up and little or no serious prospecting took place. It was only when attention was focussed on this northern part of the coast, by the location therein of the terminus of a transcontinental railway, that the Queen Charlotte Islands again received attention from the prospector, and the more valuable discoveries that have been made have been all located within the last two years, many within the past year. Consequently, it is not to be wondered at that, up to the present, little more than very meagre development work has been done on the various claims recorded. In addition to this fact, the area found to contain mineral is so extensive that prospectors, having performed sufficient work on their respective claims to hold them for the year, have stopped at that and spent their time in trying to locate further mineral deposits.

As a result, it was found on examination that,

with one or two exceptions, there were to be seen only surface prospects, of which no very definite future can be foretold; the most that can be done is to point out the probabilities from such indications as have been disclosed.

As was natural, when prospecting was resumed, it began in the vicinity of the indications found many years ago, and has proceeded along the "line of least resistance," that is, in the direction from the initial point which could most easily and safely be reached by small boats.

Skinecuttle Inlet was the starting point, and the majority of the claims so far staked have been in the bays or harbours opening off this inlet, viz., Huston Harbour, Harriet Harbour, Ikeda Bay and Collison Bay, with a few, and, at present, not so important localities farther south.

From Skinecuttle Inlet prospecting continued north and some important locations have been made along the east coast from Klunkwoi Bay to Gumshewa Inlet, in a formation quite different from that found in the vicinity of Skinecuttle Inlet. As yet, all the locations have been made close to the sea shore, within distances that could be reached in a day from a boat.

The formation, which has been found copper-bearing, at Klunkwoi and Gumshewa Bays, appears to continue N.W., parallel to the length of the island, and is again found on the north end of Moresby Island, on Skidegate Channel, between the Narrows, where also it is impregnated with copper, but whether the metal is here in commercial quantities has not yet been demonstrated.

GEOLOGICAL OBSERVATIONS.

The first geological examination made of the Queen Charlotte Islands was in 1872, when Mr. James Richardson, of the Geological Survey of Canada, visited certain coal mines on Skidegate Inlet. Mr. Richardson's time was limited to a few days and his examination did not extend beyond the vicinity of Skidegate Inlet.

In 1878, Dr. George M. Dawson made an examination of the east coast of the main islands; the full text of his report may be found in the "Report of the Geological Survey of Canada for 1878-9." The following extract from Dr. Dawson's report bears upon the geology of Moresby Island:

"The mountainous axis of the Queen Charlotte Islands, from Cape St. James to Skidegate Channel (Moresby Island) and probably still farther northward as far as Hippa Island, is composed of a mass of much disturbed, and in some places highly altered, rocks, which have at first sight an appearance of great antiquity, but are found on closer inspection to owe this appearance to the inclusion of great masses of easily altered contemporaneous volcanic materials, and to the fact that they have been subjected to an extreme of flexure and disturbance which very frequently takes the character of actual fracture and displacement, as has been observed elsewhere on the Pacific Coast. To work out the intricacies of these

older rocks, which may be looked on as the nucleus of the islands, would be a work of time and would involve much patient labour.

"In a preceding report on British Columbia it has been found necessary to include for the present the Palaeozoic and Triassic rocks under a single heading. They lie together, unconformably, beneath well-characterized Cretaceous beds, but are so much involved that no attempt has been made to separate them except locally. In the southern part of the interior of British Columbia both Carboniferous and Triassic fossils have been found among these older rocks, but no forms of greater antiquity. In the Queen Charlotte Islands, now reported on, fossils have been discovered in the rocks unconformably underlying the Cretaceous in a number of places. These serve to characterize a certain zone of argillites and limestones, which is frequently repeated in sections along different parts of the coast, as distinctively Triassic; and shows it to represent the so-called Alpine Trias, which is so largely developed in California and Nevada. No forms distinctively Carboniferous or Palaeozoic have yet been discovered, but from the intimate association of Carboniferous and Triassic rocks in the southern interior of the Province, and more particularly from the occurrence of a great mass of rocks largely volcanic in origin and believed to be Carboniferous in age, in the southern part of Vancouver Island—which forms part of the same axis of elevation with the Queen Charlotte Islands—it is highly probable that rocks of this age may come to the surface in some places.

"The limestones of these localities may, therefore, possibly be of Carboniferous age, and if so, a large portion of the associated rocks of volcanic origin must be attributed to the same period. As it is at present impossible to unravel the structural complexity of the sub-Cretaceous rocks of the islands, it has been thought best to colour them together on the map as Triassic, in correspondence with their characteristic fossils."

In 1905, Dr. R. W. Ells, of the Geological Survey, made an examination of the northern large island of the group, Graham Island, his work being practically confined to the coal-bearing formation of Graham Island and its environment. Dr. Ells' report is to be found in Part B. of Vol. XVI. of "Reports of the Geological Survey," while a summary of his report has been reproduced in the report of this Bureau for the year 1906, on pages 74 *et seq.*, together with a map of Graham Island.

In 1901, Mr. H. Carmichael, Provincial Assayer, made an examination for this Bureau of certain of the islands near and off the east coast of Moresby Island. His report is to be found in the "Report of the Minister of Mines for 1901," on pages 999 *et seq.*

In 1902, Dr. T. R. Marshall, D.Sc., M.I.M.M., of Glasgow, on behalf of this Bureau, made an examination of the coal prospects in the interior of Graham Island. His report is contained in the "Report of the Minister of Mines for 1902," on pages 54 *et seq.*

CLIMATE.

The climate of Moresby Island is particularly favourable to prospecting and to subsequent mining operations, since in summer it is never very warm, while in winter there is seldom snow or frost in the lower lands, although both are to be found on the higher mountains, the highest peaks retaining snow-caps well into the summer.

The west coast of the island is always dangerous to approach owing to the rocky character of its shores and the prevailing west wind, causing an ever-present ocean swell, which renders landing from a small boat very difficult except in the sheltered bays, and these bays, though quite numerous, are still uncharted and unknown save to a few prospectors, who have bought their knowledge by hard experience.

The east coast is in summer usually safe, as it is protected from the west wind by the main island, and the fringe of smaller islands along its shores affords some protection, and offers ample refuge, from all winds, the inner passage being always navigable for small boats.

The warm winds off the Pacific, striking the high mountainous backbone of the island, produce in winter a great deal of rain and in summer a mist, which, however, seldom develops into fog.

As compared with the shores of Vancouver Island, those of Moresby Island are comparatively free from troublesome underbrush.

The timber, though small for lumbering, is admirable for mining purposes, and is very plentiful, while the damp climate does away with the dangers of forest fires.

There is little soil to hamper prospecting, the surface being, however, heavily carpeted with moss.

SKINCUTTLE INLET.

As already remarked, the greater amount of prospecting that has been done on Moresby Island is in the vicinity of Skincuttle Inlet, which was in 1862 the scene of early prospecting. The general geological formation of almost all Moresby Island has been placed as Triassic by Dr. Dawson, with a possibility of some Carboniferous measures. Lithologically, the formation was originally composed of limestones, shales, etc., with heavy deposits of volcanic matter from some local point of issue.

On the lower end of Moresby Island, as seen in the exposures in the various harbours bordering on Skincuttle Inlet, whatever may have been the original formation, it has been subsequently subjected to such an upheaval, with the accompanying faulting and bending, and has been so cut by innumerable feldspathic dykes, that no sign of the original formation is traceable. The dyke intrusions are so numerous and extensive as to form the greater part of the rock mass, the sedimentary rocks showing as patches, or isolated masses, without any apparent relation to the next.

The important part, however, is the existing mineral deposits rather than the geological formation, and from the number of mineral locations seen it

would appear as though the whole promontory between Huston Inlet and Carpenter Bay was extensively mineralized, the locations so far made simply serving as an index to its general character. The first locations in recent years were made on the shores of Harriet Harbour, from which point prospecting extended to Ikeda Bay and Huston Inlet, and later to Collison Bay and Carpenter Bay.

The mineral claims examined in this vicinity during this trip were all within the area mentioned. Speaking generally of these claims, the mineralization is always found in the immediate vicinity of, if not in the actual contact of, limestone with one of the larger dykes and consists primarily of magnetite, with a greater or lesser amount of chalcopyrite and occasionally considerable pyrrhotite.

IKEDA BAY.

The Japanese firm of Awaya, Ikeda & Co., of Vancouver, originally interested in the fishing off the Queen Charlotte Islands, has staked claims on all the hills surrounding Ikeda Bay, and this company was found to be the only one on the island making any serious attempt at mining. It is employing more than 100 men, mostly Japanese, in mining, mining construction and prospecting the claims already staked.

At the inner end of the bay the company has erected a large and substantially built wharf, capable of receiving the largest of the coasting steamships. Connecting the wharf and the mine workings a 36-in. gauge tramway has been built, over which, on cars drawn by horses, the ore is brought down for shipment.

Lily Group.—While some development work has been done on all the company's holdings in the vicinity, the greater amount and all actual mining has been focussed on the Lily group, which consists of eight claims, the Lily, Sweet Pea, Apple, Carnation, Orchid, Lemon, Peach and Pansy. The development work for the group has been performed on the Lily, upon which the most available outcrop appeared. This outcrop showed up in a small creek, the water of which had washed clear an outcropping of magnetite carrying chalcopyrite. This outcrop occurs in places along the actual contact and elsewhere near the contact of limestone and an igneous rock, apparently a diorite, there being evidence of much movement and some faulting. This deposit, as is the nature of such deposits, does not assume the characteristics of a fissure vein, and is not very clearly defined, nor is it of uniform width or tenore of copper.

The development consists of what is called No. 1 tunnel, which is really an open cut in the creek bed along a contact of limestone and diorite, much altered, along which is a deposit of magnetite with copper pyrites; this has been exposed by the work done for some 30 or 40 ft., and has a width of from one to two feet. It would be difficult to estimate the copper contents of the exposed orebody, as this mineral is far from uniformly disseminated throughout

the lead, occurring sometimes in bunches of quite rich ore, again scattered through the orebody, while in places the magnetite is practically barren.

Some 400 ft. farther down the creek is the No. 2 tunnel, and here most of the development work has been done, and all the mining, some 700 tons of copper having been shipped from this opening in 1907, assaying about 9 per cent. copper, 3.5 oz. silver, and 0.25 oz. gold to the ton. This tunnel had been driven in on the strike of and following the vein for some 160 ft. in a S. 10 deg. E. direction. For the first 50 ft. the ore has been stoped out up to the surface, the hanging-wall, dipping at an angle of about 80 deg., being supported by timbers, although in the tunnel proper no timber is required. The tunnel is about 10 ft. wide, and in places the vein-matter occupied pretty well the whole face of the drift.

In the latter part of August the face of the drift was not in ore, the vein having been temporarily lost, but when the property was again visited, about two weeks later, it was found that a cross-cut had been driven to the left, towards the hanging-wall, in which the vein had been again found, and the main drift was being deflected to pick it up.

