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BRITISH COLUMBIA MINING RECORD

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BRITISH COLUMBIA
MINING RECORD

E. JACOBS.....Managing Editor

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NOTES AND COMMENTS.

Some nice cinnabar is in sight in a new cut recently run on the Hardie Mountain on the property of the Hardie Cinnabar Mines, says the Kamloops *Standard*.

The *Boundary Creek Times* says that the smelter of the Dominion Copper Company at Boundary Falls recently established a new record, viz., one of 5,328 tons of ore smelted in one week.

On December 27 the Hedley *Gazette* said: During the past few weeks the water has been fairly steady, and the Daly Reduction Company's stamp mill has been keeping everything going full blast.

The Ketchikan *Mining Journal* noted last month that the steamer "Henriette" on one of her down trips carried 500 tons of gypsum from Gypsum Cove, Southeast Alaska, for the British Columbia cement works.

It is stated that the new hydro-electric plant the West Kootenay Power and Light Company is erecting at Upper Bonnington Falls, Kootenay River, will be ready early in February to supply electric power to Boundary district mines and smelters.

The names of those constituting the Boards of Examiners, under the "Coal Mines Regulation Act," for the various collieries of the Province during the year 1907 are published next the last column of reading matter in this number of the MINING RECORD.

The Berry Creek Mining Company, which owns a *hydraulic placer-gold mine on Thibert Creek*, northeastern Cassiar, has finally substituted No. 6 monitors, 18-in. pipe, and 1,000 in. of water for the No. 2 monitors, 10-in. pipe, and 450 in. of water it used in its earlier operations.

From the *Similkameen Star* it is learned that the Vermilion Forks Mining and Development Company is vigorously prosecuting development work on its coal mine at Princeton along a well defined plan and

by spring will be in a position to put on a large force of men and produce coal to meet all demands.

Production of copper in the United States in 1906 is estimated to have been larger by 43,365,755 lb, than in 1905. The quantity produced in 1906 is placed at 915,000,000 lb. of a total value of $178,699,500.

Lord Strathcona, high commissioner for Canada, has been informed by the minister of the interior, by cablegram, that the tonnage of zinc deposits immediately available in the Ainsworth and Slocan districts of British Columbia is equivalent to approximately four times the present consumption of the Dominion.

The Sixth Annual Number of *The Anaconda News*, containing illustrated articles on Boundary district towns, mines, smelters, etc., has been received from the editor-publisher, Robert Keffer. The practical nature of the information published, and the general get-up of this special issue, are alike creditable to its youthful proprietor.

A coal mine operators' association has been formed at a meeting of the general managers of a number of companies, held at Fernie, Southeast Kootenay. The main object of the organization, it is announced, is to prevent strikes and lock-outs through the adoption of effective means to compel both the men and the employing companies to live up to their agreements.

From the Nelson *Daily News* it is learned that: The La Plata mine is now shipping the whole of its product to Trail. The roads are good and about a car a day is being sent out. The cessation of shipments did not last any time, the output for the month being about 1,725 tons milled and two cars of clean ore. Seventeen cars of concentrates have been shipped from the mill.

A *Reuter* despatch dated Ottawa, December 4, and published in England, stated that M. Lemieux, postmaster general and minister of labour, had been receiving congratulations on the settlement through the intervention of the labour department of the strike at the Lethbridge (Alberta) coal mines, whereby the catastrophe of a fuel famine in the Northwest had been averted.

In the course of a review of the year 1906 the London *Critic* says: Outside South Africa, Greater Britain has had a year of pronounced prosperity Canada, as is only right and proper for our oldest self-governing dependency, has led the way, and it is not overstating the case to assert that within a year's, or perhaps two years', time, Canadian securities, industrial, mining, and those associated with agricultural development, will be as popular with the investing public as some of its railroad, land, and trading issues have been during 1906.

Developments at the Similkameen Mining and Smelting Company's property on Bear Creek, northern Similkameen, are decidedly encouraging. The company put in a steam hoist, erected buildings for the comfortable housing of its men, sent in supplies for the winter, and is now engaged in steadily developing its gold-copper mine, in which the ore body shows larger as depth is gained.

A table printed on another page shows the aggregate value of the mineral production of British Columbia for the ten years 1897-1906 to have been $172,964,734. Tell the ordinary business man of the Province that for ten years the average value of its mineral production has exceeded $17,000,000 and he will not believe the statement, yet this is an incontrovertible fact, on official record.

Manager Trethewey of the La Plata mines has arranged, the Nelson *Canadian* states, for the treatment at the Trail smelter of all the concentrates he now has ready for shipment, about 1,700 tons. The same newspaper also publishes a report from the Silver Cup, in the Lardeau district, to the effect that there is now ore in sight in every part of the mine workings from the 300 to the 700-ft. level.

Notice has been gazetted by A. P. Luxton, solicitor for the applicants (whose names are not published), that application will be made to the Legislative Assembly of the Province of British Columbia at its next session, for an Act to consolidate the leaseholds, placer mining claims, and other mining property now held by the applicants situate on Willow River, Slough Creek and Williams Creek, Cariboo district, into one holding.

"Cobalt (Ontario) and Goldfield (Nevada) are today the excuses for the two greatest gambling affairs on record," observes the *Mining and Scientific Press*, of San Francisco. "At Cobalt the mines already organized into companies represent a market value of $200,000,000, while it is a fact that the entire output of the district since the first ore was shipped reaches only $5,000,000. We do not deprecate an eager interest in mining, only the insane gamble that uses mining for an excuse."

The Kaslo *Kootenaian* reports the strike, late in December, at the Whitewater deep mine, of "a solid vein of clean galena, over 3 ft. thick, and permeated throughout with rich grey copper." The same newspaper states that: "Things are progressing favourably at the Rambler-Cariboo, and we are giving away no secret when we state that ore was struck some time ago in the upraise being driven to tap the ore body in No. 8 shaft. Upraising is going on steadily, with about 130 ft. yet to be driven before connections will be complete."

Work on the Great Cariboo Gold Company's prop-

erty at Wingdam is suspended indefinitely, states the Ashcroft *Journal*. It further remarks: "C. H. Unverzagt, general manager, and Sam Keast, superintendent have gone to New York. Shareholders who desire further explanation as to the cause of the shut-down are referred to C. H. Unverzagt, 1135 Broadway, New York. However, if that source of information has proved unreliable in the past they can make guesses at the real reason why 'the richest placer mine in North America' is closed down."

Under date December 3 the Ottawa correspondent of the London *Mining Journal* wrote: There is to be a continuation for three and a half years of the iron and steel bounties, as announced by Finance Minister Fielding in his budget in the House of Commons last week, and tariff revision. The Government, the minister said, were particularly anxious to encourage iron that was made of native ore, and they accordingly proposed a special rate for iron of that description. These bounties, he added, were intended for iron and steel for consumption in Canada only, and not for export.

The total value of the metallic minerals and coal and coke produced in 1905 in the whole of Canada outside of British Columbia (excluding the Yukon's *$8,000,000 in gold), was less than $25,000,000.* It is quite probable the estimated production for 1906 will show British Columbia to have produced a higher total value of those minerals than that of the combined output of the whole of the Dominion east of the Rockies. The large increase in the silver production of Ontario may affect the position, but it is not unlikely British Columbia will be found to occupy the proud position here indicated.

The director of the United States mints is reported to have said in the course of a recent interview at Denver, Colorado: "Silver is going to reach a price of 76 cents or better within two years, and will hold that price. I believe that hundreds of silver mines throughout the West which have been shut down for more than 10 years because of the fall in price will be opening again within a year, simply because the price of this metal makes it worth while. Further, let me state, this is no speculative or boom market. The price of 71 cents today will be better next month, and it will steadily and naturally advance a point at a time until a high mark, possible 80 cents, will be touched."

The Nanaimo *Herald* says: The month of November was a record breaker for the Western Fuel Company, in the way of coal output, no less than 38,044 tons having been raised to the surface from No. 1 and Northfield mines, the former putting out 28,000 tons, and Northfield the remaining 10,044 tons. Besides being the banner month for the new company, the single day output was also broken for yesterday the output at No. 1 was 1,200 tons and Northfield 522 tons, a total of 1,722 tons. Since taking over the colliery from the old company, the Western Fuel Company has laboured under many disadvantages and it is only now that things are in such condition as to admit of the management doing justice to itself in the way of making a large output.

The total value of gold received at the United States Assay Office at Seattle, Washington, U. S. A., in 1906, was $23,346,938.24, as compared with $18,873,850.17 in 1905. The year 1906 was a record one, the highest total of any previous year having been $22,038,795.79, which was in 1900. Of the gold received in 1906, $5,670,086.28 was from the Canadian Yukon, $1,396,314 from British Columbia, and $16,141,492.47 from Alaska. The grand total of gold received at this office since its establishment is $139,353,686.31, of which Alaska contributed $47,060,098.77, the Canadian Yukon $82,365,351.55, and British Columbia $8,113,863.10. The remainder came from Oregon, Washington, Idaho and Montana, except a small amount from other parts.

Erroneous punctuation makes a great difference in the information—or mis-information, as the case may be—conveyed. Recently a London, England, journal published the following, relative to the operations of the Granby Consolidated Mining, Smelting and Power Company, Ltd.: "The report for the year ended June 30 last showed a production of 19,939,004 lb. of copper, 416,947 oz. of silver, and 50,020 oz. of gold, and that the total amount realized for the same was $475,105,869." The amount actually realized, according to the company's published statement of receipts, was $4,751,058.69. Seemingly the "old country" printer got mixed over the dollars and cents' punctuation and made changes to suit his idea of what it should be, with a result decidedly surprising as regards the money value the company's products realized.

The report circulated in Seattle that the Treadwell mines will close down on account of a shortage of coal is denied by the management, asserts the *Mining and Scientific Press*. While the fuel situation is admittedly serious, the weather is moderating and a plentiful supply of water is anticipated. Robert A. Kinzie, the manager, in an interview at Seattle, stated that while he had found it impossible to obtain coal anywhere in the United States, a plentiful supply had been ordered and was now on the way from Australia. Despatches announce the arrival of the steamer Farallon at the Treadwell docks with 500 tons, and more boats on the way. A large oil-burning plant has already been installed, and will be in operation early in January. With ample water and a small amount of coal the mine can be kept running until oil supplants coal as fuel.

The Victoria *Colonist* estimates the total value of the agricultural products of British Columbia in 1906 at $8,000,000. The MINING RECORD submits

for the consideration of all interested in the development of the natural resources of the Province that this sum does not equal the value of that year's production of copper alone among its mineral products. While it is not hinted that agriculture is receiving too much attention from the Government—would that it were practicable to give it much more aid from the same source—it is urged that the mining industry (the products of which in 1906 were valued at, in round figures, copper, $8,600,000; gold, $6,000,000; coal and coke, $3,600,000; silver and lead, $3,000,000, and other materials, $1,000,000) should be assisted in every reasonable way by the Provincial legislature, which does not at all times exhibit a disposition to deal with it even equitably, not to say generously.

Governor George C. Pardee of California, who introduced the subject of the prevention of mining frauds at the Ninth Annual Meeting of the American Mining Congress, held at Denver, Colorado, last month, said in the course of his remarks on this subject: "There is nothing meaner and dirtier in the world than the stock fakir who deliberately and unblushingly abuses the confidence of the people by robbing them of money which can and would be used for a good purpose in increasing the holder's prosperity. It is therefore of serious import that the peaceful law-abiding citizens should do what they can to protect the injured persons in such transactions. It is quite true that we cannot protect all the fools all the time, but we can protect some of them some of the time." We commend this plain-spoken opinion to several parasites on the mining industry of this Province whose unprincipled actions in a similar direction have been animadverted upon in the MINING RECORD from time to time; also to certain writers for newspapers who have aided and abetted in the nefarious schemes of two or three "fakirs" whom it is scarcely necessary for us to at this time name.

The following, from the *Mining and Scientific Press*, would appear to somewhat discount some published reports of important strikes of oil in Alberta: "Eugene Coste of Toronto, who has travelled extensively through the Canadian West during the past season in connection with the development of the oil resources of that region, states that so far no oil in any quantity has been struck. The Alberta Oil Company has a well down 1,585 ft. at Pincher Creek, south of the North Kootenay pass, and has found a little oil. They will sink to a further depth. Mr. Coste is acting as engineer for the Canadian Pacific Railway, which has gone down 800 ft. and got a showing of gas. They will sink 2,000 ft. further if necessary in the hope of obtaining oil to use as fuel for their locomotives. The company has another well at Langham 1,000 ft. down, and will sink to 1,700 ft. Small results have been obtained by the Rocky Mountain Development Company and the Western Oil and Coal Consolidated Company, operating in southern Alberta. Mr. Coste thinks that drilling operations have not so far been conducted on a sufficiently extensive scale to determine whether oil exists in paying quantities."