The ore from the tunnel is run out on cars and dumped on to an incline, at the bottom of which is a picking shed, where the ore is broken and hand-sorted, the sorted ore being sacked and run down to the dock on cars drawn by horses, a distance of little over a mile, in which distance there is a drop of about 300 ft. On each car two tons of ore are carried, and one horse is required to bring back the empty car; a driver takes down two cars at a trip.

All the work about the mines is performed by Japanese. The miners working "single handed" are very efficient and compare favourably with the average white miner at this class of work, but the timbermen work very slowly. Some 100 ft. from No. 2 tunnel, and 65 ft. lower down, No. 3 tunnel has been started and has been laid out as the main working tunnel, the entrance being very heavily and solidly timbered where it runs through the gravel surface wash. This tunnel had, in August, only been driven through the wash to solid formation in which no work had then been done.

There were employed in actual mining operations: At No. 1 tunnel, about 14 men; at No. 2 tunnel, about 12 men; at No. 3 tunnel, about 8 men.

Chrysanthemum Group.—The same company has also staked out the Chrysanthemum group of eight claims, viz.: Peony, Chrysanthemum, Rose, Violet, Cherry, Apricot, Bamboo and Maple mineral claims. This group is located on the southwest side of Ikeda Bay, at an elevation of about 400 ft. above, and about half a mile back from the sea; the approach being a gradual slant. On the Chrysanthemum mineral claim there is a large exposure of mineral, some 50 ft. long by 20 ft. wide and about 15 ft. high, consisting of 4 ft. of nearly solid magnetite, with a small percentage of iron sulphide, between defined walls of

diorite, and dipping nearly vertical, with strike north and south.

Lying adjacent to this, and to the east, is a zone of from 4 to 8 ft. wide of magnetite of a much finer grain, but not as pure, being considerably impregnated with iron pyrites and some copper pyrites. The amount of sulphide in this latter zone is so high as to render it valueless as a commercial iron ore, whereas, as far as developed, the percentage of copper is too low to be profitably worked.

On the Rose mineral claim, of the same group, there is naturally exposed in a bluff a mass of magnetite which, on the surface, is some 20 ft. high and 50 ft. long. This occurs along a diorite-limestone contact, the ore lying nearly horizontal underneath the limestone. In the limestone there is a cave, which was followed in, and up, for over 50 ft., formed by the leaching of a stream of subterranean water, and in this there is considerable hydrated iron oxide.

At other points in the group, higher up the hill, there were seen a number of smaller exposures of magnetite, all of which are quite undeveloped or even explored, so that it is quite impossible to say whether the various outcrops and exposures are in any way related or connected.

Speaking generally, the explorations made indicate that the group contains a great deal of mineralization, masses of magnetite of undetermined sizes, all carrying an appreciable percentage of sulphides of iron and copper, but in no instance has copper in marketable quantity been discovered.

Lotus Group.—The Lotus group, consisting of six mineral claims, and also owned by the Awaya-Ikeda Company, is located on the south-east side of Ikeda Bay, about half a mile back from the shore and at an elevation of some 500 ft. above the sea. The mineral here exposed is pyrrhotite, the magnetic sulphide of iron, of which a very large body has been exposed with comparatively little work. This exposure is about 20 ft. wide and is visible for a height of 20 ft., while 15 ft. more depth of mineral is reported as covered by the dump made in the work done. This mass of mineral is bounded on either side by diorite country rock, the contact of which with the pyrrhotite is not sharply defined, but is a gradual replacement. Included in the mineral mass are bunches of limestone, although solid limestone formation was not visible. A sample made up of fragments broken from the various large pieces of mineral on the dump assayed three-quarters of one per cent. of copper, with traces of gold and silver; while an average sample broken from the exposed face assayed: Copper, 0.4 per cent., with traces of gold and silver. The work done on the group was also more of an exploratory nature than development work, and while the great mass of mineral exposed has no present economic value, it strongly emphasizes the extensive mineralization of the vicinity and encourages further exploration of the group and its surroundings.

COLLISON BAY.

Collison Bay lies next to Ikeda Bay to the south-

east and is separated therefrom by a range of mountains forming a narrow neck of land running out into Skineuttle Inlet.

On August 26, a gasoline launch was taken from Ikeda Bay around to Collison Bay, but, unfortunately for the writer, the prospectors interested in claims there were absent from their claims and cabins, and it was with some difficulty, and much uncertainty, that the various claims mentioned were found; therefore it is quite possible that there may be some confusion in the names of claims seen and that some of the workings may have been overlooked.

Meal Ticket.—The Meal Ticket mineral claim and the adjoining claim, the Cash Box, are located on the north side of Collison Bay, about 280 ft. elevation and about one-third of a mile back from the water. The claims are reported as located by R. J. Leckie in October, 1906. On the Meal Ticket a tunnel has been driven in about 33 ft., and at 21 ft. in cuts obliquely a 4-ft. lead of pyrrhotite, which continues on the left side of the tunnel to the face. The tunnel having been deflected to the right where the mineral was struck, has consequently not cut through the lead, and the thickness of the lead must be inferred from its outcrop on the surface, to the left of the tunnel mouth, at which point a fault plane is observed, along which the lead has been shifted a couple of feet north and its continuation to the east is seen in the dump in the mouth of the tunnel. A general sample of the pyrrhotite exposed was taken and assayed less than half of one per cent. copper, with traces only of gold and silver. The country rock in the vicinity of the tunnel is very much altered volcanic rock, probably originally a diabase.

To the north of the tunnel, and on the Cash Box mineral claim in the cliff, there is, over a length of 100 ft., an exposure of magnetite carrying a considerable percentage of sulphides, chiefly pyrrhotite with some chalcopyrite.

Deakin's Claim.—To the north of the previously mentioned claims, and at an elevation of some 200 ft. above sea level, there is an exposure of highly crystalline limestone cut by a number of small diorite dykes, along the contact of which was a small amount of copper pyrites. Some of these contacts have been exposed along the course of a small creek—dry in summer, on which an open cut some 8 to 10 ft. long had been made. No sample was taken of the mineral exposure.

HARRIET HARBOUR.

Harriet Harbour lies to the west of Ikeda Bay and to the east of Huston Inlet, and is separated from each by mountains which run out into the sea in narrow arms, not over a mile wide at the head of the harbour, but two or three miles long.

The townsite of Jedway, with a wharf, store, post office, and several cabins, has been located on the south-west end of Harriet Harbour, and here the office of the deputy mining recorder of the district is situated. It was on the shores of this bay that the first of the more recent mineral discoveries of the

district were staked, by Watson & Thompson, in 1905. These discoveries may be considered the origin of the present activity in Moresby Island.

Copper Queen.—Probably the best known claim on this harbour is the Copper Queen, now held under bond by J. S. McMillan, of Seattle. The claim is situated on the south-west side of Harriet Harbour, some 5,000 ft. from the water and 880 ft. above it. On this claim, as on most of the claims in the district, the mineralization consists of magnetite carry-variable amounts of copper pyrites, and upon the percentage of this latter mineral found depends the value of the deposits. When visited, the only development work done consisted of a large open pit in a small draw, made to expose and develop an exposure of magnetite found in a bluff on one side of the "draw." The work had succeeded in exposing a very considerable body of magnetite in a country rock, which appeared to be a much altered diabase. In the side of the cut there was visibly exposed, dipping at an angle of 48 deg., a body of magnetite 6 ft. thick, of which about 4 ft. 6 in. was almost solid magnetite, containing irregularly distributed bunches and stringers of copper pyrites. The upper part, 18 in., of the orebody, although chiefly magnetite, was more mixed with rock matter and appeared to the eye to carry a lower percentage of copper. This face stood exposed for a height along its slope of 25 ft., with indications that it continued down under the dump and into the hill for some farther distance; at its highest point the orebody came out practically to the surface. An average sample of the exposed face of the orebody was carefully chipped off across the whole 6 ft. exposed and at different places in its length; this sample assayed, copper 1.4 per cent., with traces of gold and silver. Some 50 to 75 tons of mineral was piled up on the dump, and this also was roughly sampled, giving about 1.5 per cent. copper.

Some little distance up the creek from the open cut, and also about 300 ft. to the east, are bodies of limestone, although none show in contact with the orebody.

On the opposite side of the draw, or gully, referred to, from the open cut, some little surface stripping has been done, showing further bodies of magnetite, the connection of which with the main body is somewhat obscure.

Iron Mountain. The Iron Mountain is another claim in the immediate vicinity, held by J. S. McMillan. On this but little actual development has been done, but stripping has exposed a similar body of magnetite of considerable size, showing copper pyrites along its margin.

Moresby Island.—The Moresby Island mineral claim lies somewhat to the south of the Copper Queen and is also held by J. S. McMillan. This claim overlaps to a considerable extent the Tate mineral claim, owned by T. J. Watson, as to the merits of which dispute no opinion is expressed. The first open-cut seen showed a country rock consisting of a decom-

posed diabase or diorite, with a considerable quantity of secondary red garnets, in crystalline form, all showing copper stain and a small percentage of copper.

In the second open-cut, near where a fine-grained igneous dyke, of later origin, cuts through the country rock, there is a strong impregnation of iron pyrites and nearby a small seam of copper pyrites, while a certain amount of copper carbonate occurs in the rock matter, but no considerable body of ore has been exposed. A sample was taken of the exposed face of the cut, which gave, upon assay, copper, 2.7 per cent., wet assay, with traces of gold and silver. The face of the cut is about 10 ft. long and 10 ft. high, and was in at the bottom only 6 to 8 ft.

Reco.—The Reco mineral claim, held by J. S. McMillan, is located nearer the bottom of the hill, only 200 ft. above and a quarter of a mile from the water. The country rock here is a much altered diabase, in which a deposit of magnetic iron, about 3 ft. thick, is seen dipping into the hill at an angle of about 40 deg., accompanied by a black hornblendic dyke and overlain by a close-grained silicious rock. The magnetite carries sulphides of iron and copper, the copper contents in the exposed face of the magnetite being estimated at from $\frac{3}{4}$ to 1 per cent. copper. The exposure was visible for some 50 ft. up the bed of the creek and was fairly uniform in character.

An inclined shaft had been sunk on the deposit, and three sets of timbering, 5 ft. apart, set up, below which the shaft is reported to have been sunk about 6 ft., but as it was full of water it could not be examined. A 16-horse-power boiler and a steam drill were on the ground, covered by a rough board shed. This boiler had formerly been used in prospecting the claims farther up the hill.

Modoc.—The Modoc mineral claim, also held by J. S. McMillan, lies about 1,000 ft. north of the Reco. Here there was visible, in the bed of the creek, an irregular exposure of impure magnetite, carrying a considerable percentage of iron sulphides and a very small percentage of copper pyrites. The deposit appears to be cut off by a dyke and no ore of commercial value was visible.

HUSTON INLET.

Huston Inlet lies immediately to the west of Harriet Harbour and is a fine body of navigable water. Some little prospecting has been done on its eastern shore, on the range of hills which separates it from Harriet Harbour, but the locality must as yet be considered as unexplored. The few recorded claims are quite unprospected and undeveloped, only a little surface scratching having been attempted.

Gold Cliff.—A small cabin, known as Camp Surprise, has been erected on North Bay, a small arm of main inlet, from which a crude foot-trail leads up to the Gold Cliff mineral claim, a claim staked in the names of John McLennan, Smith & Frank Watson. Here, on a lime-diabase contact, dipping with the hill at an angle of 35 deg., and a strike S.W. and N.E., there was visible a deposit consisting of 12 in. in

thickness of magnetite, overlain by 24 in. of calcite, carrying copper pyrites and iron pyrites, and again, above this, a thin seam of quartz and calcite, fairly crystalline, and above these the country rock was exposed. This exposure was visible for some distance along a very steep hillside, the outcrop being nearly horizontal, broken somewhat by vertical faults which interfered with its continuity. Some bunches of very pretty copper ore were visible, but they were small. As a prospect, there is encouragement to some further development, but nothing so far shown has any economic values. An assay, showing considerable gold, was reported from the claim, but it has not been confirmed by any subsequent samples and is regarded as doubtful.

The Gold Peak, an adjoining claim held by the same owners, was not visited, but was reported by Frank Watson, one of the owners, to be about the same as the Gold Cliff, but with even less development done.

On the opposite side of the valley of a small creek was the Surprise mineral claim, staked by Frank Watson and sold to C. H. Parks. It lies at an elevation of about 500 ft., and is three-quarters of a mile from the inlet, and is undeveloped. The ore, from samples seen, is pyrrhotite, carrying some copper pyrites.

About a mile from the sea, and farther up on Thunder Mountain, on the north bank of the creek, the Hercules, Ida and Dusky Maiden mineral claims have been staked by McMillan, McEachern and Frank Watson, and on these one assessment has been recorded. These claims were not visited, but are reported to contain a deposit of magnetite carrying copper sulphides.

BURNABY AND COPPER ISLANDS.

Red Raven.—The Red Raven mineral claim, on the south side of Coper Island, a claim recently re-staked by Abe Johnson and so named by him, is of interest as having been the spot upon which Francis Poole and his party did their work in 1862-3, and where, about five years ago, a prospector named Abe Heino, having re-located the property, did considerable work, the remains of which are still visible and excite in visitors much curiosity as to "what he was driving at."

Geologically, the island is very similar to that portion of Moresby Island immediately to the south, and some two or three miles distant. The sedimentary rocks are so cut up by later volcanic rocks as to give the appearance of the limestones being the intrusions and the volcanics the country rocks.

In a little cove running into the island some 30 to 40 ft., with nearly perpendicular walls and a rocky floor, submerged at high tide, a tunnel was driven from the level of the rock floor for a distance of 35 ft., and from this tunnel a cross-cut had been started off to the right, towards the water, for some 10 ft. The work had been done along a limestone diabase contact, along which was visible a little magnetite carrying some copper pyrites, but in no place was the mineral-

ization sufficient to be of any importance. The present owner has done no work on the property, the work seen having been done years previously. The property is interesting, as showing what Poole spent two years upon, while so many much more promising showings were "sticking out of the ground" within three or four miles, on the larger island.

On Burnaby Island more of the old work done by Poole in 1863 was visible. On the south side of the island there was found a shaft, with very old timbers, sunk about 12 ft. deep, which had followed down a limestone diabase contact on which a small quantity of copper sulphides was visible. Some short distance to the east, along the steep rocks of the shore, on a contact of crystalline limestone and trap rock, a shelf had been blasted out, sufficient for a foothold, from which a tunnel had been driven in for 12 ft., at the inner end of which was a winze 9 ft. deep. The contact carried a little copper pyrites and some magnetite, but was unimportant. It could not be learned if these old workings had been recently re-staked.

Sea King.—The Sea King mineral claim is a recent staking on the south-west side of Burnaby Island, by Captain Locke, of the steamship "Princess Beatrice." On the beach, between high and low water, there is exposed a contact of limestone and fine-grained trap, along which stands, exposed by action of the waters, a contact deposit of magnetite, from two to three feet wide, dipping at an angle of 80 deg. to the west. The magnetite carries some iron pyrites and a small percentage of copper pyrites.

In a small gulch, a short distance to the west, there is a light-gray-coloured igneous dyke, fairly crystalline, and showing some hornblende, having a width of 4 or 5 ft., containing some stringers of calcite and also some magnetite and copper pyrites. Some little surface stripping had recently been done, with an idea of tracing out the contact, which was found to contain some copper pyrites.

Skinentle Island Claims.—On Skinentle Island was seen more of the prospecting work done by Poole in 1863, for the Queen Charlotte Mining Company, of Victoria. Here a shaft had been sunk about 15 ft. deep, near which some open cuts had been made. The shaft was full of water, but had evidently been sunk down on one of the fissures exposed to the open cut, which was from 12 to 15 in. wide and contained a considerable percentage of iron pyrites and some copper pyrites. Messrs. Raper, Hamilton, Law, *et al.*, of Texada Island, had re-staked this property and did some work on it, but do not appear to have recorded the last work done.

KLUNKWOI BAY.

On August 31, thanks to the courtesy of Mr. Ikeda, of the Ikeda Bay mines, the writer was loaned a gasoline motor boat with two men, and a start was made for a group of claims situated on Klunkwoi Bay, at the north end of Darwin Sound and inside of Lyell Island. The passages inside of Burnaby and Lyell Islands were taken, as being more protected from wind and sea. This inside passage is at all seasons

suitable for a small boat, although the channel inside of Burnaby Island is only one fathom deep at low water and is most tortuous and difficult to follow. The distance from Ikeda Bay to Klunkwoi Bay is about 45 miles, and the run was made in less than eight hours.

Swede Group.—None of the claims in this section of the island have been long staked, the first being the Swede group, staked in January, 1907, by Larsen, Pearson & Rogers. The group consists of eight claims, the Excelsior, Pearson, Larsen, Keystone, Bob, Anaconda, Seattle and Homestake mineral claims. The claims are so located as to cover a small peninsula projecting into Klunkwoi Bay and separating two smaller bays or fiords. This peninsula is not more than 2,500 ft. across and rises to a height above the water of about 1,000 ft., the average slope of the hillside being about 46 deg., and this steep slope continues under the sea level, giving deep water at which any vessel can lie almost along the shore line. Although the claims had only been located for about six months, it was found that the owners had done a very considerable amount of development work, which as far as it had progressed, proved more than encouraging. This work consisted of a number of open-cuts running horizontally along the hillside at intervals from the sea level to a height of 700 ft. above. These cuts are on the Larsen claim, and may be said to have prospected a strip of hillside about 250 ft. wide extending from the shore up to an elevation of 700 ft. The line of these cuts continued over the hill on to the south slope, has been further prospected on the Anaconda claim, and found there to be similar in all respects; therefore, it is to be presumed that the mineralized zone is continuous over the peninsula along the line prospected in a N. 63 deg. E. direction.

A short distance to the west of the workings a fault plane has cut across the peninsula, the line of its break showing clearly on the mountain side. To the west of this break the prospectors claim not to have found mineral, but it is suspected their investigation has not been very thorough, as the geological conditions are the same on either side of the break, and it has not been a channel of infiltration of mineral. The country rock right across the peninsula appears to be uniform and the same, a much altered diabase,* cut by a few later trap dykes, which, however, do not appear to have any effect upon the mineralization.

As far as disclosed in the cuts, the 4 or 6 ft. of the rock lying next the surface contain very little mineral, but when this depth is reached the rock is found to become impregnated with copper pyrites and occasionally bornite, and this impregnation in the deeper

*Microscopic examination made by Dr. Dresser, of McGill University (4,613).—This is a massive, dark green, fine-grained rock, showing spots of epidote, and a few grains of pyrite and pyrrhotite. It is found to consist essentially of plagioclase, feldspar and pyroxene. There are also present accessory magnetite, as well as the secondary minerals, chlorite and leucocene. No quartz or olivine could be found. The structure is ophitic, and the rock is consequently a diabase.

cuts appears to be growing greater with depth as far as the work has proceeded; this is, at the greatest, a depth of some 15 ft. Sometimes the chalcopyrite occurs in little granules, peppered all through the rock, and again it occurs in little veinlets, constituting an ore difficult to estimate the copper contents of by the eye.

Samples were taken from the most extensive of the open cuts, viz., the one at an elevation of about 75 ft. above the sea level; of these a general sample gadded off the face over a distance of 75 ft. horizontally, and for the height of the cut, except the upper "barren" 6 ft., gave upon assay better than 2 per cent. copper, with traces of gold and silver.

Another sample, taken by the writer, and which was intended to represent ore as it would be roughly hand-picked, gave copper 5.7 per cent., silver 0.2 oz. to the ton, and trace of gold.

A third sample, taken on the south slope of the peninsula from an open cut on the Anaconda claim, gave 2.9 per cent. copper, with traces of gold and silver.

The occurrence of the mineral is such as to render hopeless any form of water concentration, so the ore should be smelted direct, but for such treatment it is admirably suited, as the gangue matter is self-fluxing and very easily melted.

To summarize the situation, the claims have not as yet been developed sufficiently to absolutely prove their ultimate value. They are still only prospects, but the success attending the development done commands attention and gives promise of an exceedingly large, but low grade, deposit of copper ore. The location of the properties is ideal for the cheapest kind of mining, and the facilities for cheap transportation by vessel could scarcely be improved upon.

The grade of the ore, as already noted, is low, probably not higher than 2 or 3 per cent. copper, with little or no gold and silver values, but the fact is that the values have increased with depth, so far as development has proceeded. The unknown factors are, how deep will this improvement in values continue and how deep will the ore be found, which can only be determined by development work.

Last Chance Group.—The Last Chance group of six claims, the Last Chance, Goodenough, Jumbo, All Right, No Doubt and Star, owned by Messrs. Wintermute, McEachern & Jones, lies to the S.W. of and adjoining the Swede group near the shore of the next bay to the south. These claims are more recently located than the Swede group and have not had the same amount of development work done, but such as has been done, a couple of large open cuts, discloses conditions almost identical with those found in the Swede group, and, as the ore found is also in direct line with the mineralized zone on the Swede group, it is fair to suppose it to be a direct continuation of the Swede group deposit. The most important development work has been done on the Last Chance claim, at a distance of 1,600 ft. from the bay, at an elevation of about 200 ft., and consists of an open-cut

in rock 45 ft. long in a N. and S. direction, across the orebody, and has a face of 6 ft. in depth. A general sample made up of small pieces broken off the ore already mined, gave, upon assay, copper 2.7 per cent., silver 0.4 oz. to the ton, and trace of gold.