We have received from the author, Dr. R. W. Ells, a copy of his "Report on Graham Island," the most northerly of the Queen Charlotte group, British Columbia, which has been published by the Geological Survey of Canada. In his letter of transmittal to the director of the Survey Dr. Ells says: "In the work of exploration particular attention was given to the coal areas of the interior, which were discovered 20 years ago and where several large and valuable seams are disclosed. These have been opened at three points, known as Camp Wilson, on the north, Camp Robertson, near the southern part, and Camp Anthracite, at the southern extremity of the field. The probable extension of these seams was indicated as closely as possible from the data available. The exploration also included a boat voyage around the entire island, and a traverse across the central portion was made by way of Masset Inlet, the Yakoun River and Lake, and thence by trail across the coal basin to Skidegate. This was done in order to ascertain the western limit of the coal field and the character of the Yakoun River, by which route it was hoped that a ready means of access to the coal seams might be found." We shall further notice this report in a later issue.

Last month our exchanges included a copy of "L'Ingegneria Ferroviaria," which appears to be the "Organo Ufficiale del Collegio Nazionale Degli Ingegneri Ferroviari Italiani." This interesting publication was dated "Roma, 16 ottobre 1906." Every month our editorial table is graced with a copy of 'Le Mois Scientifique et Industriel," the "Principales Revues Analysees" in which are evidently classed under the separate heads of "Revues Techniques Generales," "Mecanique," and "Electricite." Then two or three valued correspondents are in the habit of addressing us in German, beside which we are periodically favoured with "Zentralblatt fur Eisenhuttenwesen." Occasionally a communication comes to us in Spanish. Reverting to French—we have "Salutations distinguees" and "Salutations empressees" (we regret that our printer's lintoype machine has no properly accented letters in its magazines) from courteous correspondents writing from France, from Belgium, and from Turkey. We appreciate the compliment thus paid to our knowledge of languages, but, really, our life is all too short to admit of our meriting this confidence in our linguistic versatility. Still we manage to worry through somehow and nobody appears to be any the worse as a result of our limitations in this direction.

The strike of union employees of the Alberta Railway and Irrigation Company, operating coal mines at Lethbridge, Alberta, has been settled. The men

resumed work on December 3, after having been on strike since March 9, last. During November the friendly offices of the Dominion department of labour under "The Conciliation Act, 1900," were accepted by both parties to the dispute, intervention having been made by the department at the request of the premier of Saskatchewan. The deputy minister of labour proceeded to Lethbridge and there succeeded in bringing about an agreement between the company and the men. In the basis of settlement reached, an increase of wages amounting to practically an extra ten per cent for most of its employees was granted by the company, which also agreed to the appointment of a check-weighman to protect the interests of the men, and to deduct from the pay of its employees through the payroll the amount necessary for the payment of such check-weighman. Several other concessions were made to the men. Arbitration of future differences, in manner set forth therein, was included in the agreement. The strikers withdrew their demands for a complete recognition of the union, for the deduction of union dues by the company, for an 8-hour day, and other less important concessions.

The provincial mineralogist's approximate estimate of the value of the mineral production of British Columbia for the year 1906 is as follows:

Gold, placer	$ 920,000
Gold, lode	5,150,000
Total gold	$6,070,000
Silver	2,200,000
Copper	8,690,000
Lead	2,690,000
Coal	4,590,000
Coke	1,050,000
Miscellaneous	1,100,000
	$26,390,000

The Victoria *Colonist* estimates the value of the products of other industries to have been: Lumber, $9,500,000; agriculture, $8,000,000; fisheries, $8,000,000; and manufactures, $11,000,000. Comparing mining with lumbering, agriculture and fishing it is noteworthy that the estimated value of the mineral production in 1906 is greater than that of the combined total of the products of the other three staple industries mentioned, the respective total estimated values being—mineral products, $26,390,000; lumber, agriculture, and fisheries (together), $25,500,000. This is a showing all interested in the mining industry may well take particular pride in.

A press despatch sent out from Coleman, Alberta, gives some interesting information relative to the International Coal and Coke Company's operations. The manager has announced the addition to the company's plant of a Bradford breaker or crusher for crushing and cleaning the coal used in the coke ovens. The company is completing a battery of 100 new coke ovens, which brings up the total to 190 ovens. When the crusher shall be ready for operation it will complete in their entirety the company's plans of enlargement for this year. The crusher will be installed at an expenditure of $5,000, and when finished the company will have one of the most complete and modern coal handling plants in Western Canada. Since the inception of coal-mining here three years ago the company has installed an operating plant having a handling capacity of 3,000 tons of coal daily, and built 190 coke ovens. It is today giving steady employment to 400 men, who, under the contract system in vogue, make an average of more than $100 per month each in wages. The past month has been a particularly good one with the mines throughout the Blairmore-Frank district All the mines made an especially good run, an aggregate of 2,500 tons a day being shipped from them. The International Company figured most conspicuously in the shipments, maintaining an average of 1,500 tons daily, and on one occasion reaching an output of a little more than 1,700 tons in one shift.

The London *Mining Journal*, in its "Mining Market" notes, lately remarked: 'Le Rois are 1-16 better on the issue of the report and accounts and declaration of an interim dividend of 2s. a share. The company for the first time since 1900 had a balance of cash to its credit amounting on June 30 to £90,000. The ore shipped for the year contained 1 dwt. less gold, but a little more copper. The quantity amounted to 110,042 tons, against 114,960 tons in 1905, and the total profit for the year before writings off was £97,435, against £89,479. The question as to whether the company will do better at its own smelter at Northport than at Trail remains to be decided, as shipments to Northport have only just been resumed. The mine is in better showing than for some time past, but the improvement in the company's position is obviously due either to more profitable working at Trail or the better price for copper. Present profits must be on a large scale." In regard to "more profitable working at Trail," the directors of the Le Roi Mining Company, in their annual report (printed in last month's MINING RECORD), said: "The policy of shipping Le Roi ore to Trail involved the closing down of the Le Roi smelter at Northport and the rapid deterioration of that valuable asset. In support of this action it was alleged by the late directors that a great saving would be effected. This, however, proved to be fallacious, the cost to the Le Roi Company under this arrangement being greater than formerly. The present directors, after looking carefully into the matter, decided that this state of affairs could not be allowed to continue, and authorized the managing director to take steps to cancel the contract, in which he was successful."

The London *Money Market Review*, commenting on Le Roi mine affairs, recently said, in part: Le Roi shareholders have no cause to regret the step they took a year ago, when they rejected amalgamation

proposals put forward by Sir Henry Tyler and his colleagues, made a clean sweep of the old board, and again placed the control of the property in the hands of the dismissed managing director, Mr. A. J. McMillan.* * * * * The history of the company has been until quite recently one long record of disappointment and disaster. Floated in 1898, under the auspices of Whitaker Wright, with a share capital of £1,000,000 sterling, it made but a poor show from the start. Only one meagre dividend was paid—namely, 5 per cent., in the year after its flotation. Yet the £5 shares were successfully manipulated up to £9 10s. in 1901, only, however, to fall with a crash in the very next year to 21s. 3d. Since then they have been down to 10s. They have now recovered to about 33s. 9d., at which price perhaps they are quite high enough until the position is more assured. There can be little doubt that the mine was sold to the public at an exorbitant figure, and that the capitalization, like that of most Whitaker Wright promotions, was excessive. Still, there is no reason why, with careful management, modest but regular dividends should not be earned. Last year's distribution of 3½ per cent absorbs £35,000, and is provided wholly out of the twelve months' net profits, which amounted to £37,138. This net profit, moreover, was arrived at after having made apparently *adequate provision for exploration and development* charges, depreciation, improvements, special expenses and other items. In short, it was a real net profit and its distribution is perfectly legitimate.

A special correspondent of the San Francisco *Mining and Scientific Press*, writing to that journal from Toronto, Ontario, says: 'The situation as regards stability of titles generally is in condition far from satisfactory to the large investor. There is any amount of litigation now pending in connection with Cobalt properties. As the law now stands after the title has passed from the Crown, anyone seeking to impugn it or set up a counter-claim on the ground of fraud or misrepresentation must first obtain a *fiat*—that is, the consent of the attorney general to bring an action. This practically places at the mercy of the Government many of the mining enterprises of Cobalt, especially those whose title dates back to the earlier days of the camp, when there was much irregularity and not a little downright fraud in making locations. Last summer the White Silver Mining Company had their leases, covering about 120 acres, cancelled, on the ground of fraudulent affidavits of discovery by the locators, and quite recently the owners of the O'Brien mine, after protracted litigation, were glad to secure their title by undertaking to pay a 25 per cent. royalty to the Government on their output. With these instances before them, it is hardly a matter for surprise that shrewd investors should hesitate before placing themselves in a position to be held up either by possible claimants or by the Provincial Government. Mining men are loud in their demands for some change by which an indefeasible title can be secured, which will be more satisfactory, to outsiders at least, than a cabinet minister's bland assurance that so far as he knows, no one is assailing it. The question is likely to have a prominent place during the coming session of the Provincial Legislature." If those who find fault with the mining laws and regulations of British Columbia would seek information relative to the position in Ontario they would quickly find out that, as compared with that province, there exists in British Columbia but little reasonable cause for railing at the Government in this connection.

Elsewhere in this number of the MINING RECORD is printed a report of the operations of the Berry Creek Mining Company, together with other information concerning its placer-gold property, situated in the Cassiar district. The record of this company is a distinctly creditable one, its chief characteristics being much work and little talk. Not infrequently the efforts at mining in this Province of Englishmen are spoken of with ridicule, and sometimes deservedly so, but in the case of the Berry Creek Mining Company its English organizers and managers have scored a decided success, and it is gratifying to the MINING RECORD to feel warranted in according them praise for their persistence under many difficulties until these have been largely overcome. Next season's work should bring in comparatively large profits. It is not unlikely the property will eventually be sold as a paying concern and a company with ample capital to work on a large scale be organized. At the request of his co-shareholders Warburton Pike lately prepared a review of the position of the mine. The following excerpt from his summary of the results achieved will doubtless be read with interest: In summing up the result of these five years' work, or rather the work of five short seasons of 150 days at the outside, it is only fair to consider that so far our efforts have been almost entirely confined to development work. During this time we have succeeded in opening up the mine to a width of 300 ft., making ample room for the accommodation of falling gravel without danger to machinery; we have installed four sets of sluices, with the necessary rock cuts through which to wash gravel in four separate pits; we have acquired new water rights and perfected our water supply by means of flumes and ditches; we have put up and proved a complete new plant capable of using the increased water supply to the best advantage; we have also purchased three new leases adjoining our original property, moved our saw-mill from the mine, where large timber was exhausted, to a newly acquired and suitable site on Dease Lake, where it has cut 60,000 ft. of lumber, of which more than half is still on hand at mine and mill. In addition to this we have taken out gold dust to the value of $63,000, exposed a pay-streak in No. 2 pit which has produced an average of $475 per diem during a run of 26 days, and gained some practical knowledge of hydraulic mining which will no doubt render us less liable to serious errors in the future.

MINING A PROGRESSIVE INDUSTRY IN BRITISH COLUMBIA.

Some Prominent Features Denoting Progress in 1906.

MINING IN BRITISH COLUMBIA is a decidedly progressive industry and its growing importance and augmenting value should be more emphatically and persistently proclaimed by the newspaper press of the Province, which, as a rule, does not give it the prominence it merits. Similarly in official quarters its steady expansion and consequent weighty influence on the general industrial situation do not always appear to be adequately recognized. For instance, the hon. the premier, who is also minister of mines, in his published address to the electorate of British Columbia, is, we think, altogether too modest concerning it. His brief comments on this industry and the attitude of the Provincial Government towards it are as follows:

> "It is gratifying to know that this important industry is in a most flourishing condition; that in the last few years there has been a remarkable development in particular of the Coast mines, some of which bid fair to rival in volume and the value of their output the richest of those in the interior of the Province.
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> "The Government has not thought it desirable to make alterations in the mining regulations, believing that the interests of that industry are best served by creating the impression that the laws affecting it are not likely to be changed."