The country rock has been classed, after microscopic examination, as a "Porphyritic diabase."^{*}

As far as the development has gone, these claims give promise similar to the Swede group, and the camp as a whole indicates the presence of very large quantities of low-grade copper ore. The deposits are admirably situated for cheap mining and transportation, the character of gangue matter is such as to permit of very cheap smelting, so it is estimated that such ore is well within the commercial limit and can be treated at a profit, despite the fact that there is no appreciable quantity of gold or silver present.

The formation in which these deposits occur would appear to extend for a considerable width east and west, and is found again to the north-west on the shores of Skidegate Channel, near the Narrows, constituting a large area of territory which may prove productive, and is at least, well worth prospecting.

This past summer a number of claims have been staked in the vicinity of the Swede group and farther up the coast, but, at the time, no work of any sort had been done on them and they were not visited.

OLD SHAFT.

On September 2, the trip northward was resumed in the gasoline launch to Skidegate, a further distance of 15 miles, a stop being made at the Old Shaft, some seven miles south of the Sand Spit.

^{*}As a result of microscopic examination, Dr. Dresser, of McGill University, reports:—"The rock is fine-grained and of a uniform green colour. The slide is found to be much decomposed. Feldspar is present in a few phenocrysts and in more numerous small lath-shaped crystals of plagioclase. There are numerous grains of augite and epidote with much chlorite, the latter being in larger irregular masses. It is a Porphyritic diabase.

^{**}After the publication of this bulletin by the Provincial Bureau of Mines, C. McK. Smith wrote a letter to the *Victoria Times* stating that: "In 1862 a miner from Australia arrived in Victoria with the intention of going to Cariboo, but as there was some excitement about copper on Queen Charlotte Island at that time decided to try his luck in copper up there. On his arrival at Skidegate he prospected down the coast, and found the copper cropping on which he put down the mysterious shaft. He and his men worked there to the end of the year, then came to Victoria to spend the winter, and early in the spring of 1863 he returned to the mine, taking with him two shifts of men in order to sink the shaft as rapidly as possible. In August, 1863, I was prospecting on Queen Charlotte Island and called at the shaft, which at that time was down about 60 ft., and the men were driving down night and day. In conversation with the owner I remarked: 'You have not much of a cropping of copper for going to so much expense.' He replied: 'I expect to strike a large body of copper when I get deeper.' What he found deeper I do not know, but at the end of the year 1863 he covered up the shaft and came down to Victoria. From here he started back to Australia via San Francisco, and has not been heard of since. This Australian miner's name was Waddington; he was a nephew of Alfred Waddington, a pioneer of British Columbia, well known to all old timers here."—Editor MINING RECORD.

Old Shaft.—The Old Shaft, judging by the size of trees growing on the old dump, was sunk some 40 to 50 years ago, but by whom is not known, nor does there seem to be any Indian tradition regarding it.^{**} The property has recently been taken up again by Sheldon & Shabbard, who have bonded it to D. R. Young and associates, who were unwatering it, employing one white man and two Indians. At that date the shaft had been unwatered to about 90 ft. depth, and the foreman reported having sounded it to a further depth of 45 ft. Some short distance above the 90-ft. mark two cross-cuts had been found, one to the east and one to the west, extending about 25 ft. from the shaft. The shaft had not been cleaned out, so, of course, nothing was visible in it as to ore.

The country rock in the vicinity, as exposed on the beach, is an agglomerate, in which a fissure was seen a few inches wide, carrying copper pyrites in quartz. Selected samples of clean mineral assayed 10 per cent. copper and 2 oz. of silver to the ton. This fissure led directly to the old shaft, distant only a few feet, and it was evidently on this fissure that the shaft had been sunk and along which the two cross-cuts had been driven. The fissure, as seen on the beach, was too small to be of any importance, and the old dump exhibited no commercial ore. The owners claim to have discovered a more extensive fissure, running north and south—that is, at right angles to the first, at a distance of some 100 ft. to the west of the shaft and in the woods—to which it is proposed to drive a cross-cut from the shaft at some depth. The white man in charge did not know where the exposure of this north and south vein was, and it was consequently not seen by the writer.

GOLD HARBOUR.

Mr. John McLellan, a British Columbia assayer, has been working during the past summer at Gold Harbour, a bay of Moore Channel, on the west coast of Moresby Island, just south of Skidegate Channel. It was at this point the Hudson Bay Company, in 1852, found and mined a deposit of gold-bearing quartz. Mr. McLellan examined the old workings, but could find no continuation of the values, though he discovered in the vicinity another small quartz vein carrying gold in considerable proportions. He reports the vein as being rich, but very small; he erected last season an arrastra driven by water power and managed to extract a certain amount of gold, bringing a small "brick" to Victoria.

Western Australian returns show a production in 1907 of 1,697,552 oz. of gold, valued at £7,202,411.

One of the numerous papers presented at the winter meeting of the American Institute of Mining Engineers, held in New York on February 18-21, was entitled "The Briquetting Plant at Bankhead, Alberta, Canada." It was prepared by Edward W. Parker, statistician, United States Geological Survey, Washington, D.C., and brought out a number of enquiries and some discussion.

CANADIAN MINING INSTITUTE.

Programme of Tenth Annual Meeting, March 4-6, Inclusive.

THE CANADIAN MINING INSTITUTE is steadily increasing both its membership and its usefulness. The programme of the tenth annual meeting of members, convened for March 4, 5 and 6 at Ottawa, Ontario, gives evidence of the wide spread interest the mining and smelting men of the Dominion are evincing in its proceedings, beside which several men of high standing in the mining profession in other countries are also assisting by contributing papers and promising attendance at the meeting, to discuss others of the many to be submitted.

It is especially gratifying to note that members of the Dominion Government are also showing an active interest in the Institute's annual convention, and that His Excellency the Governor-General has kindly consented to address the members. The local committee having charge of the arrangements for this meeting at Ottawa, consisting of Messrs. R. W. Brock (acting director of the Geological Survey), D. B. Dowling, H. M. Ami, E. D. Ingall, Theo. Denis, Wm. McInnes, Erik Nystrom, J. McLeish, A. M. Campbell, and A. E. Barlow (chairman), are all officials of the Dominion Department of Mines, either in the Mines or the Geological Survey branch. This indicates the practical and increasing interest that department is taking in the work of the Institute. Incidentally, it may not be out of place to here suggest that the time has arrived when the Department of Mines of British Columbia should no longer be content to allow so far as it is concerned, the provincial mineralogist to be alone in his endeavours to further the aims and objects of the Institute in British Columbia, especially under the circumstances that there are now about 130 members resident in the Province, this number including some of the leading men connected with its mining and smelting industries.

It has been announced that the local committee is endeavouring to make this meeting the most successful and profitable in the history of the Institute. To this end the executive officers and council of the Institute have also been working for some time past, and have arranged a programme in which speakers of international reputation as well as representative and successful mining men will take an active part. The president, whose term of office is about to expire, is Mr. Frederic Keffler, geologist and engineer of the British Columbia Copper Company, Limited, operating mines and smelting works in the Boundary District; he will preside during the greater part of the meeting—until the election of his successor (Dr. Willet G. Miller, provincial geologist of Ontario,) shall be officially proclaimed on Friday, March 6, so that British Columbia will be influentially (though,

unfortunately, not numerous) represented at the meeting.

The meeting is to be held in the Russell House. The following is

THE PROGRAMME.

Wednesday, March 4.—The first session will be opened at 10 a.m. by the Right Hon. Sir Wilfrid Laurier, Prime Minister of Canada, and the Hon. William Templeman, Minister of Mines, who have kindly consented to welcome and address the members. The Wednesday morning, and if necessary the afternoon, session of that day, will be devoted to the reading and consideration of the report of the council; the treasurer's statement and balance sheet; the proposed removal of the headquarters of the Institute from Montreal to Ottawa; the proposed repeal and amendments to by-laws; the appointment of scrutineers of the ballots for the election of officers and council for the year 1908-1909, etc. A selection of papers to be illustrated by lantern slides will be read and discussed on Wednesday evening.

Thursday, March 5.—There will be a morning and an afternoon session, chiefly for the reading and discussion of papers, of the Institute, beginning at 10 a.m. and 3 p.m. respectively.

Friday, March 6.—At 10.30 a.m. His Excellency Earl Grey, Governor-General of Canada, has kindly consented to address the members of the Institute in the drawing room of the Russell House.

Immediately following this address the president will announce the result of the election of officers and council for the ensuing year.

At 11 o'clock, by kind invitation of the acting director, Prof. R. W. Brock, members who may be so inclined, will be conducted through the museum of the Geological Survey. As this museum contains the nucleus of the material for the new Victoria Memorial or National Museum, it is recommended that as many members as possible take advantage of such a favourable arrangement to examine what must be of interest to all engaged in the profession or business of mining.

Friday afternoon will be devoted to the reading and discussion of papers.

ENTERTAINMENTS.

On Thursday evening a smoking concert will be held in the American dining room of the Russell House. All members and their friends are cordially invited to be present.

The annual dinner will be held in the same room on Friday evening.

LIST OF PAPERS.

The following papers will be presented and discussed at the meeting:

1. "The Iron Ores of Canada," by Prof. C. K. Leith, University of Wisconsin, Madison, Wisconsin, U. S. A.

2. "The Iron Ores of Ontario," by A. B. Willmott, Sault Ste Marie, Ontario.

3. "The Iron and Steel Industries of Ontario," by J. G. Parmelee, Sault Ste. Marie, Ontario.