Now, in our opinion, the premier would have been quite justified in directing public attention to the fact that in the most productive placer-gold districts —Atlin and Cariboo—financially strong companies are making extensive preparations for the recovery of gold on a much larger scale and in manner that gives promise of permanence of operations; that Rossland, Boundary and Coast mines are steadily increasing their output of gold and silver in conjunction with copper; that the production of silver in 1906 was larger in quantity than for years previously, notwithstanding the comparative smallness of production of this metal in the Slocan during that year; that an increase of nearly 7,500,000 lb. in the amount of copper produced was an advance over that of 1905 of nearly 20 per cent; that the production of lead is being well maintained and this without any present assistance in the way of bounty from the Dominion, the estimated small decrease this year as compared with last being attributable to the compulsory closing down for several weeks of the lead smelters owing to labour troubles at the Crow's Nest Pass Coal Company's collieries; that there was a larger gross tonnage of coal mined despite the above-mentioned labour troubles and that the chief market for Vancouver Island coal was lost to a considerable extent following the San Francisco disaster last spring.

Further, there are the permanent benefits which may reasonably be expected to result from the discovery during the year of large bodies of pay ore down to nearly 2,000 ft. depth in Rossland mines; the substantial increase in output of Boundary mines, with the certainty of still further enlargement of production; the renewal under favourable auspices of active mining at Ainsworth; the great significance of success having attended deep-level mining in the Slocan, the Rambler-Cariboo Company having lately encountered good ore between 800 and 1,000-ft. depth; the improved conditions in the Silverton section of the Slocan Lake district; the important recent developments at Mt. Sicker, Vancouver Island, and the addition to the producing mines of the Province of the Britannia, on Howe Sound, and the Brown-Alaska Company's mine on Portland Canal.

The steady expansion of coal-mining operations is also worthy of note—on Vancouver Island, where the Western Fuel Company has opened up what is practically a new mine; at Nicola, where two companies are preparing to produce coal in considerable quantity; at Princeton, Similkameen; and in the Crow's Nest Pass, where, near Hosmer, the C. P. R. is developing a coal mine, and where, in the upper Elk section, several coal properties are being systematically prospected.

In connection with the reduction of ores, the costly modern improvements, either already made or in hand, at the copper smelters in the Boundary district and at Trail; the installation of improved roasting and other plant at the lead smelters at Trail, Nelson, and Marysville, and the operation the greater part of the year of the Crofton works after a long shut-down, are all noteworthy evidences of progress in 1906.

Best of all, though, from the point of view of the encouragement of the further investment of capital in the mining and smelting industries of British Columbia, there is the fact that apart from the large amount of net profits expended in further development and equipment by several of the bigger companies, and the net earnings of close corporations engaged in mining, between $3,000,000 and $4,000,000 were divided among shareholders in mining companies. Since nothing else is so convincing to prospective investors, this distribution of surplus net profits may well be regarded as a matter for sincere congratulation.

Now the MINING RECORD is not suggesting that the hon. the premier should have included in his manifesto the whole of these facts. It is simply taking the all too brief and modest statement of the head of the Government as a text and from it is venturing upon the foregoing little discourse, which may well be given wide publicity, since it is simply a review of some of the leading features of a very gratifying situation in regard to mining in the Province, the value of the products of which, as pointed out on another page of this issue, is greater for 1906 than that estimated for the lumbering, agricultural and fishing industries of British Columbia combined.

ZINC MINING IN BRITISH COLUMBIA.

ZINC MINING did not make progress in British Columbia in 1906 as had been expected it would do. On the contrary, the production of zinc was small as compared with that of 1905. The reasons for this practical failure of efforts to build up a profitable zinc-producing industry are stated in the memorial printed on another page, and in the following article taken from the Nelson *Daily News*:

"During the eleven months ending on November 30, last, so Mr. S. S. Fowler informs us, the average price of spelter in London was £26 18s. 7d. (equivalent to $5.82 per 100 lb.) the highest average for more than 35 years. But notwithstanding the price obtainable, British Columbia zinc ore production has decreased to about 2,885 tons as compared with about 8,500 tons shipped during 1905. The shipments of 1906 were distributed as follows: Frank, Alberta, 825 tons; American smelters, 1,400 tons; European smelters, 660 tons. The reasons for this decreased output of the mines are several. First, and probably the most important one, is that British Columbia is now practically excluded from the American market by the enforcement of the Dingley tariff. This tariff imposes a duty of 20 per cent *ad valorem* on zinc ores, other than calamine, and the Customs authorities have ruled that the value is to be determined not only by the zinc contained in the ore, but by the zinc plus the lead and silver. This decision of the board of appraisers has been appealed from by the smelting interests of Colorado and Kansas and the matter is still under advisement.

"In the meantime the American smelters are taking a very limited amount of ore from British Columbia, fairly low grade in zinc and containing considerable quantities of lead and silver. No ore of high grade in zinc is being mined at present.

"Under the existing conditions, with a high price but no nearby market available, it would seem natural that zinc of high grade should be sold in Europe to a greater extent than it is; but there are many details which make that market unattractive to the producer as a direct purchaser.

"It was hoped a year ago that the smelter at Frank, Alberta, owned by the Canadian Metal Co., would have been in condition to be operated successfully by the middle of 1906, and thus afford an outlet for the Kootenay product. Indeed, the Frank plant was run for a short time during the summer, producing several carloads of excellent spelter. The operations, however, revealed the fact that efficiency was not attainable when working on a small scale, nor without considerable alteration of the plant. It was therefore decided to close the works pending the making of necessary changes.

"In the meantime, the Blue Bell mine, owned by the Canadian Metal Co., is being extensively developed and is about to be equipped with a plant for the concentration of its ore, for both zinc and lead. The zinc output will be quite sufficient to insure continuity of operations at Frank, and thus, with an adequate and constant supply of raw material, it is expected that the cost of operation at Frank may be so reduced as to afford a permanent local market for Kootenay zinc producers.

"The 'Report of the Zinc Commission,' which was published about November 1, has proved to be a valuable work, containing, as it does, a compilation of a vast amount of general information as to zinc, together with the results of many and extensive experiments on various zinc-bearing ores. It is evident from the report that we have an extensive latent resource in zinc, and that, were the more important properties worked and the product smelted in Canada, the product would fill the Canadian demand many times over. Foreign markets are therefore essential, and in these the world's price for spelter must be met.

"The 'Report of the Zinc Commission' plainly indicates that, with spelter at not above 5 cents per lb., and without conditions considerably more in our favour than they are now, the zinc mining and smelting industry, if unaided, must develop but slowly. If it can be fostered and well established, when prices of the metal are high as at present, we believe it quite probable it will become so well entrenched as to be able to live through periods of lower ranges of price. Now is the time for help."

Regarding the prospect of assistance being given this industry, the following press despatch, sent from Ottawa on December 31, will serve to indicate the position at that date:

'F. J. Deane of Nelson, British Columbia, who with W. C. Dalgleish has been here for some time past in connection with a proposed bounty for the encouragement of the zinc industry in British Columbia, had a long conference this morning with the finance minister, Hon. W. S. Fielding, and Hon. William Templeman, in reference thereto. The matter was fully discussed, Mr. Fielding evincing a cordial interest and promising to give the project thorough consideration at a later date, when Mr. Deane shall be in a position to present data not as yet available. Further discussion of the subject with the finance minister will be deferred for a few weeks, his time just now being fully occupied with the tariff, and the subject being one that can be taken up more conveniently later in the session. Whilst Mr. Fielding did not hesitate to express his anxiety to assist in every way possible the mining industry in British Columbia, he pointed out plainly that there is now prevalent a feeling of hostility to bounties, and that it would be necessary to establish a very strong case in order to secure aid of this nature."

A press despatch lately received from Ottawa states that Hon. Wm. Templeman is greatly interested in the movement to establish the zinc industry on a profitable basis in British Columbia, and will lend his hearty support to any proper effort in that direction.

Annual Review of Mining in British Columbia.

By E. Jacobs.*

A CONSIDERABLE INCREASE in value of the mineral production of British Columbia in 1906 as compared with that of 1905 appears to be the satisfactory result of the year's mining and smelting operations. The estimated total of $26,357,115 for the former year gives a net increase of $3,895,790 over that immediately preceding. As 1905 made a gain of $3,483,930 over 1904, it is evident that the mining industry of the Province has assumed much more important proportions than those of four or five years ago, the increase in value over the totals of 1902 and 1903, respectively, being fully 50 per cent.

While much of the marked increase in value in 1906 over the production of 1905 is attributable to enhanced average prices for metals in the former year, the fact should not be lost sight of that with the exception of lead and zinc, production of which was unfavourably influenced by conditions believed to be but temporary in their diminishing effects, the quantities of minerals produced were larger, gold, silver, copper, and coal all exhibiting a greater production than in 1905. Indeed lode gold, copper, and coal each reached a total quantity higher than that shown in the official records of any previous year. This is a decidedly satisfactory position for the mining industry of the Province to be in, albeit it is but the natural result to be looked for with prices of metals ruling high and with a reasonable prospect of their continuing so for the greater part of the ensuing year. The outlook for a further increase in the production of coal is also promising, the demand being much in excess of the supply, but with little likelihood of a change in the situation until after the close of the winter, if then.

TOTAL MINERAL PRODUCTION IN TEN YEARS.

The totals of mineral production in British Columbia during ten years, 1897-1906 provide an object lesson to which, in the interests of the mining industry of the Province, too much prominence cannot be given, so they follow:

Year.	Total Value.
1897	$ 10,455,268
1898	10,906,861
1899	12,393,131
1900	16,344,751
1901	20,086,780
1902	17,486,550
1903	17,495,594
1904	18,977,359
1905	22,461,325
1906 (estimated)	26,357,115
Total for ten years	$172,964,734

*Editor B. C. Mining Record.

In calculating the values of the several minerals to obtain the totals for 1906 shown in the next following table, placer gold has been taken as worth $20 per oz.; lode gold, $20.67; silver, 66.791 cents (less 5 per cent); copper, 19.278 cents per lb.; lead, 5.75 (less 10 per cent); zinc, roughly estimated at $15 per ton; coal taken at $3 per ton of 2,240 lb., and coke at $5. Silver, copper and lead values are the average prices for the year, according to the New York *Engineering and Mining Journal.*

VALUE OF PRODUCTION IN 1905 AND 1906.

The respective totals of value of minerals produced in 1905 and 1906 (the latter estimated) are as under:

	1905	1906
Gold, placer	$ 969,300	$ 920,000
Gold, lode	4,933,102	5,167,500
Total gold	$5,902,402	$6,087,500
Silver	1,971,818	2,201,765
Copper	5,876,222	8,675,100
Lead	2,399,022	2,742,750
Zinc	139,200	60,000
Total metalliferous	$16,288,664	$19,767,115
Coal	$4,152,936	$4,590,000
Coke	1,358,925	1,050,000
Building materials, etc.	660,800	950,000
Total non-metalliferous	$6,172,661	$6,590,000
Summary—		
Metalliferous	$16,288,664	$19,767,115
Non-metalliferous	6,172,661	6,590,000
Total production	$22,461,325	$26,357,115

QUANTITIES OF MINERALS PRODUCED IN 1905 AND 1906.

The quantities of minerals produced in 1905 and, approximately, those in 1906, were as under:

	1905	1906
Gold, placer Oz.	48,465	46,000
Gold, lode Oz.	238,660	250,000
Total gold Oz.	287,125	296,000
Silver Oz.	3,439,417	3,470,000
Copper Lb.	37,692,251	45,000,000
Lead Lb.	56,580,703	53,000,000
Zinc Tons.	9,413	4,000
Coal Tons of 2,240 lb.	1,384,312	1,530,000
Coke Tons of 2,240 lb.	271,785	210,000

By far the greater part of the increase for the year just closed was made by copper, which not only had the assistance of an advance in average price of about 3 2-3 cents per lb., but was produced to the extent of about 7,300,000 lb. more than in 1905. Lode gold, silver, coal and building materials, etc.,

also show increases in both quantity and total value. Lead fell off in quantity but its total value was higher. Zinc and coke are known to have decreased during the year, though there were particular reasons for the falling off in production of these minerals, as will be pointed out presently.

As to districts — the Boundary made the largest increase and further strengthened its claim to being the biggest copper-producing district in Canada. East Kootenay, which occupies a similar position in regard to lead, came next. While in several other districts production showed little, if any, increase, there were in them important developments which may be expected to add considerably to the output of mineral from those districts in the near future.

GOLD.

The further falling off in placer gold (1905 production having previously been the lowest since 1898) is attributable to causes which are matters for congratulation rather than the reverse. In both Cariboo and Atlin districts, the two chief placer gold sections of the Province, financially strong companies have been and still are engaged in preparing for extensive operations next year or the following. The Guggenheim enterprises in both districts named are on such a scale as should add largely to the quantity of placer gold recovered after works now in course of construction shall have been completed. In Atlin individual miners are rapidly giving place to companies, and steam shovels are superseding small appliances where large quantities of gravel are to be handled.

Lode gold was larger in quantity recovered by between 11,000 and 12,000 oz. The increase of nearly a quarter of a million tons of ore treated in the Boundary added proportionately to the lode gold output, there being a little gold associated with the copper ore. Rossland's production was well kept up. The Ymir mine has again been a disappointment in point of gold yield. The Nickel Plate, in lower Similkameen, was not worked to the full capacity of the Daly Reduction Company's 40-stamp mill at Hedley, to which, however, it sent between 30,000 and 35,000 tons of ore. The Iron Mask at Kamloops and the Brown-Alaska Company's mine on Portland Canal also contributed to the lode gold total. The two Vancouver Island smelters together produced rather more than 9,000 oz. of gold, but part of this was recovered from foreign ores and matte.

SILVER.

The St. Eugene increased its output of lead-silver ore and consequently its silver production, and the Sullivan mine, also in East Kootenay, added its quota of silver from its low-grade ore. The North Star was another East Kootenay mine producing silver.

Boundary and Rossland mines helped a little, but the Slocan output was again much below expectations. The closing of the silver-lead smelters at Nelson and Trail for several weeks during the strike at the Crow's Nest Pass coal mines was in part responsible for the increase in production of this metal in 1906 not having been larger—it was only about 30,000 oz., the year's total having been approximately 3,470,000 oz. as compared with 3,439,417 oz. in 1905.

COPPER.

It is estimated that fully three-fourths of the copper produced came from Boundary mines which in 1905, according to the "Annual Report of the Minister of Mines" for that year, gave an average assay, based upon copper recovered, of 1.53 per cent. With an output exceeding 1,100,000 tons of copper ore in 1906 an estimate of 33,000,000 lb. of copper as the district's production should be well within the mark.

Rossland, with an output of about 278,000 tons of ore having an average copper content of rather less than 1 per cent, contributed between 5,000,000 and 6,000,000 lb.

The Coast mines, chiefly the Tyee on Vancouver Island and the Britannia on Howe Sound, made up practically all the remainder of the year's total of this metal.

The Vancouver Island smelters made a combined production of 6,500,000 lb. (from which will have to be deducted the copper content of foreign ores smelted and matte converted).

The Iron Mask at Kamloops is reported as not having made so large an output in 1906 as in 1905. Its concentrator and small smelting furnace were both closed down, presumably not having given advantageous results.

LEAD.

The St. Eugene again maintained its very considerable advantage in lead production, and the Sullivan was also an important producer. On the other hand Slocan is believed to have fallen short heavily. The Blue Bell mine in Ainsworth division will likely produce a considerable quantity of lead when arrangements for treating its big body of lead-zinc ores shall have been completed.

ZINC.

The production of zinc received a set-back by the charging of duty on zinc ore and concentrate entering the United States from British Columbia, and the non-completion of the Canadian Metal Company's zinc smelter at Frank, Alberta. Additional plant is being installed at these works with the object of making them suitable for the economic production of zinc. The exhaustive report of the Zinc Commission, lately published, gives valuable information relative to the zinc resources of the Province.

COAL AND COKE.

If the revised returns that shall later be supplied by the several producing coal-mining companies shall confirm the approximate figures already obtained from them, it will be found that the total production of coal in 1906 was larger than that of any previous year. There was not so large a quantity of coke manufactured, though, owing to a strike in the Crow's Nest Pass.

First the destruction early in the year of a large part of San Francisco, which cut off from the Vancouver Island collieries what had long been their chief market for coal, and next the recent labour troubles at the Crow's Nest Pass Coal Company's collieries, which were closed for two months and not operating to their former full capacity the following month, prevented the production of these fuels from showing a much larger increase. During the latter part of the year there has been, though, a distinct improvement in the demand for coal and coke, but the Island collieries could not get sufficient men to admit of their keeping pace with it. Coal and coke from Western Alberta in large measure kept West Kootenay and Boundary mines and smelters supplied during the strike, so that the stoppage of supply from Southeast Kootenay coal mines was not felt to so great an extent as would otherwise have been the case. Preparations are being made to mine coal in the Nicola district, which has lately been given railway communication.

A SUMMARY REVIEW OF MINING IN BRITISH COLUMBIA IN 1906.

In presenting the following summary review the purpose is to convey an idea of the general character of the progress made and to thereby make it clear that the mining industry is developing along lines big with promise of permanent and profitable results. With operations spread over so large an area, and with nearly every individual branch of the industry exhibiting a healthy growth, there should be no doubt as to the lasting benefit to be derived by the Province as a whole from the turning to profitable account of so great a staple resource as the mineral wealth occurring so abundantly in British Columbia. And if a plain statement of facts will carry conviction, the following information, supplemented by statistics appearing on other pages of this issue, should convince those who read it that the mining industry of British Columbia is indeed an important one and is assisting materially to bring prosperity and increased population to the Province.

Taking the districts in the order usually followed in official publications, some of the chief features of mining are noted below:

CARIBOO.

In the Quesnel division of Cariboo district the most important event of the year was the transfer of the Consolidated Cariboo Hydraulic Mining Company's big hydraulic placer gold property to the Guggenheim interests, of New York, and the inauguration of works long ago recommended by John B. Hobson, who had for years directed the old company's mining operations. The property was transferred to a company incorporated early in the year under the name of the Cariboo Gold Mining Company, of Wilmington, Delaware, U. S. A., having an authorized capital of $1,000,000, and for which Mr. Hobson is attorney in British Columbia and resident manager. Included in the provision being made to secure an additional water supply for washing the large quantity of gold-bearing gravel owned, is the construction of a canal from Spanish Lake to Bullion, about 17 miles. A second company has been incorporated to work other gravel beds, this being known as the Bullion Hydraulic Mining Company.

In the Cariboo mining division, the deep drifting enterprise of the Cariboo Consolidated, Ltd., made satisfactory progress, the great flow of water from the ancient channel its workings tap having been partly overcome and some gravel washed. The gold recovered during two or three months paid operating expenses.

The Slough Creek, Ltd., installed at its deep-drift mine a direct-acting winding engine, 16 by 36 and having a 7-ft. drum. It is intended to use this for bailing water, running two 500-gal. skips in balance. A water lodgment for about 60,000 gal. was excavated underground, and additional drain tunnels were driven. The big pumps were operated the year through without interruption.

Several hydraulic placer mines in this division did well during the year, while the Bear Hydraulic Company nearly completed its dead work and is now in readiness to enter upon production. This company put in an overhead cableway—the first one in the district—for handling big boulders and rocks, and intends installing electric searchlights to enable work to be carried on at night as well as day throughout the gravel-washing season. The water storage dam in course of construction will provide 40 days' water supply at 3,000 in. per day.

CASSIAR.

Atlin, which is the only division of present considerable importance in Cassiar district, is still very much in a transition stage, with the holdings of individual miners gradually being acquired by companies. The year's output of gold will probably be found to have been between $425,000 and $450,000.

The Atlin Consolidated Mining Company, supposed to be a Guggenheim enterprise, purchased gravel leases on Pine Creek, on which it installed a 75-ton steam shovel and a system of electrically-operated dump cars for conveying the gravel to the sluice boxes. For the particular ground here worked the steam shovel has proved a decided success. Construction work was sufficiently advanced by August to allow of washing being commenced. It is understood that profitable results were secured, report placing the value of the gold recovered during 41 days' run at $26,000. The company will probably put in two more steam shovels next season.

Dredging at Atlin has proved a failure. The British America Dredging Company's dredge has been dismantled, and the British Columbia Dredging Company did but a few weeks' dredging.

Water conditions are much better generally at Atlin, and still improving, experience having shown how the water can be used to best advantage.

The Amalgamated McKee Creek Mining Company is stated to have hydraulicked at a lower cost than in previous seasons and made excellent profits. Its total clean-up is placed at about $32,000. The Societe Miniere, operating on Boulder Creek, is said to have taken out approximately $35,000 and to have had a profitable season.

On Spruce Creek the Spruce Creek Power Company is stated to be only in the preliminary stages of its work and so at a disadvantage, consequently its season's operations will not have been profitable. The Columbia Hydraulic Mining Company at the upper end of the creek had its property seized under a debenture mortgage, so it is out of business. The Northern Mines property is in the hands of a receiver, not having capital enough to go on. Practically the whole of Spruce, which is a valuable creek, is under option expiring next October.

The two Ruffner companies—Pine Creek Power and North Columbia—owning adjoining properties, have been worked conjointly and moved an enormous quantity of gravel last season and took out more gold than in any previous year—$72,000, so it is stated. The water question on Pine Creek appears to at last have been solved. The Ruffner companies have built a dam at the outlet of Surprise Lake and their water supply plans have been approved by the public works department. It is estimated that a supply of about 5,000 in. per day for the whole season has been provided for.

Other noteworthy results obtained in Cassiar last year were at the Berry Creek Mining Company's hydraulic property in the northern part of the district. This company completed its water supply system and was able to wash gravel for 109 24-hour days, recovering gold to the value of $21,750. Much top dirt had to be hydraulicked first, so this result is not regarded as a fair demonstration of what the property will produce when opened up. In one pit an average of $475 per diem was obtained during a run of 20 days.

EAST KOOTENAY.

Both coal and lead-silver ore in the Fort Steele division of this district contributed largely to the year's total mineral production. Unfortunately labour troubles prevented a similar large output to that of the three quarters to September 30 from being maintained throughout the year.

The Crow's Nest Pass Coal Company's average monthly gross production of coal during nine months of the year was nearly 80,000 tons as compared with 69,000 tons per month in 1905. The average monthly production of coke for the same period was about 21,400 tons, which was a slightly lower average than was maintained in 1905. The strike interfered with production to such an extent during the last quarter that the whole year's gross output of coal did not exceed 800,000 short tons, while the quantity of coke made was about 220,000 tons. The company's big steel trestle and tipple at its Coal Creek colliery was completed and proved equal to the requirements of a much larger daily output than it was found practicable to maintain.

The St. Eugene milled during the first six months of the year 84,066 tons of ore, producing 14,008 tons of concentrates which, together with 1,489 tons of crude ore, were shipped to the smelter. From this product there was extracted about 418,000 oz. silver and 17,300,000 lb. of lead; total value, $798,660. The output of the second half of the year was somewhere about 2,000 tons of crude ore and 11,000 tons of concentrates. The mine is reported to be in better condition than ever before, developments disclosing the occurrence of big shoots of ore not previously met with, and with large ore reserves.

The Sullivan group mine sent between 25,000 and 30,000 tons of lead-silver ore to the smelter at Marysville during 1906. Its actual output during the company's fiscal year was reported at the annual meeting held in September to have been 26,997 tons containing 21.14 per cent lead (wet assay) and 9.015 oz. silver per ton. The manager reported in sight in the 60-ft. north drift 40,000 tons of ore, with indications that this will be augmented from 40,000 to 50,000 tons. There was in addition some 25,000 tons of ore carrying 18 to 20 per cent zinc and 12.5 per cent lead for which it was hoped a market will yet be found. An operating profit of $138,404 for the fiscal year was shown.

An important discovery of ore at the Stemwinder, near the North Star was reported and a company was formed to work this property. The North Star shipped nearly 4,000 tons of ore during the year.

Placer mining operations in Fort Steele division were not large. Returns are not yet in, but the gold recovered will probably reach a total between $10,000 and $15,000.

In northeast Kootenay operations were resumed on the Ptarmigan and Paradise mines, both of which made small shipments of ore to the smelter. In the Golden division the Laborers' Co-operative company continued at work, but as yet its properties are not shipping ore in quantity.

WEST KOOTENAY.

In several parts of this big district mining was active in 1906. In other camps there was also progress though not to a similar extent.

AINSWORTH.

Ainsworth, the oldest camp in this district, took on new life during the year, the finding of ore running high in silver in the Krao mine attracting much attention and encouraging owners of other properties to either again work them or conclude arrangements for working on lease. The sale of the Krao to mining men of Butte, Montana, and the organizing of a company in that city to work the mine, are among the more prominent events of the year in connection with this camp. A contract was let recently for the extension a further distance of 1,000 ft. of the Highlander long tunnel. In other parts of Ainsworth mining division developments were in several in-

stances encouraging. The Blue Bell was proved to have large bodies of ore and it was decided to erect a concentrating mill at this mine. An air compressor and other power plant were installed at the Argenta, on Hamill Creek, and development work is in progress. Up the south fork of Kaslo Creek the Cork mine and mill were worked with little intermission and results were such as to induce an extension of operations. The re-equipment of the Montezuma mill was undertaken with the object of treating Montezuma and Province ores. At Whitewater that mine and mill, together with the adjoining Whitewater Deep, were worked under lease and some 800 to 900 tons of concentrates, etc., sent to the smelter.

SLOCAN.