4. "The Use of Charcoal as Blast Furnace Fuel in Northern Ontario," by R. H. Sweetzer, Columbus, Ohio, U. S. A.
5. "Electric Smelting in Ontario," by R. Turnbull, St. Catharines, Ontario.
6. "Possibilities of Electric Smelting," by Dr. A. Stansfield, McGill University, Montreal, Quebec.
7. "A New Iron Ore Field in Eastern Canada," by John E. Hardman, Montreal.
8. "The Moose Mountain Iron Ore Deposits," by N. E. Leech, Sudbury, Ontario.
9. "The History and Progress of the Iron and Steel Industries of Nova Scotia," by Arthur P. Scott, Sydney, Nova Scotia.
10. "Progress with the Groendal Process of Concentration and Briquetting of Iron Ores," by P. McN. Bennie, Niagara Falls, New York, U. S. A.
11. "The Carbon Minerals of New Brunswick," by Dr. R. W. Ells, Ottawa, Ontario.
12. "Utilization of Waste at Lille Colliery," by W. A. Davidson, Blairmore, Alberta.
13. "The Classification of Coal," by D. B. Dowling, Ottawa.
14. "The Reduction of Ash in Coal for Coke-making Purposes, and how it is accomplished at Lille Colliery," by Raoul Green, Frank, Alberta.
15. "On a Method of Identifying a Coal Seam in Any Given Basin," by Dr. H. M. Ami, Ottawa.
16. "The Utilization of Peat for Industrial and Metallurgical Processes in Ontario," by E. Nystrom, Ottawa.
17. "The Mode of Occurrence of Canadian Graphite," by H. P. H. Brumell, Buckingham, Quebec.
18. "Notes on the Natural Gas at Three Rivers, Quebec," by John E. Hardman, Montreal.
19. "The Metallurgy of the Cobalt Ores," by F. N. Flynn, Cobalt, Ontario.
20. "Sampling of Silver-Cobalt Ores," by Arthur A. Cole, Cobalt.
21. "General Mining Conditions in the Cobalt District," by Frank C. Loring, Toronto, Ontario.
22. "Laboratory Experiments on Special Methods of Cyanidation of Cobalt Ores," by J. W. Bell, Montreal.
23. "The Origin of the Silver of James Township," by Dr. A. E. Barlow, Ottawa.
24. "Observations on the Geology and Ore Deposits of Camp Hedley, British Columbia," by Chas. Camsell, Ottawa.
25. "Notes on Costs of Diamond Drilling in the Boundary District of British Columbia," by Frederic Keffler, Greenwood, British Columbia.
26. "Handling 3,000 Tons of Ore per Day at the Granby Mines and Smelter, Phoenix and Grand Forks, British Columbia," by A. B. W. Hodges, Grand Forks, British Columbia.
27. "Methods of Mining at the Granby Mines, Phoenix, British Columbia," by C. M. Campbell, Phoenix, British Columbia.
28. "Some Notes Relative to the Copper River District, Alaska," by W. M. Brewer, Victoria, British Columbia.
29. "Some Whitehorse Ore Deposits," by R. G. McConnell, Ottawa.
30. "Some Western Methods of Assaying," by C. S. Baker, Greenwood, British Columbia.
31. "A Partial Bibliography of Publications Referring to the Geology and Mineral Industry of Alberta, British Columbia and the Yukon," by J. C. Gwillim, Kingston, Ontario.
32. "Dredging and Its Possibilities," by A. E. Hepburn, Vancouver, British Columbia.
33. "Some Notes on Labour-Saving Devices to Cheapen Copper Smelting," by R. C. Campbell-Johnston, Vancouver.
34. "Topographical Methods Used for the Special Map of Rossland, British Columbia," by W. H. Boyd, Ottawa.
35. "Metallography Applied to Engineering," by Dr. W. Campbell, Columbia University, New York, U. S. A.
36. "Gold in the Eastern Townships of Quebec," by J. Obalski, Quebec.
37. "A Few Notes on the Unvia de Oro Mine, State of Chihuahua, Mexico," by J. W. Bell, Montreal.
38. "Minerals and Ores of Northern Canada," by J. B. Tyrrell, Toronto.
39. "Note on a System of Conventional Signs for Showing Mineral Occurrences on Maps, etc.," by E. D. Ingall, Ottawa.
40. "Laboratory Experiments on Certain British Columbia Ores by the Flotation Process," by Dr. J. Bonsall Porter, Montreal.
41. "The Comparative Amount of Slime Produced by Crushing in Different Types of Fine Crushers," by Dr. J. B. Porter and G. Strout, McGill University, Montreal.
42. "Notes on an Experimental Electrostatic Separator," by J. C. Kemp and K. B. Carruthers, McGill University, Montreal.
43. "Notes on Mining Laws," by Dr. W. G. Miller, Toronto.
44. "On Secondary Education," by H. H. Stock, editor *Mines and Minerals*, Scranton, Pa., U. S. A.
45. "The Compilation of Mining Statistics," by J. McLeish, Ottawa.
46. "Utilization of Waterfalls," by Hilder Daw, Montreal.
47. (Title to be announced later), by E. P. Jennings, Salt Lake City, Utah, U. S. A.
48. "Notes on the Elmore Vacuum Process," by H. H. Claudet, Rossland, British Columbia.
49. "The Duties of Mining Engineers," by J. D. Kendall, London, England.
50. "Occurrences of Tungsten Ores in Canada," by Dr. T. L. Walker, Toronto.
51. "Mineral Production of British Columbia in 1907," by E. Jacobs, editor *B. C. MINING RECORD*, Victoria, British Columbia.

Student Papers.

52. "Operations of the Modern Blast Furnace," by K. S. Twitchell, School of Mining, Kingston, Ontario.

53. "Micro-Chemical Tests on Ores," by F. S. Sine, School of Mining, Kingston.

54. "Petrography of the Lardeau District, British Columbia," by J. Hill, School of Mining, Kingston.

55. "Iron Ore Deposits of the Eastern Ontario Gold Belt," by S. J. Schofield, School of Mining, Kingston.

56. "Magnetic Prospecting in the Sudbury District, Ontario," by M. Y. Williams, School of Mining, Kingston.

57. "Coal Mining in Southern British Columbia," by W. M. Harding, School of Mining, Kingston.

58. "Manufacture of Coke in Alberta," by J. P. Cordukes, School of Mining, Kingston.

59. "Notes on Mining in the Yukon," by A. A. Pare, McGill University, Montreal, Quebec.

60. "The Rossland Mines (British Columbia) and the Consolidated Mining and Smelting Company of Canada," by H. G. Carmichael, McGill University, Montreal.

61. "The White Bear Mine, Rossland, British Columbia," by H. H. Yuill, McGill University, Montreal.

62. "Note on the Method of Mining at the Brooklyn Mine, Phoenix, British Columbia," by E. E. Campbell, McGill University, Montreal.

63. "The Occurrence and Method of Treatment of the Nickel Plate Gold Ore at Camp Hedley, British Columbia," by A. O. Hayes, McGill University, Montreal.

64. "Notes on the Oilfields of Trinidad," by Sydney Ellis, McGill University, Montreal.

REPORTED AGREEMENT ON THE WAGES QUESTION AT HEDLEY.

WAGE-SCALE ADJUSTMENTS have been general in the mining districts of the interior the Province during the last month or two. Among the camps at which this matter has been dealt with is Camp Hedley, Similkameen, where is situated the Yale Mining Company's Nickel Plate gold mine and the Daly Reduction Company's 40-stamp mill. On January 2 the Hedley *Gazette* published the following information concerning the outcome of negotiations on this question between the general manager of the companies mentioned and their employees:

Inquiry at the office of the Daly Reduction Company on Monday night as to the local situation on the labour question elicited the very welcome information that the conference between the general manager and a committee of the miners who waited on him, had been satisfactory and pointed to an agreement to continue work after January 1.

The opinion expressed by the *Gazette* two weeks ago to the effect that the men had reason to be confident and were confident that they could expect fair

treatment from the management, was amply borne out by the satisfactory character of the meeting on Monday evening, for the new wage scale posted was in no single case less than that paid in the Boundary and in some instances was from 11 to 15 per cent. in advance of the wage paid there under latest agreement, on which the Granby employees resumed work.

The only thing, therefore, which can now put a stop to operations in this camp is the weather, which, if too severe, might interfere with the efficient working of the flume. So far as water supply goes, there is ample to keep things bowling along in good shape until spring opens up, if the frost will permit of getting it down to where it is needed.

Below is the wage schedule which went into force on January 1:

	At the Mill.	Hours
Crushermen	\$3.50	for 9
Conveyormen	3.00	" 9
Batterymen	3.00	" 9
Amalgamators	4.00	" 8
Head vannerman	4.00	" 8
Shift vannerman	3.50	" 8
Classifiermen	3.25	" 8
Solutionmen	4.00	" 8
Shuicers	3.25	" 9
Carpenters	4.00	" 9
Machinists	4.00	" 9
Machinists' helpers	3.25	" 9
Blacksmiths	4.00	" 9
Blacksmiths' helpers	3.25	" 9
Compressormen	4.00	" 8
Compressormen's helpers	3.25	" 9
Flume-men	3.00	" 10
	At the Mine.	
Sinkers, over 25 degrees	\$4.00	for 8
Machine miners	3.50	" 8
Muckers	3.00	" 8
Muckers, sinking	3.50	" 8
Barmen	3.75	" 8
Nippers	3.25	" 8
Timbermen	3.50	" 8
Blacksmiths	4.00	" 9
Blacksmiths' helpers	3.25	" 9
Machinists	4.00	" 9
Motormen	3.75	" 9
Brakemen	3.25	" 9
Teamsters	3.25	" 9
Compressor engineers	4.00	" 8
Lake pumpmen	4.00	" 8
Head trammer (ore bin)	4.00	" 9
Central station trammer	3.75	" 9
Tipple trammer	3.50	" 9
Trackmen	3.00	" 9

In the Transvaal the government and the Johannesburg chamber of mines have jointly offered a first prize of £4,000 and a second of £1,000, for the best rock drills produced by January 1, 1909. In addition the chamber of mines offers prizes amounting in value to £256 for the best drill operators.

ANNUAL REPORT OF THE BRITISH COLUMBIA COPPER COMPANY.

President's Review of the Year's Operations.

THE ANNUAL REPORT of the British Columbia Copper Company, Limited, as submitted to the stockholders, who held their annual general meeting at Charleston, West Virginia, U. S. A., on February 11, is here reprinted:

"To the Stockholders of the British Columbia Copper Company, Limited:

"Submitted herewith for your consideration is a brief report of the operations of our company during the past year, and the results therefrom.

"In many respects the year ending November 30, 1907, has been the most trying and hardest yet experienced in the history of our company. In the winter of 1906-7 the Northwest was subjected for many weeks to the most serious fuel famine ever known there. Fuel was so scarce at times that in order to secure even a meagre supply of ore from the mines to our smelter, our company had to furnish the railway company with coal in order to carry on its local traffic. When this fuel famine was relieved, it was too late to market our production at the higher prices for copper current in the early part of 1907, owing to a great shortage of cars and the fact that our copper is paid for at quotations of a date subsequent to its shipment.

"For detail as to our operations I refer you to the report of our general manager, which is on file in the office of the company, and open to the inspection of any stockholder.

"I am more than ever impressed with the necessity to bring about the best results for our stockholders and to secure profit in operations, it is absolutely necessary that our mines and entire plant should be run steadily and continuously to their entire capacity. This has been impossible owing to the embarrassments which I have previously stated.

"Although we have at Greenwood one of the latest and best-equipped smelters, with three blast furnaces and converting plant, and a capacity of about 2,000 tons of ore a day, we were only able to operate our plant for about half its entire capacity, this unsatisfactory operation being brought about through circumstances entirely beyond our control.

"In July last, having, as we supposed, overcome the embarrassments which surrounded us early in the year, and with copper selling in excess of 22 cents per lb., your directors felt warranted in declaring a dividend on the capital stock, amounting to 40 cents a share, this being paid out of its surplus earnings, and the first dividend paid by the company. At the time this dividend was declared we could not foresee the financial crisis which overcame the entire country, and the unprecedented decline in the price of copper, which by the month of October, 1907, had fallen to about half the price at which it was selling when the dividend was declared.