In the Slocan the cutting of the Rambler-Cariboo vein at a vertical depth of about 1,250 ft. below the surface, after nearly two years' work to reach it, was one of the most notable events of the year. A raise to connect with the 800-ft. shaft above is being made and when this shall have been completed the mine will again ship ore. This raise had entered good ore at last accounts. Other deep-level mining has been done in the Last Chance and Surprise mines. The tunnel driven by Alex. Smith in the latter is at a depth of 750 ft. under the old workings. Strikes of ore were reported in several mines, the Sunshine among others. The Lucky Jim was closed the greater part of the year, owing to the market for zinc ore not having been considered good enough to warrant the owners working this mine. About 1,000 tons of this ore are stored at the Kootenay Ore Company's sampling mill, Kaslo, awaiting sale at a higher price than yet offered for it. The Slocan Star was idle because of litigation and it will not be likely to resume ordinary work until after this unfortunate difficulty shall have been disposed of. More work has been ordered by the Supreme Court to determine certain facts in connection with this extra-lateral rights dispute. The Ruth, Last Chance and American Boy were among the Sandon mines worked. The Lone Bachelor has continued to ship high grade silver ore and the property has been bonded. The Eureka has also developed satisfactorily, and has shipped a few cars of ore of excellent quality. Lewis Hind was engaged in opening up an antimony property up the second branch of the north fork of Carpenter Creek until the snow became too deep for operations to be continued.

SLOCAN LAKE.

Slocan Lake mines made a generally good showing, especially those around Silverton. The Hewitt, Lorna Doone and Vancouver group, after having been shown to have valuable ore bodies were acquired by representatives of capital who, it is understood, intend forming a company to operate them conjointly and having the Wakefield mill to concentrate such ore as needs treatment on the spot. A valuable find was made at the Standard, on Four Mile Creek, and this is being developed. The old dumps of the Bosun mine were shipped to the Monitor-Ajax Fraction Company's mill at Rosebery for treatment there to save lead and zinc contained therein.

In Slocan City division the Ottawa has continued development work at depth. The Arlington is again being operated after a long close-down. Several other mines in this section have also resumed work.

ABOUT NELSON.

About Nelson, the Silver King has been producing ore, though not to the extent expected at the beginning of the year. The adjoining Dandy claim has opened up a fine shoot of ore and shipments have been made to the smelter. It is proposed to tap the Silver King at a level lower than that now worked, through the Dandy. Outside capital has been secured for the Reliance Company's May and Jennie mine which should now be worked on a scale commensurate with the requirements of its considerable reserves of ore. The Eureka copper property has been shipping ore. The Queen Victoria, a promising copper property situated near Beasley Siding, has been acquired and, it is stated will be developed.

The La Plata on Kokanee Creek has become one of the most important properties off Kootenay Lake. During the year extensive development work was done in the mine and a concentrating mill was built and put in operation. About 2,000 tons of smelting ore was shipped crude and 12,000 tons of concentrating ore milled.

YMIR, SALMO, AND ERIE.

In Ymir camp the Ymir mine has been operated under conditions that have proved disappointing. Late advices are to the effect that capital is to be provided for opening up ore bodies reported to carry values that will return a profit above the cost of mining and milling. The Hunter V. has been worked by the Hall Mining and Smelting Company, and between 4,000 and 5,000 tons of ore shipped.

At Salmo the Queen has been further developed and has done well. Returns for eight months to August 31 showed a tonnage of nearly 5,000 tons and a gross recovery of about $44,000 or something like $9 per ton. The owner, Wm. Waldie, of Nelson, bought the Yellowstone mine and 10-stamp mill. The Yellowstone group of five claims adjoins the Queen group of a similar number. The Second Relief continued production at about the same rate as during the previous financial period, milling about 600 tons per month. Development was kept well ahead giving a reserve of ore sufficient to keep the mill running all the year. The outlook for both the Queen and Second Relief is considered satisfactory. The Arlington at Erie has also been a regular producer.

ROSSLAND.

The year at Rossland has been one of the most eventful and encouraging in the history of that camp. Le Roi, Le Roi No. 2, and Centre Star-War Eagle have all experienced important underground developments and have paid dividends to their shareholders. The total tonnage of the camp is less than that of 1905, yet an output of about 280,000 tons

is an important one. Le Roi led with a total production of about 126,000 tons, the Centre Star-War Eagle coming next with about 115,000 tons. Le Roi No. 2 maintained its average producetion of about 2,100 tons per month the greater part of the year. The opening up of the deep levels of these mines is being steadily proceeded with. The Le Roi shaft is being deepened to reach ore bodies partly explored by a winze from the 1350-ft. level down to the 1750-ft. with levels opened at each 100 ft. depth between the two. Not only have there been these important developments in the Le Roi claim, but work on the Black Bear, west of the Josie dyke, has been very successful, a big shoot of ore having been found on the 700, 800, and 900-ft. levels, with a good prospect of its being found on other levels, above and below. A large tonnage of ore is available here. It is worthy of note, as told to shareholders at their recent meeting, that since the Le Roi passed into the possession of an English company in 1898 it has produced more than 1,100,000 tons of ore, yielding approximately 615,000 oz. gold, 720,000 oz. silver, and nearly 32,000,000 lb., or 16,000 tons, of copper.

In Le Roi No. 2 the long ore body known as the Hamilton vein has continued to yield the regular quantity of ore of good grade. This promises to prove practically continuous to a greater distance than was at first expected. Including the customary characteristic breaks caused by dykes, it extends along a length of between 1,400 and 1,500 ft. An important comparatively recent event is the opening out of a streak of ore on the 300-ft. level, evidently the westward continuation of the Poorman vein which appears to add considerably to the possible ore reserves. Surface stripping on claims bought last year and situated north of No. 1 mine has given fairly good results, but the strike and dip of the ore shoots have not yet been definitely determined. A shortage of water prevented the concentrator from being run three shifts, but it is expected that arrangements being made to get water from the company's No. 1 mine will allow of three shifts being kept regularly employed in the mill.

The Consolidated Mining and Smelting Company of Canada has been pushing development in its War Eagle, Centre Star and Iron Mask mines. The last published report of this company stated that on the 11th or lowest level of the Centre Star, 1380 ft. below the collar of the shaft, measured on the dip of the vein, most encouraging results had been obtained, while in the War Eagle good ore is being developed on the 11th level, 1,582 ft. deep on the incline. A shoot of ore encountered at nearly 1,600 ft. depth, having a width of about 40 ft. and assaying $18 per ton, is a discovery of considerable importance, and this is what was reported by Centre Star officials in September. Additions to plant and equipment at this mine include a Canadian Westinghouse 650-h. p. induction motor to drive the 40-drill air compressor; a Nordberg hoist of a capacity of 1,350 tons per 10 hours from a depth of 3,000 ft.; and a complete ore-sorting and sampling plant.

The White Bear mine is stated to give promise of being productive ere long. A strike of a shoot of good ore was lately reported, but authenticated particulars have not yet been obtained.

The structural survey of Rossland camp commenced in 1905 by members of the staff of the Geological Survey of Canada, was continued for months in 1906 and well advanced towards completion. Professor Brock's preliminary report, based on the results of the 1905 season's work, published by the Survey showed that two questions in particular were having attention in carrying on the investigation, viz., (1) do the ore bodies now being worked extend to greater depths? and (2) is it likely valuable ore bodies occur outside the area already being worked? The conclusions that shall be arrived at when the investigation shall have been completed will be based upon data that should enable the geologists engaged in this important work to express opinions that will be a reliable guide to future explorations in search of ore.

LARDEAU.

In the Lardeau, several properties in Ferguson and Camborne camps, respectively, were worked with good results. Development work at the lower Sunshine tunnel of the Silver Cup mine has opened up several good showings of ore and during part of the year about 100 tons of ore, extracted in the course of development, were shipped monthly to the smelter. The mill will not be operated until after there shall be plenty of ore available to keep it supplied for a considerable time. The Reward Gold and Silver Mining Company has been engaged in driving a deep level cross-cut tunnel for exploration purposes. The chief purpose of this work is to get under several mineralized leads outcropping on the surface of the mountain. The intention was to drive about 4,000 ft. of a cross-cut and gain, at that distance in, a vertical depth of about 2,600 ft. The Broadview, also in Ferguson camp, was sold to Cincinnatti and Ohio capitalists, who organized a company and have since been developing the mine.

The Eva at Camborne has been at work the greater part of the year, and its large shoots of gold-quartz ore have been further opened up. The average monthly output from the 10-stamp mill when running was of a value of about $5,000. Arrangements for increasing the number of stamps have been in hand and operations on a larger scale will be inaugurated as soon as practicable. Capital for continuing development on the Beatrice is stated to be now available. The equipment of the Silver Dollar with machinery has been steadily proceeding, an air compressor having been installed, an aerial tramway constructed, and the work of getting the heavy parts of the stamp mill up the mountain undertaken. The Mammoth was also worked throughout the season, with good results.

REVELSTOKE.

In the Revelstoke district there were no important developments. The Prince Company's property in

Standard Basin was idle part of the year. Placer mining operations in the Big Bend section were continued but there is nothing out of the ordinary to chronicle in connection with them.

YALE.

The chief copper-producing mines in British Columbia are in

PHOENIX AND GREENWOOD CAMPS.

The Boundary section of Yale district, including Osoyoos mining division in which is situated the Nickel Plate mine near Hedley, produced rather more than 1,200,000 tons of ore. This shows an increase over the production of 1905 of about 250,000 tons. The greater part of this big production came from the mines of three companies, viz.: Granby, Dominion Copper, and British Columbia Copper Companies. The proportions contributed by these companies, respectively, were approximately, as follows: Granby, 825,000 tons; Dominion Copper, 225,000 tons; British Columbia Copper, 130,000 tons. Each of these companies operates several mines. The year's record for each company is chiefly one of further development, additional equipment and increased production, with little unusual to call for more than brief comment.

The Granby Company enlarged the area of its mining property at Phoenix by the purchase of adjoining mineral claims, and, as well, bonded others situated in the Similkameen. The sinking of the three-compartment incline shaft was the chief improvement in the mine workings at Phoenix. The plans in connection with this shaft which for the time will not be sunk deeper than 500 ft. included the erection of a 90-ft. head frame, and the installation of a double conical drum hoisting engine, operated by a 250-h.p. type S Canadian Westinghouse variable speed induction motor, 2,000 volts, equal to sinking to a depth of 2,000 ft. and to hoist ore in two 5-ton skips in balance, the skips automatically dumping into two 400-ton receiving bins. Another Jenckes-Farrel crusher of the Blake type, having a jaw opening of 42 by 36 in. and a capacity of 150 tons per hour crushed to a 6-in. cube, has been added to the plant, this making the third machine of this style and size in use at these mines. Ore was mined on all levels of the mines, from the big open quarries down to 500 feet depth. Beside considerably extending operations on the company's original holdings, the development of the neighbouring Gold Drop and Monarch mines has been pushed on.

The British Columbia Copper Company has en-

Crow's Nest Pass Coal Company's New Steel Trestle and Tipple at Its Coal Creek Colliery, Southeast Kootenay.

larged the main shaft of its Mother Lode mine near Greenwood to a 4-compartment shaft and deepened it to 475 ft., with a station opened at the 400-ft. level and a big ore pocket below. On four levels—80-, 200-, 300- and 400-ft.—much development work has been done to provide for a larger output of ore consequent upon the increase in the treatment capacity of the company's smelter. The mine is now equal to a daily output of 800 to 1,000 tons of ore. Plant and machinery has been adapted to the new conditions, the changes made including the substitution of electricity for steam to drive the big air compressor, and provision for a similar change in motive power for the ore crushers. The company is operating three mines in Summit Camp, viz., Emma, Oro Denoro, and B. C., and from these 400 to 500 tons of ore per day are obtained. The Lone Star and Washington, immediately south of the International boundary line, and the Napoleon at Marcus, Wash., are also worked by this company.

The Dominion Copper Company has several mines at work—the Stemwinder-Brooklyn-Idaho group, the Rawhide, and the Athelstan, all in Phoenix camp; the Mountain Rose in Summit camp, and the Sunset in Deadwood camp. A 25-drill Canadian Rand Drill Company's air compressor and a 400-h.p. Canadian Westinghouse induction motor have been installed at the Idaho mine, and the Rawhide has also been equipped with an electrically driven air compressor plant. The company's mines being scattered, it was found best to crush the ore at the smelter where, at Boundary Falls, a Jenckes-Farrel crusher having a capacity of 1,000 to 1,200 tons per day (one 8-hour shift) is being put in. The company is also developing mines in Franklin camp (up the north fork of Kettle River), and near the International boundary line.

The Snowshoe, after having been idle for between two and three years, is being worked under lease by the Consolidated Mining and Smelting Company of Canada, which is shipping the ore to its smelter at Trail. A much larger tonnage of ore has been developed than was known prior to the resumption of work to occur here.

The silver-gold properties about Greenwood and Phoenix together shipped about 2,100 tons of ore, having a total value of between $150,000 and $200,000. These include the Providence, Skylark, Strathmore, and several others. The Providence, with an output of nearly 1,200 tons for the year made the biggest showing. The Skylark's production was about 700 tons, and that of the Strathmore nearly 150. Shipments from the remaining properties were unimportant.

Both Franklin and Carmi-Beaverdell camps, the latter situated up the west fork of Kettle River, had a good deal of development work done in them, and small shipments of high-grade silver-gold ore were made from several mines in the latter. Operations will not be extensive in these camps until after railway communication shall have been provided.

SIMILKAMEEN, NICOLA, ETC.

The Similkameen district's production was necessarily small, owing to the absence of transportation facilities. The Nickel Plate near Hedley was not operated to full capacity. More gold ore was milled at Hedley, however, than in 1905. It is expected that a more active policy will be carried out in 1907. A small quantity of coal was mined at Princeton and it is intended to considerably increase production of this mineral on the completion of the railway. At Bear Creek the Similkameen Mining and Smelting Company has been developing its property, and in this neighbourhood the Granby Company has taken hold of a group of claims having a big surface showing.

About Nicola several coal properties have had more or less prospecting done on them, the Diamond Vale Coal and Iron Company having been most active in this direction. Towards the end of the year the Nicola Valley Coal and Coke Company was organized and commenced mining coal on a small scale. The opening of the Canadian Pacific Railway Company's railway from Spence's Bridge is having the effect of encouraging the bonding of mineral claims. Several groups in Aspen Grove camp, on Ten Mile Creek, and other parts of the district have been receiving attention.

In the Vernon district little if any mining worthy of notice was done in 1906. About Ashcroft, the Highland Valley had some work done on it, but there was no ore production. Kamloops did not make such a good showing as in 1905, the only producing property—the Iron Mask—not having been operated uninterruptedly. No reason has been made public for its not having maintained production at full capacity. Its concentrating mill has not been running latterly.

Placer mining in Similkameen, Yale and Lillooet districts was limited in extent. Dredging for gold on the Fraser does not appear to have been successful during the year.

COAST DISTRICTS.

HOWE SOUND.

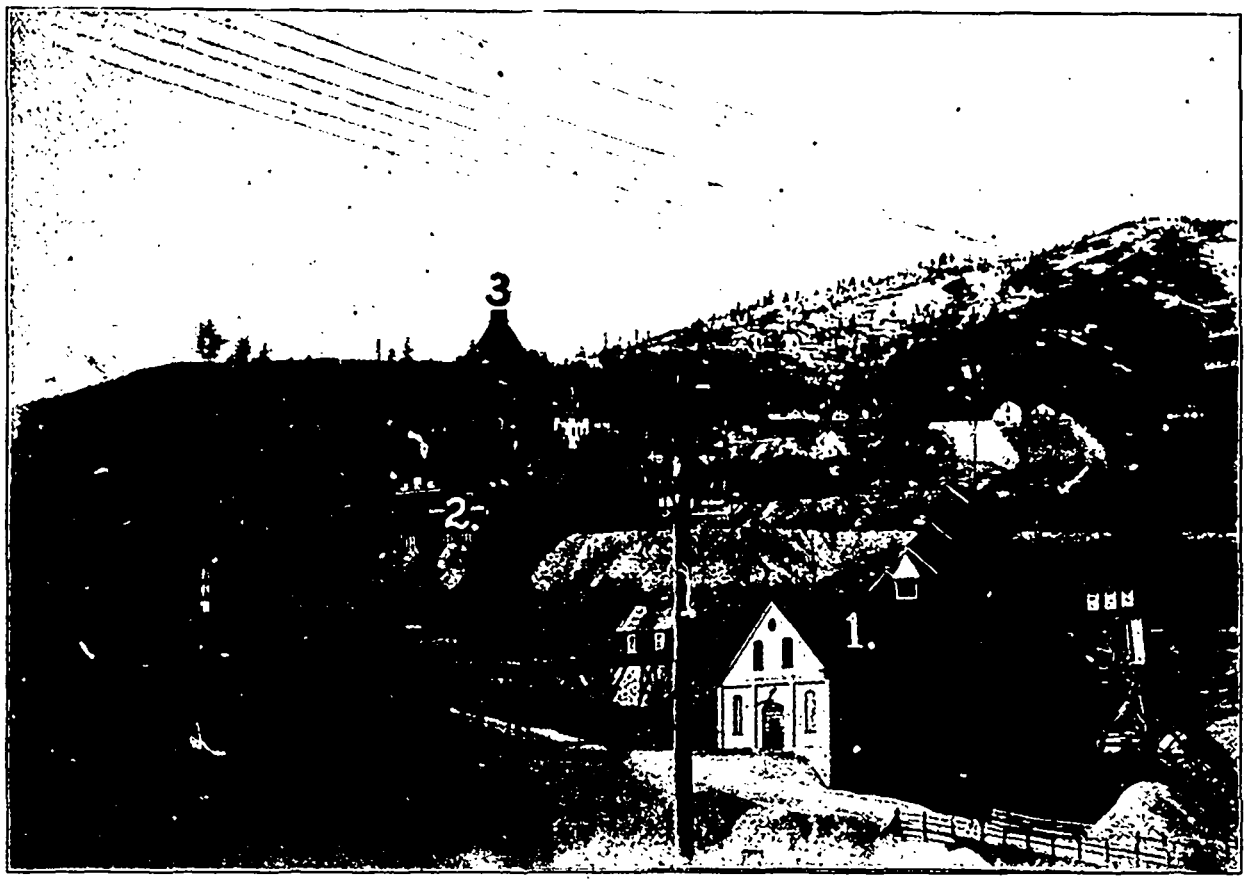
On the mainland coast the only mining property working to any extent during the year just closed was the Britannia on Howe Sound, which mined 108,396 tons of copper-gold ore. Of this quantity, 35,726 tons were shipped to the Britannia Smelting Company's smelter at Crofton, Vancouver Island, and 6,826 tons to other smelters. The remaining 65,844 tons were milled at the company's concentrator, Britannia Beach, producing 12,612 tons of concentrates, which were shipped to the smelter.

TEXADA ISLAND.

Recent developments on Texada Island have proved that the bornite ores characteristic of the producing mines there continue in depth and maintain their good gold values. The Marble Bay Company has had this satisfactory experience down to its lowest (760-ft.) level, and the Copper Queen and Cornell

ore showings at depth are similarly encouraging. In the Copper Queen the length of the ore body has increased from 70 ft. on the 500 ft. level to 120 ft. on the 600-ft. level. The Marble Bay is developing below its 760-ft. level, and it is expected that the main shaft of the Copper Queen will be deepened to 1,000 ft. The shipment of ore from the Cornell has been resumed. Development work on the Loyal property has proved that the ore outcropping at the surface continues down. The Commodore has been equipped with a hoist, boiler, pump, etc., and buildings have been erected to accommodate the men employed on the property.

The coal mines have been rushed with orders during the latter part of the year. The Wellington Colliery Company has steadily operated its mines at both Extension and Comox, but men have not been available to put on another shift at the former as has been desired. The Western Fuel Company reopened its Brechin (Northfield) mine late in the year and is now operating both that and its No. 1 Esplanade-Protection Island mines.



SURFACE WORKS OF SOME ROSSLAND MINES.

1—Nickle Plate Power House. 2—Centre Star Surface Works. 3—Head Frame, Hoist House, etc., over War Eagle Main Shaft.

VANCOUVER ISLAND.

The Tyee has continued shipping throughout the year from its upper working, but no ore body of commercial importance appears to have been yet found at the 1,200-ft. level. The Tyee big ore shoot has been located on the adjoining Richard III. mine which will ship about 50 tons of ore per day to the Tyee Company's smelter as soon as arrangements for conveying it to the railway shall be completed There is little else in metalliferous ore mining on the island to chronicle.

KOOTENAY AND BOUNDARY SMELTING WORKS.

Notes of Progress at the Interior Smelters in 1906.

COPPER AND LEAD SMELTING are among the most important of the several industries allied to mining. The big reduction works established at several places in the Kootenay and Boundary districts employ in the aggregate large numbers of men and add considerably to the industrial prosperity of the districts mentioned. Each successive year sees modern improvements and substantial enlargements made at one or other of these works, in order that pace may be kept with metal-

lurgical progress and the economic problems connected with the yearly turning to profitable account of ore of lower and lower grade, each year witnessing the utilization of ore that in earlier years was regarded as not amenable to treatment at a profit.

There are in the districts named three lead and five copper smelters. The lead smelters are situated at Marysville, in East Kootenay, and Nelson and Trail, in West Kootenay. The copper smelters are at Trail, Northport (Washington), and one near each of the three Boundary towns of Grand Forks, Greenwood, and Boundary Falls.

It has not been practicable to obtain information relative to the Sullivan Company's lead smelter at Marysville. It is reported that more Huntington-Heberlein roasting plant is to be put in, but no particulars have been received.

THE HALL MINING AND SMELTING COMPANY'S LEAD SMELTER AT NELSON.

Of the Nelson smelter the *Daily News* says:

"During the past year the Huntington-Heberlein desulphurizing process has been installed and many improvements have been made around the works in order to facilitate the cheaper handling of material so as to be able, as far as possible, to compete for the purchase of Slocan lead ores with other countries more advantageously situated in regard to labour.

'This has entailed a large outlay and it is hoped that the lower rate which the company is now able to offer may be the means of stimulating the production of lead ore, which has been more or less variable.

"A new sample mill and crushing plant has been built according to the latest of ideas and has been equipped with the best modern machinery. It is so designed as to eliminate all handling excepting that necessary in removing ore from the box cars in which it is received, even to the bedding the ore—which is absolutely automatic.

"The new roasting plant consists of a circular 50-ton Huntington-Heberlein roaster, which, together with the Merton furnace and other roasters previously in operation, supplies semi-roasted material for the operation of converting in the Huntington-Heberlein pots.

"The converting plant consists at present of six pots standing 17 ft. from the ground in two rows of three each at some distance apart, so arranged as to dump their contents by the turning of a worm gear into the space intervening. They are housed in a new building of substantial construction, and are connected with the roaster discharge bins by means of a new and powerful elevator. The ore is fed into the converters from gravity pockets suspended above the pots.

"In order to avoid the noxious atmosphere usually found around a plant of this nature no dependence on natural draught is made, the gases from the pots being sucked up by an exhaust fan 7 ft. in diameter. Ore is transported from beds to roasters through the agency of a new switchback automatic tramway which has been giving excellent satisfaction during some months' service.

"A large expendtiure has been made on new bins, and ore can now be expeditiously handled from the dump or box cars directly to gravity bins at the furnaces.

"A new system of moulding and handling the bars of base bullion produced at the blast furnace is now being installed, in the expectation of a further saving of labour."

THE CONSOLIDATED MINING AND SMELTING COMPANY'S SMELTER AND REFINERY AT TRAIL.

At Trail important additions and enlargements have been made. Big ore receiving and storage bins and a copper sampling mill have been constructed. A No. 8 McCully crusher having a capacity of 200 tons per hour, and a gravity system with electric haulage to the blast furnace bins have been put in. A large copper blast furnace, making five for reducing copper ores, has been installed. The other copper furnaces have been lengthened from 15 ft. to 20 ft.; and there have been installed a charging apparatus operated by an electric locomotive, two additional Roots' blowers of large capacity, and two corresponding electric motors for their operation. The copper plant has now a capacity of from 1,500 to 1,800 tons of ore per day.

The lead furnaces have been rebuilt with larger capacity than ever before, being now equal to 75 tons of metallic lead per day. The Huntington-Heberlein process of roasting and desulphurizing ores has proved so successful here that six more converters have been added. Larger melting kettles have been placed in the lead refinery, 132 electrolytic refining tanks (making 240 in all) have been built, an electric crane put in the tank room, three 1,250-kw. Westinghouse transformers and a large motor-generator set added to the electrical department. The capacity of the refinery has been increased from 50 to 75 tons per day.

A process for the refining of gold and silver slimes, whereby antimony may be advantageously recovered as a by-product, has been perfected by A. J. McNab, the assistant superintendent of the refinery. It is expected that up to 800 lb. per day of antimony may be recovered. This metal is worth at present 27 cents per lb.

The transportation and storage of hydro-fluo silicic acid having proven troublesome, a plant has been installed for its manufacture. In connection with this plant it may be noted that it calls for a considerable amount of fluorspar, which is now imported, but which might probably be found at home, if closely looked for by prospectors.