"If we had been able to receive payment for our copper shipped on quotations at date of shipment, our net profit would have been \$396,534.30, but owing to the circumstances enumerated above, the bulk of our production was secured in the latter part of the year, on a market the rapidity of the fall of which has been unprecedented. These earnings have been reduced by approximately \$304,000, leaving the actual net earnings as shown by the report of the treasurer hereto attached. This, however, it must be remembered, is taking into account all development, the cost of which has been charged to operation, and which amounted to \$114,898.41.

"I most heartily congratulate our stockholders on the very satisfactory physical condition of our properties. We have been able to equip our mines with sufficient modern machinery to maintain the maximum production of which they are capable, this being somewhat in excess of our smelting capacity, the reduction works also being completely equipped.

"We have mined during the past year from our own properties 268,231 tons, but the development has been so thoroughly pushed that we have been able to block out much more ore than we have taken from the mines.

"We have, as well, purchased and paid for during the year, at a cost of \$75,000, a new property—the Lone Star and Washington—which shows great promise for the future.

Owing to the very low price of copper, and the exceptionally high cost of operation, it was thought advisable to close down the mines and reduction works last November, which course was pursued by all other companies in the same territory, and work has not yet been resumed. During this interim, vigorous and successful efforts have been made to materially reduce the cost of production, and I am much pleased to inform you that nearly all the embarrassing conditions which rendered our operations so difficult to carry out during the past year, have been removed. We do not fear again any embarrassment from the lack of railway cars, and we have now assurance of ample fuel supply, which will permit of continuous operation at full capacity. I confidently look forward to an early resumption of our operations upon a much more satisfactory earning basis.

"In closing, I cannot fail to express to those interested in the company that great credit is due to all the officers and the operating staff of the company for their faithful, loyal, intelligent and constant efforts in its behalf.

"Yours respectfully,

"Colgate Hoyt, President."

The board of directors for the ensuing year consists of the following: Copley Amory, A. N. Brady, C. H. Burke, Newman Erb (chairman), Edwin Hawley, Colgate Hoyt, B. B. Lawrence, J. C. Reiff, F. L. Sommer, C. A. Starbuck, and F. L. Underwood.

The officers of the company are: President, New-

man Erb; vice-presidents, B. B. Lawrence and F. L. Sommer; secretary and treasurer, R. H. Eggleston. At Greenwood, British Columbia, J. E. McAllister remains general manager of the company, and Fred-

eric Keffer, geologist and engineer in charge of the company's several mines.

The financial statement for the year to November 30 last follows:

BALANCE SHEET AS AT NOVEMBER 30, 1907.

Assets.			
Cost of properties—Book value			\$2,555,881.79
Inventories of materials and supplies		\$165,927.45	
Current assets:			
Accounts receivable	\$282,236.51		
Cash on hand and in bank	56,409.36	338,645.87	
			<hr/>
Total inventories and current assets			504,573.32
Deferred items:			
Prepaid insurance and taxes	\$ 3,932.31		
Prepaid interest	1,742.50		5,674.81
			<hr/>
			\$3,066,129.92
<hr/>			
Capital and Liabilities:			
Capital stock (authorized \$3,000,000) issued			\$2,515,000.00
Current liabilities:			
Loan payable		\$100,000.00	
Accounts payable		109,491.35	
Debit balance, Greenwood office		59,353.05	268,844.40
			<hr/>
Total Capital and Liabilities			\$2,783,844.40
Reserve for allowances on accounts receivable:			
Shipments of copper for 1907			106,244.21
Surplus			176,041.31
			<hr/>
			\$3,066,129.92

SURPLUS ACCOUNT AS AT NOVEMBER 30, 1907.

1906			
December 1, Balance			\$231,022.40
1907			
November 30, Expenses on stock sales	\$ 4,126.75		
Adjustment account, 1906, shipments in suspense	16,650.00		
Dividends paid	201,200.00		
Premium on stock sales			57,116.15
Adjustment account, Lone Star and Washin ten mines account, 1906			958.69
Adjustment account, 1906, shipments			20,765.40
Income, year ended November 30, 1907			88,155.42
Balance	176,041.31		
			<hr/>
		\$398,018.06	\$398,018.06

From the Dominion Department of Mines' Summary Report of the operations of the Geological Survey in 1907, it is learned that "during the past year Dr. Penhallow received from Mr. L. M. Lambe, of the Geological Survey, a very extensive collection of Tertiary plants from various localities in British Columbia. The study of this important material necessitated a complete review of all the work previously done with respect to the Tertiary flora of Western Canada, embracing that already reported upon by Sir William Dawson with respect to the Lignite Tertiary of Saskatchewan and Mackenzie River, as well as the work of Heer, and the study of plants derived from British Columbia. The floras thus surveyed have been co-ordinated with the work of Lesquereux, Newberry and others, upon the Tertiary

floras of the United States. There has also been brought under consideration a detailed discussion of the cause of the combustion of beds of lignite. In both of these respects conclusions have been reached which seem to offer satisfactory explanations and which establish the probable positions of the various Tertiary beds in Canada. It has been found that, so far as explored, all of the Tertiary rocks belong to horizons which extend from the Lower Eocene to the Oligocene, or possibly to the Lower Miocene."

From England comes the news that efforts are being made with the object of forming, in the first instance, a German convention, which is to serve as a nucleus for a larger convention, of which, in addition to Germany, the Belgian, French, and English zinc producers are to be partners.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia—

Le Roi—January: Shipped to Northport during the month 6,564 tons of ore, containing 2,289 oz. gold, 4,830 oz. silver and 195,500 lb. copper. Expenditure on development work, \$5,500.

Le Roi No. 2—January: Josie mine (Rossland) report—Shipped 2,711 tons of ore. The net receipts are \$68,592, being payment for 2,719 tons of ore, and \$2,235, for 142 tons of concentrates shipped; in all \$70,827.

Le Roi No. 2—January: Vancouver mine (Slocan) report—Shipped 217 tons. The receipts are \$16,298, being payment for 278 tons shipped (including \$3,324 for lead ore). Zinc shipments, 1,316 tons; receipts \$9,804, being approximately 80 per cent. for 1,029 tons. (Office note—The zinc concentrates produced during the month amounted to 277 tons. The larger tonnage shipped represents the accumulation of several months.)

DIVIDEND.

On February 27 a cable from London, received at Rossland, intimated that the *Le Roi No. 2, Limited*, had declared a dividend of two shillings per share (practically 50 cents). As the company's capital is £600,000 in 120,000 shares of £5 each, the total of this dividend is £12,000. The total of dividends declared by this company to date is about \$830,000.

NOTES.

The Beaver Valley Oil Company has not yet been successful with its oil-bearing operations in the Cariboo District. It has suspended operations until the spring, when another hole will be bored at a different place.

The Giant-California Mining Company, Rossland, has been making test shipments of ore from the main ore shoot of the Giant mine. Wm. Yolen Williams, of Spokane, Washington, U.S.A., is the company's consulting engineer, and he visits the property periodically to direct mining operations on it.

The Athabasca gold mine, stamp mill, etc., situated a few miles from Nelson, were recently sold by auction in Vancouver. It is stated that F. W. Hartly was purchaser, and the price \$2,000.

The annual general meeting of the Diamond Vale Coal and Iron Mines, Limited, was held in Vancouver last month, when a report on the year's operations and the results, was submitted by B. P. Little, engineer in charge.

Slough Creek, Limited, has obtained a water grant of 3,000 miner's inches from Willow River, Cariboo, and 1,000 inches from Slough Creek.

The annual meeting of the Canadian Concentrating and Smelting Company, Limited, was held at Vancouver on February 13. The company is working the Monarch mine at Field, and the manager reported that the company made its first shipment of ore from the mine on January 12 and that since that date seven more cars have been sent out. The output is about 100 tons of ore per week, and the ore is sent to Toronto, Ontario. The following directors and officers were elected for the next year: President, J. W. Shelhorne; vice-president, Dr W. B. McKechnie, J. W. Malcolm, William Carter, H. B. Warren, Walter Townsend (secretary-treasurer), all of Vancouver; Arthur Wheeler, jr., managing director; H. J. Graine, Maurice Cane, H. D. Twigg, of Victoria, and J. R. Roland of Winnipeg.

CONSOLIDATED MINING AND SMELTING COMPANY
OF CANADA, LIMITED.

The extent of the operations of the Consolidated Mining and Smelting Company of Canada during six months ended December 31, 1907, is indicated in the figures printed below, which were courteously supplied to the *MINING RECORD* upon request. The several mines and the smelter mentioned are all in British Columbia.

Tonnes mined from the company's properties—

Centre Star group, Rossland	87,451 tons
St. Eugene group, Moyie	75,104 tons
Snowshoe mine, Phoenix	86,109 tons

Total

248,664 tons

The St. Eugene produced 12,110 tons of lead-silver concentrate, some of which was shipped to Europe and some to the Marysville smelter at Kimberley, East Kootenay, but the greater part was smelted and refined at the company's works at Trail.

Operations at Trail smelter—

The average amount of ore and bi-products smelted at Trail was 1,116 tons per day; the amount of lead-silver bullion produced daily was 42 tons averaging \$164 per ton; copper matte 14 8-10 tons daily, averaging \$453 per ton. The amount of pig lead produced by the Trail refinery was 38 4-10 tons daily, averaging about \$79 per ton.

Upon the above basis of production the gross value of the output for the year will approximate \$6,000,000, divided about as follows: Gold 39 1-10 per cent.; silver 27 2-10 per cent.; copper 12 4-10 per cent.; lead 21 3-10 per cent.

DOMINION COPPER COMPANY, LIMITED.

At the recent annual meeting of the Dominion Copper Company, Limited, held in Greenwood, the following directors were elected for the ensuing year: Warner Miller, Leopold Harriman, H. H. Melville, A. M. Wickwire, John M. Shaw, Samuel Newhouse, C. J. Cull. The board stands practically as last year, with the exception of Mr. Cull, who is understood to represent English stockholders in the company.

At the annual meeting the reports of the officers and the financial statement of the company for the year ending July 31, 1907, which were printed in last month's *MINING RECORD*, were approved. The meeting was held at Greenwood to comply with the laws, the details having been arranged at the New York office of the company. Nothing was stated regarding a resumption of operations by the company.

The officers of the company will probably be the same as last year, namely, President, Warner Miller; vice-president, H. H. Melville; secretary-treasurer, Leopold Harriman; managing director, Samuel Newhouse; consulting engineer, Maurice M. Johnson.

LE ROI NO. 2, LIMITED.

The *Rossland Miner* of February 29 contained the following information relative to the *Le Roi No. 2*:

"A cablegram from London announces that the *Le Roi 2* company has declared a dividend of two shillings a share. The cablegram also states that a report has been issued to the shareholders which revealed that the affairs of the company are in a flourishing condition. The company's mine is in first class shape, and the development during the past year has been of a very satisfactory character. It promises to yield good returns for many years to come.

"Following are the dividends paid by the *Le Roi 2* company since October, 1905: October, 1905, one shilling; February, 1906 (out of profits made in 1905), three shillings; total for 1905, four shillings; July, 1906, one shilling; October, 1906, two shillings; February, 1907 (out of profits made in 1905), one shilling; total for 1906, six shillings. July, 1907, two shillings; February, 1908 (out of profits made in 1907), two shillings; total for 1907, four shillings. This gives a total dividend since October, 1905, inclusive, of 14 shillings.

"The report issued is not yet to hand, but it is thought the dividend just declared would have been considerably larger had it not been that the intention of the directors is to increase the output of ore. This will involve the expenditure of a considerable amount in the way of development work and a larger plant; hence it is thought the directors desire to retain as large a surplus in the treasury as possible with which to make the proposed improvements.

"The management of the *Le Roi 2* company is to be congratulated on the able way in which it is carrying on the affairs of the company in the interests of its stockholders."

COAL MINING NEWS.

According to the *Similkameen Star*, "advices from Granite Creek state that work on the coal discovery on the north fork is showing up well."

The *Similkameen Star* says that the Vermilion Forks Mining Company, of Princeton, has arranged to supply the Daly Reduction Company's assay office, Hedley, with 50 tons of local coal. Also, that it has been reported from Tulameen that another 7-ft. seam of coal has been struck at Collins Gulch.

The *Nicola Herald* states that more machinery is arriving at Comtee for the Nicola Valley Coal and Coke Company's properties and will be installed shortly. Preparations are being made for a large season's work at Middlesboro' collieries, and the shipments of coal before the end of this year will be considerable.

On February 13 the *Frank Paper* stated that the Lille colliery of the West Canadian Collieries, Limited, was again running full time; also that the company's Bellevue colliery would resume operations that morning, a contract to supply coal having been obtained which would require the mine to be operated to its ordinary capacity.

Farther east in Alberta things appear to be slack for it is stated that the Breckenridge & Lund, and Galbraith mines, at Lundbreck have been closed down to await improvement in the coal market. The Alberta Company is continuing its development work and has moved the hoist from the original workings below Lundbreck to the new seams discovered a short time ago south of the town. These seams are to be opened for the purpose of a thorough examination of their character and extent.

The first annual meeting of the Western Coal Operators' Association was held at Calgary, Alberta, last month when the following officers were elected for the ensuing year: President, Lewis Stockett; vice-president, J. D. Hurd; secretary-treasurer, W. F. Little; executive committee, O. E. S. Whiteside, Louis C. Rameau and W. H. McNeil. The retiring president, G. G. S. Lindsey, K.C., who has rendered such valuable services to the association in the past, was urged by the meeting to accept the office for a further period but through pressure of business was compelled to decline.

The output of coal from the mines of the Crow's Nest Pass Coal Company, in southeast Kootenay, for five weeks to January 31, was 105,012 tons, or a daily average of 3,621 tons for the 29 days worked. For February the output was 86,063 tons, a daily average for 24 days worked of 3,586 tons. February's production shows an increase as compared with the corresponding period of 1907 and 1906. The output for each of the three periods was as under:

	Tons.
Four weeks in February, 1908.....	86,063
" " " " 1907.....	77,862
" " " " 1906.....	70,136

The daily average for 24 days of the three years, respectively, was: For February, 1908, 3,586 tons; for 1907, 3,244 tons; for 1906, 2,922 tons.

CROWN COAL AND COKE COMPANY.

A press despatch from Spokane, Washington, U.S.A., gives information relative to this company, as follows:

Reports submitted at the second annual meeting in this city of the Crown Coal and Coke Company, operating in the Crow's Nest Pass district, show 14 veins opened at various points for two and a half miles, and prove the earlier estimates of the present development. According to measurements, coal now in sight on the property under the present workings and above the level of the valley is enormous. R. G. Belden, vice-president, said in a report:

"A wagon road 12 miles long was completed last summer and the property fully equipped with machinery. A complete sawmill has been purchased by the company and is to be erected on the property where a large amount of timber is available.

"The plans and specifications for a tippie, having a capacity of 2,000 tons a day, have been drawn and survey is completed. We expect to be shipping a considerable quantity of coal daily by next September and should be a large factor in supplying the coal necessary for consumption in the Spokane country next fall and winter."

The stock of the company is owned largely at Milwaukee, Pittsburg, Minneapolis, Janesville and other eastern cities, and most of the holders were present at the meeting, where these officers and directors were named:

President, C. L. Butterfield, Moscow, Ida.; first vice-president, F. L. Farrel, Milwaukee; second vice-president and general manager, R. G. Belden, Spokane; secretary-treasurer, A. E. Wayland, Spokane; directors, J. H. Hemphill and F. H. Mason of Spokane, J. T. Nevin, Pittsburg, and L. A. Barnes, Minneapolis.

DIAMOND VALE COAL AND IRON MINES.

The output of coal from the mine, in Nicola Valley, of the Diamond Vale Coal and Iron Mines, Limited, says the *Vancouver Artesian Advertiser*, is at present 60 tons per day, but this will shortly be increased when the permanent equipment now in course of construction shall be completed. The force of men will then be increased by about 30 when the facilities are in place. B. P. Little, who represents the president on the property, left for the Nicola on February 29, after a visit to Vancouver making purchases of necessary material. With him went Benjamin Browett, who has been with the Western Fuel Company at Nanaimo. Mr. Browett is a practical coal miner; he will be superintendent under Mr. Little, who, until the present, has looked after all the engineering, etc. With the expansion of operations another practical official is necessary. Coal from the Diamond Vale is arriving in Vancouver regularly; one car arrived yesterday and another is on the way. The quality is better than was anticipated and the demand is good, larger than can just now be supplied. With present progress, however, no difficulty is expected in carrying out the estimate, namely, that 300 tons per day will be produced by midsummer, and 500 tons per day by the end of this year.

EASTERN B. C. RAILWAY COMPANY AND B. C. CORBIN'S COAL LANDS IN SOUTHEAST KOOTENAY.

Before the bill granting a charter to the company mentioned had been dealt with by the Provincial Legislature the *Cranbrook Prospector* said:

If all goes well with the application of the company known as the Eastern B. C. Railway Company for permission to build a railway, the first 10 miles of which will run from the Crow's Nest Pass to the Loop, British Columbia will within a few months have another big producing coal company. An intimation that the company will apply for incorporation at the next session of parliament has appeared for the last few weeks in the *British Columbia Gazette*.

"It now transpires that at the back of the company is D. C. Corbin, the well known capitalist and railway man of Spokane.

"Mr. Corbin has in south-eastern Kootenay some 17 coal measures. J. A. Harvey, legal adviser to Mr. Corbin, has been in the city closing up the details which transform the leases into patented claims. In all Mr. Corbin will have more than 10,000 acres of coal lands in this district and hence the importance of the construction of the railway mentioned, as it will tap the country where the above-mentioned coal measures occur."

HOSMER MINING COMPANY.

On February 11 the *Montreal Star* published the following: "The Canadian Pacific Railway Company intends to undertake the development of important mining areas in British Columbia, and, in the near future, will be turning out a large amount of coal to supply its locomotives in the West.

"As stated by the *Star* some weeks ago, a new company, known as the Hosmer Mining Company, of which the provisional directors are a number of prominent officials of the C. P. R., was incorporated during the present session of the Dominion Parliament, the object stated being to develop mining areas in Canada.

"W. H. Aldridge, the general manager of the C. P. R. mining interests, with headquarters at Trail, B.C., is at present in Montreal, and during the past few days has been in consultation with the chief officials of the company. Talking to the *Star* a few days since, Mr. Aldridge stated that it was the intention to push the work of the development at Hosmer. The town is in the Crow's Nest Pass country, and only eight miles from Fernie, in the centre of the best coal mining district of western Canada.

"Eight seams will be opened here, but the product of all will be brought to the surface by one tunnel. A steel tippie is to be erected at once and up-to-date machinery installed. It is expected that the actual work of raising coal will start not later than the first of next year, and the company is providing for a daily output of 3,000 tons.

"A large part of the coal will be used on the C. P. R., but some will be also placed on the market, both east and west of the mines.

"Mr. Aldridge states that the mines near Banff are very busy at present, and that the daily output there is some 1,200 tons a day. A large business in briquetted coal, the dust pressed into bricks, is also done at this mine, and the company finds that the demand for this class of fuel is large."

AT THE PACIFIC COAL COMPANY'S COLLIERY, BANKHEAD, ALBERTA.

Recently a meeting of the Pacific Coal Company's western agents was held at colliery at Bankhead, near Banff, Alberta. The *Nelson Daily News* published the following account of the gathering:

The objects of the meeting were to arrange for a better distribution of the output of the mines. The large amount of coal being mined is not being evenly disposed of owing to the agents sending in orders for the same classes of coal, and if hard coal users can be prevailed upon to vary their demands for coal the mine company will be better satisfied and the breaking of the coal to the different sizes most in demand can be dispensed with.

The agents who attended were: Geo. Motion, Nelson; A. B. Fleming, Brandon; A. E. Wetmore, Regina; C. S. Lott, Calgary; Winslow E. Worden, Cranbrook; F. B. Lewis, Revelstoke. W. H. Aldridge, managing director of the Consolidated Mining and Smelting Company of Canada, Limited, was also present. The members of the party were driven out from Banff to the mines and spent a most interesting and instructive day. They were taken down into the mine, and were not only shown how the coal was mined, but were given a little practical work in mining themselves.

The process of manufacturing the new fuel briquettes, which the company is making from the smallest sizes of the mine output, was also shown the agents, and proved most interesting.

Lewis Stockett, the company's manager, showed the visitors around, and entertained them at the company's quarters, Bankhead.

Three separate copper belts are known to occur on Seward Peninsula, Alaska.

J. D. Sibbald, of Revelstoke, the Company's manager, has some fine specimens of placer gold brought in from the Revelstoke & McCullough Creek Hydraulic Mining Company's hydraulic mine at Big Bend, says the *Mail-Herald*. There are over 34 oz. of gold in small and large nuggets, the largest weighing over 17 dwt. The whole is valued at \$600 and is the result of two men's work in less than a month.

At Nelson a by-law submitted to the ratepayers to give the Canada Zinc Company a franchise for 10 years to construct, operate, and maintain a high-voltage electric transmission line through the city to its electric zinc-smelting plant, for power purposes, was carried by a large majority. The voting figures were: For, 159; against, 7. A bill to authorize the loan by the Provincial Government to the company of \$10,000, to enable the latter to complete the construction of its works, has been submitted to the Provincial Legislature.

BOOK REVIEWED.

Martin's Mining and Water Cases of British Columbia, With Statutes. Vol. II., Part II. By Hon. Mr. Justice Martin. Pages, 304 (pp. 269-572); 7x9 in. Price, \$7.50. The Carswell Company, Limited, Toronto, Ontario, 1908.