The number of men employed has averaged about 550. The tonnage treated in the copper furnaces has been 240,000 tons; in lead furnaces, 17,500 tons; copper matte shipped, 4,682 tons; gold, 99,647 oz.; silver, 1,401,865 oz.; copper, 3,948,456 lb.; lead, 21,274,025 lb. Of this there were refined at

the works 10,389 tons of lead, 10,403 oz. gold, and 1,205,029 oz. silver.

Both the smelter and refinery were closed down for several months in the year, while enlargements were being made.

THE LE ROI MINING COMPANY'S SMELTER AT NORTHPORT, WASHINGTON, U. S. A.

Concerning the Le Roi Mining Company's smelter, the Rossland *Miner* says:

"After a prolonged shutdown, operations at the Northport smelter were resumed on Christmas day, when one furnace was blown in. Two additional furnaces will also soon be in blast. A reserve of 30,000 tons of Le Roi ore is now at the smelter.

"The smelter has six furnaces, which together have a capacity of 1,200 tons daily, if Le Roi is the ore to be treated, being refractory and requiring much flux. Comparing these copper furnaces with those of the Boundary, where the ore is nearly self-fluxing, their capacity would be from 325 to 350 tons each daily.

"The ore of the Le Roi takes up but 55 per cent of the charge. There is a flux of about 30 per cent lime and 12 per cent coke. The one furnace which was running last week was running easily, making a matte of about 10 to 12 per cent. This is put back through the furnaces and afterwards roasted and smelted with a high grade silicious ore, such as is obtained from the First Thought mine at Orient, Wash. The owners of this mine have concluded a contract with the Northport smelter to send it 500 tons of ore monthly.

The Copper King, of Chewelah is also sending ore, while other ore, principally concentrates, is obtained from the Second Relief and other mines in the Ymir district.

A. I. Goodell, the superintendent, takes an optimistic view in regard to the operations. He said that he did not require any special iron flux. He found that the iron content of the Le Roi ore was not only sufficient for the silica content, but was able to take in a month 500 tons of other silicious ore, averaging 86 per cent silica. Mr. Goodell also expressed confidence in the mine and smelter together being able to earn dividends of $300,000 annually for the Le Roi shareholders.

GRANBY CONSOLIDATED M., S. AND P. COMPANY'S SMELTER AT GRAND FORKS.

At the Grand Forks smelter additions to equipment in 1906 included two more large "Jumbo" blowers, four Canadian Westinghouse 150-h.p. motors to run the blowers, a third copper converter stand, an automatic converter-slag conveyor and elevator, and a fifth power plunger pump of a capacity of 750,000 gal. per diem. The wood framing of the entire furnace building, 71 by 400 ft. has been replaced by steel and new buildings have been added.

The Phoenix *Pioneer* says: "At the Granby smelter the policy of extension has been carried out by enlarging the furnaces that are now in operation there. Of the battery of eight blast furnaces, two were of the extra large type when installed, and the others are now undergoing the enlarging process. This was expected to be completed by the first of the year, but the burning down of an iron works and other causes have delayed finishing this work. However, in a month or two the work will probably be done, when the capacity of the smelter will be about 90,000 or 95,000 tons monthly. It is the policy to get out this tonnage with seven furnaces, allowing an average of one of the eight to be under repairs, if need be, all the time."

The tonnage of ore treated at the Granby Company's works in 1906 was 838,847 tons, as compared with 687,988 tons in 1905. These figures show an increase in the quantity treated of nearly 151,000 tons. But for the greater part of this enormous quantity of ore came from the company's own mines at Phoenix.

BRITISH COLUMBIA COPPER COMPANY'S NEW SMELTING WORKS AT GREENWOOD.

The following particulars of the Greenwood and Boundary Falls smelting works have been taken from the Phoenix *Pioneer's* Fourth Annual Holiday Number:

"During 1906 the smelting works of the British Columbia Copper Company near Greenwood, have been entirely remodelled and built along modern lines. The two old furnaces, which had been in use for about five years, were torn out, giving place to one of the finest and most complete and up to date smelting plants in the Dominion of Canada—nothing being left undone that modern engineering could suggest. This work is now finally completed, giving the new plant with three mammoth furnaces a daily capacity of more than three times that of the two old furnaces.

"Custom ore is weighed on self-registering scales, and bins to the capacity of 2,000 tons are provided to receive it. From these the ore passes through a sampling mill of 600 tons daily capacity, from whence a conveyor belt delivers it again into railroad ore dumps, these deliverying the ore into the smelter bins. The latter have a capacity of 12,000 tons of ore and 2,000 tons of coke.

"The new blast furnaces were manufactured by the Power and Mining Machinery Company, of Cudahy, Wis. They have a hearth area of 46 by 240 in. each, and a daily capacity for treating from 600 to 700 tons each, the furnace charging being done with side dumping cars, hauled in trains from the ore and coke bins with trolley locomotives. The molten slag is hauled away from the furnaces in cars of 25 tons capacity, built by the M. H. Treadwell Company of Lebanon, Pa., each being provided with an electric motor for tilting the car, the system being operated by trolley locomotives.

"In the power house are three Roots' rotary blowers, each delivering 300 cu. ft. of air per revolution, and driven by 300-h.p. motors—these furnish air for the blast furnaces; a Nordberg blowing engine, having a capacity of 5,000 cu. ft. per min., operated by a 300-h.p. variable speed motor, to fur-

nish air for the converting plant; a high pressure air compressor, to furnish air for pneumatic tools, raising furnace charging doors, etc.; a hydraulic accumulator, for tilting the converters, and two motor generators of 100- and 75-kw. capacity, to furnish direct current for travelling crane and trolley locomotives.

'The entire machinery is being operated by electrical energy, which is furnished by the British Columbia Constructing and Distributing Company, from the power station at Bonnington Falls, on the Kootenay River, 75 miles distant. Similar power is also in use for the machinery at the Mother Lode and Emma mines of the company.

"In the converter building, adjoining the blast furnace building is a modern two-stand converter plant, by which the copper matte is taken molten from the furnaces by a 40-ton electric travelling crane and blown up into blister copper, 99 per cent fine. This operation results in a great saving in freight on waste. In addition the company converts the copper matte from the smelter of the Dominion Copper Company at Boundary Falls, by contract.

"The water supply comes from Copper Creek, across which a dam has been thrown about a mile before it reaches the smelting works, giving a reservoir at such elevation that ample pressure for fire and other purposes is obtained. A complete fire system has been installed with self-draining hydrants at intervals throughout the works, giving as adequate protection as it is possible to secure. The water from the blast furnace jackets delivers into a cooling pond, from whence a centrifugal pump returns it to storage tanks of 160,000 gal. capacity, to be re-fed to the furnace jackets as required.

"The blast furnace and converter buildings are constructed entirely of steel. The plant is provided with fully-equipped machine and blacksmith shops and storage warehouses.

"The tonnage of ore treated at the British Columbia Copper Company's smelter, including custom ore, by years, is as follows, the figures for 1906 of course being reduced on account of the works being out of commission for several months during enlarging operations:

Year.	Tons.
1901	117,611
1902	148,600
1903	162,913
1904	210,484
1905	210,830
1906 (estimated)	130,000
Total	980,438

"The British Columbia Copper Company is in a most fortunate position. Developments at the company's Mother Lode, Emma, Napoleon and other mines have proved conclusively that the properties are much more valuable than anticipated; that there is better ore and more of it in each and every one of them, and that when mixed in the proper proportions they make a splendid combination for smelting purposes. Construction being now over, development well advanced ahead of immediate needs, and the copper market rising and strong, with a heavy demand for the quality of copper produced here, the future of the company is certainly full of promise for the fortunate shareholders.

"Taken all in all, the new smelting works of the British Columbia Copper Company, with a capacity of handling from 50,000 to 60,000 tons of ore per month, is as complete an institution of its kind as can be found anywhere."

DOMINION COPPER COMPANY'S SMELTER AT BOUNDARY FALLS.

'In December, 1905, the smelting plant of the Dominion Copper Company, located at Boundary Falls, was blown in under the present management, after a number of repairs had been made. Wm. C. Thomas, the experienced superintendent, has been most successful in the results accomplished at the reduction works. It is understood that, with but two furnaces in operation, the cost of making copper now amounts to between 9 and 10 cents per lb., and that it is hoped and expected to get it down to under 8 cents. The two furnaces now in use have a rated capacity of smelting about 300 tons of ore per day each, but in actual practice they do better than this.

"Additional dumping ground was acquired, and the smelter put in the best possible condition by Supt. Thomas, with the result that it has had an almost uninterrupted run this last year, having treated more than 200,000 tons of company ore in that time. The amount of ore treated at this smelter, under the several managements, for the last four years was as follows:

1903	132,570 tons
1904	30,930 tons
1905	84,059 tons
1906 (estimated)	220,000 tons
Total	467,559 tons

"From November 28, 1905, to December 31, 1906, the company shipped about 225,000 tons of ore.

"Last spring it was decided to install another and much larger blast furnace at the smelter, and accordingly an order was given to the Traylor Engineering Company of New York city, for one of the Giroux hot blast type. This furnace is now partly installed, and but for the delays incident to freight traffic would have been in operation before now. It will doubtless be ready for use in a few weeks, and will about double the company's capacity and copper output to some 1,400 tons of ore daily, or about 40,000 tons of ore per month.

"The copper matte from the furnaces, which is roughly 50 per cent fine, is sent to the converting works of the British Columbia Copper Company at Greenwood, where it is blown up into blister copper 99 per cent fine, under a favourable contract."

MINING ON VANCOUVER ISLAND IN 1906.

VANCOUVER ISLAND MINES, other than its coal mines, did not make as much progress as had been hoped they would do. As a matter of fact there was little, if any, metalliferous mining of importance other than that done at Mount Sicker, where further extensive development work was done, with important results.

NANAIMO DISTRICT.

In Nanaimo district, some prospecting was done and two or three promising properties at the head of the south fork of Nanaimo River were found to have some promising showings of ore on them. The Texada Island mines, also in this district, are mentioned on another page.

The re-opening of two or three of the valuable sandstone quarries in this district followed an increased demand for building stone. Large blocks of stone of excellent quality and appearance are obtainable close to deep water so that loading can be done directly onto scows.

VICTORIA DISTRICT.

In the Victoria district, Mt. Sicker and Koksilah are the two sections in which operations were worthy of notice.

Tyee.—At the Tyee mine, on Mt. Sicker, the main shaft was deepened to 1,250 ft. Low-grade ore was encountered at the 1,000-, 1,150-, and 1,250-ft. levels and concentration tests of this ore are now being made, it being the intention of the Tyee Copper Co. to concentrate the large tonnage of low-grade material developed in the mine. The sinking of the main shaft is to be continued until a depth of at least 1,450 ft. shall have been reached, as it is expected it will be by early next spring. Besides the work done in the main part of the Tyee mine, the shaft on the adjoining X. L. claim, which is also one of the Tyee Company's group has been deepened to 550 ft. Sinking to greater depth is also to be undertaken here.

The company has two diamond drills at work on its property, one being a Sullivan B drill, capacity 3,000 ft. Other exploration is in hand, development work altogether being important. The prospects for a successful issue to the work are considered bright and it is expected that the company's operations will continue to be profitable.

The total production of metals in 1906 at the Tyee Copper Company's smelter at Ladysmith was as follows: Copper, 2,115,617 lb.; gold, 3,776 oz.; silver, 77,085 oz.; of a total value, after deduction of costs of refining and purchase of custom ore, of $396,500. The quantity of ore treated was: Tyee, 23,823 tons; custom, about 5,500 tons.

Richard III.—The big shoot of ore so long and profitably worked by the Tyee Company has been encountered in the adjoining Richard III. mine in a cross-cut driven at the 330-ft. level with the object of cutting this ore. About 50 tons of ore are being taken out daily. Arrangements have been made to ship to the Tyee Copper Co.'s smelter at Ladysmith a considerable quantity of this ore. Previous to meeting with this body of ore, which has been proved the biggest and most valuable known to occur on Mt. Sicker, the only shipping done by the Richard III. Company was a lot of about 1,500 tons from a shoot of ore occuring between the 425 and 500-ft. levels of the mine. The outlook for this mine is now considered most promising.

Mt. Sicker and Brenton.—The Mt. Sicker and Brenton Company did some work during the early part of the year on its Copper Canyon claim, with but indifferent results.

V. I. M. and D. Co.—In the Koksilah section, the Vancouver Island Mining and Development Company which owns a group of claims here, continued development work and shipped five carloads of ore from the Blue Bell. The copper value of this ore ranged from two to five per cent. Although still too early to form definite conclusions as to what developments may be expected to be on this property, indications at the depth reached are favourable and conditions generally appear to warrant the expectation that this district will yet produce an appreciably large tonnage of ore.