The publishers draw attention to the greatly increased scope of this work consequent upon the expansion of water rights and their close relation to mining operations. Now, in Vol. I. and in this and the preceding part of Vol. II. are to be found:

"1. All the reports of Mining Cases and of Water Clauses Consolidation Act Cases of British Columbia from the earliest time up to the 1st January, 1908, in all the courts, and from the trial up to the Privy Council.

"2. All the Mining Statutes of practical utility covering the same period.

"3. The Water Clauses Consolidation Act, 1897, and its many Amending Acts to date.

"4. Tables of all the British Columbia Mining and Water Proclamations, Ordinances and Statutes.

"5. All the reports of cases in any way relating to British Columbia Water Rights since March, 1905.

"6. An alphabetical digest of all British Columbia Water Cases (in addition to those under the Water Clauses Consolidation Act, and otherwise as above) from the earliest times, which are not herein reported in full.

"7. All the reported Yukon Mining Cases decided by the Supreme Court of Canada.

"All the head notes of all said cases, wherever reported, have been revised and re-written and amended where necessary, and the cases themselves annotated, and in many instances corrected and amplified.

"Many important cases herein reported are not to be found elsewhere."

On two former occasions the MINING RECORD had the pleasure of expressing its earnest appreciation of the sterling worth of Mr. Justice Martin's services in making readily accessible to lay as well as professional men the reports of Mining Cases of especial bearing upon mining in this Province, and in adding notes that are so clear and complete as to further greatly enhance the value of the volumes he has prepared for publication. Again willing testimony is borne to the exceptional merit of his work in this direction, now brought practically up to date. To mention some of the cases which make the new volume of particular service to legal and mining men in British Columbia, there are: Centre Star Mining Co., Ltd. v. Kossland-Kootenay Mining Co., Ltd., dealing with trespass, extraction of ore, and damage from accumulation of water; Dockstader v. Clark, mineral claim location matters; First of May Mining Co. v. Cariboo Goldfields, Ltd., and *Ginaca et al v. McKee Consolidated Hydraulic, Ltd.*, both mining water right cases; Halpin v. Fowler, mine lease action; Star Mining & Milling Co. v. Byron N. White Co., extra-lateral rights, trespass, etc.; and Voigt v. Groves *et al.*, adversing application for certificate of improvements. The wide variety of litigation covered is partly indicated by these, which do not, though, by any means represent the whole field, but only some of the general causes of actions in connection with mining.

So many journals have in the past acknowledged the care and thoroughness characterizing Mr. Justice Martin's work that it would appear quite superfluous to once again point it out. It is but just to this learned author, though, to here say that it is eminently useful, not only to lawyers, but as well to those who are actively engaged in the management and direction of mining enterprises, and of other undertakings with which possession of water rights is associated. We heartily recommend "Martin's Mining and Water Cases" as a most valuable work for both reference and the full information of all concerned in the industries affected.

MINING MEN AND AFFAIRS.

Wm. West is superintendent of the Pay Roll mine, situated in the Moyie section of East Kootenay.

Lorne A. Campbell, of Rossland, general manager of the West Kootenay Power and Light Company, Limited, was in Vancouver during February.

W. V. Bowron, for seven years foreman of the China Creek hydraulic gold mine, is down from Cariboo visiting relatives in Victoria.

Carl H. Hand, of Butte, Montana, U.S.A., has returned to that city after having inspected progress at the Krao mine, Ainsworth camp.

A 10-stamp mill and other power plant are to be installed shortly at the Bertha mine, situated north of Grand Forks, Boundary district.

G. L. Mackenzie, who several years ago was manager of the Copper Queen and Cornell mines, on Texada Island, was in Arizona lately.

F. A. Ross, of Hedley, Similkameen, general manager of the Daly Reduction Company, lately paid a visit to Spokane, Washington, U.S.A.

R. P. Butchart, of Victoria, managing director of the Vancouver Portland Cement Company, Limited, has returned from a visit to Ontario and Mexico.

A. W. Davis, of Sandon, manager of the Consolidated Mining and Smelting Company's Richmond-Eureka mine, has returned to the Slocan from an eastern trip.

W. R. Benjamin is superintendent of the Bull River water power works being installed on that stream, which runs through part of the Fort Steele division of East Kootenay.

Bruce White, of Nelson, last month looked over a number of mineral claims on Queen Charlotte Islands, and visited other northern points before returning to the Kootenay.

W. J. Elmendorf, of Spokane, Washington, recently examined and reported on the Indian Chief mine, at Sidney Inlet, west coast of Vancouver Island, for the Tyece Copper Company.

A. Klauer, of Fernie, East Kootenay, chief accountant for the Crow's Nest Pass Coal Company, Limited, has returned from Toronto, Ontario, whence he went to meet the directors of the company.

W. H. Trewartha James, of London, England, the new general manager of the Tyece Copper Company, Limited, is expected to arrive in Victoria in the course of a few weeks, to there assume the duties of his office.

Cecil B. Smith, of Toronto, Ontario, one of the prominent electrical engineers of the Dominion, has been examining and reporting on the Nelson City hydro-electric system at upper Bonnington Falls, Kootenay River.

A. B. W. Hodges, of Grand Forks, manager of the Granby Consolidated Mining, Smelting and Power Company's big mines and smelting works in the Boundary District, arrived in Victoria at the end of the month, on a business visit.

N. F. Townsend, of Rossland, who has been connected with the Le Roi mine in the capacity of mine surveyor, assistant superintendent, etc., has resigned and left Rossland for the coast, where he will practise his profession.

W. H. Aldridge, managing director of the Consolidated Mining and Smelting Company of Canada, Limited, has returned to Trail from a business visit to Montreal, Toronto, and other eastern Canadian cities.

John Daly, formerly of Kaslo, where he was in charge of the office of the Rambler-Cariboo Mines, Limited, was on a visit to Kaslo late in the month. He came from Mullan, Idaho, U.S.A., where he holds a responsible position.

R. N. Riblet, formerly of Nelson, has returned from Juneau, Alaska, which town was his headquarters while he superintended the construction of aerial tramways in the district for several Alaskan mining companies.

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A. B. Irwin, who several years ago was manager of the Porto Rico mine, in the Ymir section of Nelson mining division, died last month in Vancouver. Of late years he had been manager of the Pacific Coast Pipe Company, Limited.

S. S. Fowler, of Nelson, general manager of the Canadian Metal Company, has been in eastern Canadian cities the greater part of February. In Montreal he attended a meeting of the council of the Canadian Mining Institute, of which as a past president he is, *ex officio*, a member.

Jas. Anderson, of Kaslo, associated with the management of several Slocan mines and the Kootenay Ore Company's sampling works at Kaslo, recently made a trip to the chief coast cities of British Columbia, Washington and Oregon. Accompanied by Mrs. Anderson, he went out *via* Spokane.

W. A. Carlyle, of London, in the capacity of consulting engineer to the Le Roi Mining Company, has been engaged in examining the company's Le Roi mine at Rossland during the greater part of February. He leaves on his return to England early in March.

George Stilwell, superintendent of the Hewitt mine in the Silverton camp section of Slocan district, is being kept very busy in connection with the equipment and further development of that mine in preparation for a much enlarged production of ore.

Etienne A. Ritter, of Colorado Springs, Colorado, U.S.A., known to Cariboo mining men as having reported on the Bear Hydraulic Company's hydraulic mining enterprise on Cunningham Creek, was lately engaged in examining mining properties in Nevada, U.S.A.

Benjamin Browett, of Nanaimo, has been appointed superintendent of the newly opened coal mine in Nicola Valley of the Diamond Vale Coal and Iron Mines, Limited, B. P. Little, the company's engineer, met Mr. Browett on the coast and accompanied him to Coutlee, Nicola Valley.

Wm. Yolen Williams, of Spokane, last month went to Chesaw, Washington, to look at a mining property upon which an unusually good find of mineral had been reported to have been made. It is understood the report was not borne out by facts.

Frederic Keffer, engineer in charge of the British Columbia Copper Company's several mines in the Boundary District, left Greenwood on February 29 for Ottawa, Ontario, to there attend the annual meeting of the Canadian Mining Institute, of which he has been president for the institute year now closing.

J. L. Parker, formerly manager of the Brown-Alaska Company's mines in the Ketchikan and Portland Canal districts, is now in charge of operations at the Indian Chief mine at Sidney Inlet, west coast of Vancouver Island, where he has entered upon a vigorous development policy.

Isaac B. Hammond, president of the Hammond Manufacturing Company, Inc., Portland, Oregon, U.S.A., is reported to have spent last season examining properties regarded as probably suitable for gold-dredging purposes, situated in the Nome region and other parts of Alaska. It is understood he has been representing the Guggenheims in this connection.

R. Roberts, manager of the Jewel gold mine, situated in Long Lake camp, Boundary District, has been in Colorado, U.S.A., in connection with making treatment tests of ore from the Jewel, so as to better determine what provision it will be best to make for saving on a commercial scale the values the ore in bulk contains.

Alexander Sharp, manager of the First Thought mine, at Orient, Washington, U.S.A., was a visitor to Rossland during the last week in February. The Orient is reported to be regularly shipping about 1,500 tons of ore, in all, to smelters at Everett and Northport, Washington, and Marysville, East Kootenay, B.C.

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E. Vaughan, of Grand Forks, after two years' service in the assay department of the Granby Mining, Smelting and Power Company, left the Boundary district early in February. His intention is to proceed to England, but by a circuitous route, first visiting Colorado, Arizona, and other parts of the United States where mining is extensively carried on, and going thence to South Africa before proceeding to England.

Chester A. Thomas, manager of the Klondike interests of the Guggenheims, accompanied by the commissioner of the Yukon (Hon. Alex. Henderson) and other men prominent in Dawson City, recently made a four-days' visit of inspection to the extensive water-supply and other works of his principals in the Twelve-mile district of Yukon. It is stated the company intends to carry on extensive operations next season.

Horace G. Nichols, manager of the Ymir gold mine, is on a visit to England to confer with the directors of the company owning the mine and 80-stamp mill near Ymir. The *Nelson Daily News* says: Mr. Nichols is reported to have made a hit with his new patented process of separating slimes in cyanide plants. By the method adopted instead of there having to be a couple of hundred settling tanks in large plants, this number is cut down to three and the slimes instead of taking 36 hours to settle take but an hour. It is understood that Mr. Nicholls has been offered £50,000 for his patent but refused, preferring to take a royalty on ore treated by his process.



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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. Entry by proxy may, however, be made on certain conditions by the father, mother, son, daughter, brother or sister of an intending homesteader.

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.

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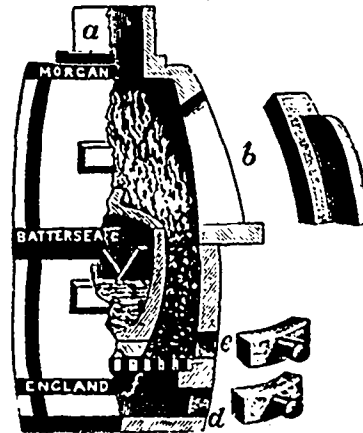
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