King Solomon.—The King Solomon Mines group, which includes the King Solomon and Queen of Sheba mineral claims, shipped five carloads of ore to the Crofton smelter early in the year, after first having made wagon road connection to admit of hauling ore to the railway. Three cars of first class ore averaged 8 to 9 per cent copper and two of second class about 5 per cent, with small gold values in both grades. This property is a very promising one and, having big exposures of good ore, has attracted the notice of prospective buyers, but as yet has not been sold

Smelting at Crofton.—The Britannia Smelting Company's smelter at Crofton has been kept running practically the year through on ore and concentrates from the Britannia mines, on Howe Sound, and latterly in addition on ore from the Mt. Andrew mine on Prince of Wales Island, southeast Alaska. Custom ore from various points has also been treated at these works. The tonnage smelted in 1906 was as follows: Britannia ore, 20,546 tons; Britannia concentrates, 11,393 tons; Mt. Andrew ore, 3,445 tons; custom ores, furnace products, foreign matte, etc., 19,208 tons; total, 54,592 tons. The production was 4,441,575 lb. of copper bullion, containing: Copper, 4,409,560 lb.; silver, 38,265 oz.; gold, 5,261 oz. Improvements have lately been made to the blast furnaces and it is expected that a larger tonnage will be handled in future.

ALBERNI DISTRICT.

In the Alberni district, on the west coast of Vancouver Island, which includes Alberni, Clayoquot and Quatsino mining divisions, there was but little mining in 1906. Among the few properties that were worked in the Alberni division were the Happy John, Southern Cross, Sarita, and a claim in the neighborhood of Great Central Lake having a small

showing of rich gold ore at which an arastra was erected. The Big Interior group was under bond for a time but the option was not proceeded with. The provincial assayer visited the last mentioned property last summer and his report on it follows:—

"Considerable bodies of ore having been reported to exist at the head of Great Central Lake, Alberni district, it was decided to make a preliminary examination of that region which was done towards the end of August, 1906. Great Central Lake can now be reached with ease from the town of Alberni, a distance of 12 miles, by wagon road, the elevation of the lake being 200 ft. above the sea. This inland sheet of water presents the same physical features as do the inlets which indent the west coast of Vancouver Island, the mountains rising abruptly from the water, with here and there a valley extending back for a considerable distance, the most important valley being that extending to Ash Lake on the northeast.

"The general length of the lake is east and west, and it is about 25 miles long by a mile or so wide. At its western end two creeks flow in, heading from mountains still farther to the west. A trail from the lake follows the most northerly of these creeks on a gradual ascent for a distance of 10 miles until it ends in a basin, shut in by high mountains, the basin having here an elevation of 1,500 ft. above the Great Central Lake, or 1,700 ft. above the sea. To the south a precipitous bluff rises 2,075 ft. high, from which pours a considerable stream of water that barely touches the rocks until it reaches the bottom, breaking into a mass of spray in its descent. The ascent of the bluff requires stout muscles and the aid of the small bushes which cling so tenaciously to the clefts in the rock. On the top there is a small rocky plateau or basin enclosing a lake about half a mile long by a quarter wide, the elevation of the lake being 3,350 ft. above the sea. This mountain lake, situated in the heart of Vancouver Island, with snow-clad mountains rising 2,000 ft. above it and the blue crevassed glacier of the 'Nine Peaks' showing up to the south in the morning sun, forms a beautiful scene.

"Big Interior Group.—This group consists of seven claims, viz.: Big Interior Nos. 1 to 7, and was located by Drinkwater and Nicholls, of Alberni. The claims are reached from the head of the small lake referred to by following up a small second basin, slightly to the north of the main basin, about a quarter of a mile. The head of this second basin is hemmed in on three sides by precipitous cliffs about 1,000 ft. high, on which rests a snow cap, terminating in peaks which are 2,000 ft. above the lake below. Practically, this entire face, some 4,000 ft. wide by 1,000 ft. high, shows the strong red colour due to iron stain, while at the base there are thousands of tons of the same rock which have been mined by the action of the elements. A closer examination shows this cliff to be a granitoid rock, mineralized with copper pyrites, pyrrhotite and pyrite in varying proportions, some zones showing strong mineralization, while in others it is more sparse. To the west the rock assumes a brecciated structure and has been cemented together by a filling of calcite, with a considerable impregnation of copper carbonates and into this zone a tunnel has been driven a distance of 31 ft. The ascent of the bluff is somewhat dangerous, owing to the rather precarious foothold and the absence of vegetation, the top being reached at an elevation of 1,375 ft. above the small lake. From the top of the bluff a snowslide was followed until a further elevation of 500 ft. was reached, at which point the ore is uncovered and shows the strongly mineralized granitic mass which is seen to penetrate nearly horizontal strata of limestone, alternate bands of which continue to the top of the mountain 500 ft. still higher. This sharp ridge, with an altitude of 5,700 ft. may be considered as the backbone of Vancouver Island, shedding the water to the south down the Alberni Canal, to the northeast down Buttle Lake and the Campbell River, and to the west by Bear River into Clayoquot Sound.

"Summary.—The mineralized zone, showing in the face of the cliff to the north of the basin and forming the great mass of low grade mineral on the property, is so large, so inaccessible, and the mineralization so scattered, that it would be impossible to obtain anything approximating an average general sample of the exposure without the expenditure of an amount of time and money not justifiable under the circumstances. However, at the foot of the cliff there is a talus extending the whole length or width of the mineralized zone, made up of material broken away from the whole face of the zone in question. While this talus may to a certain extent have been affected by weathering, it still may be considered a very approximate sample of the inaccesible cliff. Samples were taken from this talus, from which it is judged that approximately the central portion of the mineralized zone will assay from ½ to 1 per cent copper, with from 1½ to 2 oz. silver per ton, and a trace of gold. These values extend over a width of about 1,500 ft., while to the right the mineralization gradually fades off into the country rock.

"To the left of the mineralized zone is what has been called, for purposes of designation, the 'brecciated zone,' and which is merely a continuation, to the left, of the mineralized zone which has here been subjected to a crushing due to movement, and in which the interstices between the fragments of the rock have been filled with secondary minerals, chiefly calcite, with some carbonate of copper, forming a secondary enrichment. This secondary enrichment has taken place, as would be expected, along defined channels, producing streaks of higher grade mineralization often forming commercial ore. Here, again, no general sampling was possible; although a tunnel has been driven for some 31 ft. into the bluff, it was found impossible to examine the face of the cliff for 10 ft. on either side of the tunnel mouth.

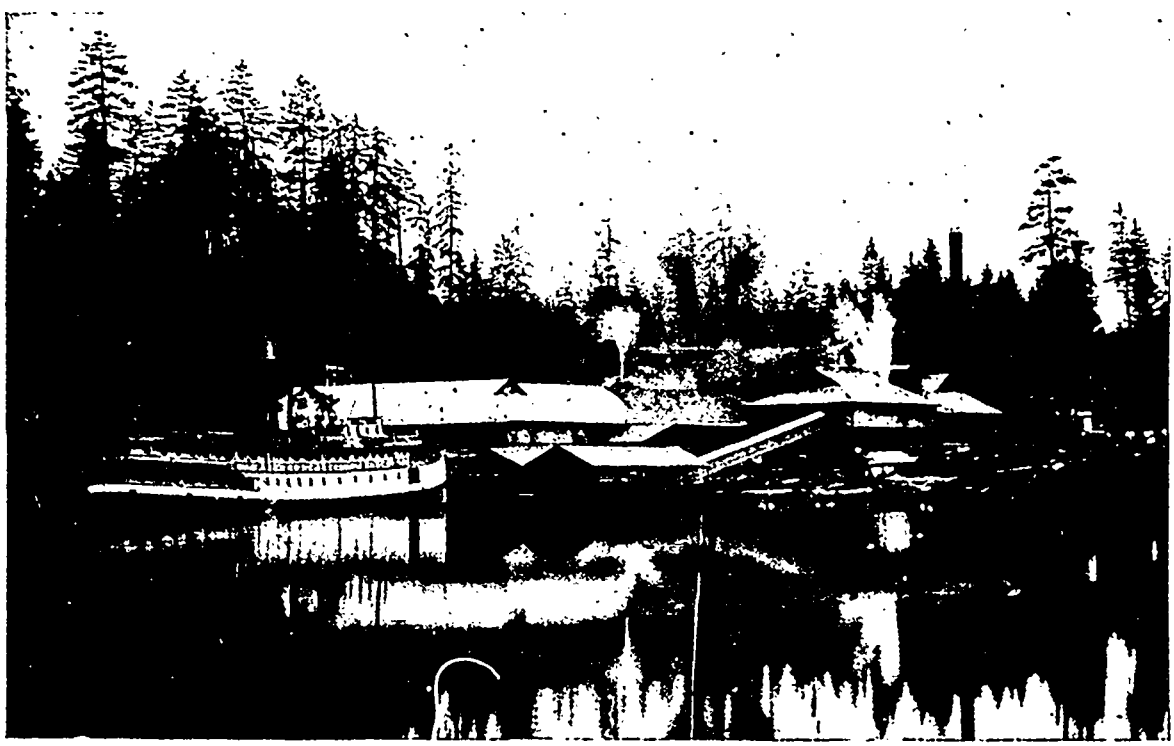
"The mineralization just described, and which forms the great bulk of visible mineralization on the property, is admittedly very much diffused through

the rock, and is consequently so low grade as to be of value only if found to be amenable to some form of concentration, and of which there seems to be a fair probability.

"On the top of the mountain is an area in which the mineralization seems to be more concentrated, producing, in places, ore of a grade to stand transportation and treatment charges. This higher grade ore appears to occur along the lines of contact of alternating bands of granitic rock and limestone. The extent of the latter deposit it was found impossible to determine, as the ore was found to be covered in most places by a heavy capping of gossan, and in many places seemingly permanent snow and ice covered up the formation. While the future of the property is far from being proven, the very great extent of the mineralization, with occasional concentrations, certainly renders the proposition worthy of most careful investigation and prospecting.

"Della and Glacier.—These claims are situated on the small lake in the Big Interior Basin, and are owned by Drinkwater and Engvik. On the claims is a small quartz vein from 2 to 3 ft. wide, mineralized chiefly with arsenical iron. Assays of the straight ore gave the following result: Gold, 5.12 oz. per ton; silver, 5.2 oz. per ton; copper, 1 per cent. The vein has not yet been worked to any extent, but an attempt is being made to extract the values by roasting the ore and grinding in an arastra, which has been erected and is being run by a small water-wheel constructed on the ground. The arastra had just been completed at the time of my visit."

June Group.—In the northwestern part of Vancouver Island the only property upon which any important development work has been done is the June Group, situated a few miles back from the north shore of the southeast arm of Quatsino Sound. There is on this property a marked mineralized zone, occurring as a ridge, shown up for a length of 300 ft. This showing had been prospected by a series of open cuts and gave promise of the probable finding of an ore-body, so the owners determined to do some development work on the property, to demonstrate at a depth the promise given by the surface showing, and started a long cross-cut tunnel. This work has been done under the charge of Harold Grant, of Victoria, from whom the following account of work done was obtained by the Provincial Bureau of Mines:



Vancouver Portland Cement Company's Cement-Manufacturing Works Near Victoria, Vancouver Island.

"Development work has been actively carried on for the last 12 months. This has consisted principally in running a tunnel under the large open cut where ore shows on the surface. This tunnel has been driven through very hard ground for 410 ft. The formation cut by the tunnel is well mineralized along a contact between limestone and granite, much cut up by felsitic intrusives. In a 20-ft. cross-cut, to the north, ore carrying 2 per cent copper was struck, and a considerable quantity can be hand-sorted to a shipping grade."

IRON.

In the Renfrew district, N. E. Newton and associates further developed their Gordon River iron properties. These iron deposits extend from Gordon

River to Bugaboo Creek. The lowest, or most easterly, claims are held by Young Brothers, of Saanich; then comes the Newton property, and above this is the Bentley, McGregor, *et al.* The last mentioned has been under bond to J. A. Moore, of Seattle, whose option was to run until December 31. Some work was done on the Bentley-McGregor property in 1906, but no particulars have been received. On the Newton property development work, consisting of surface stripping, open-cutting and the driving of a tunnel about 60 ft. into the ore, resulted in the uncovering of ore estimated to represent approximately 250,000 tons. The face of the tunnel is about 60 ft. below the surface, driving gaining about foot for foot in depth, and is still in ore. Those interested are of opinion that the prospects of an iron furnace being established on the coast of British Columbia are favorable.

The bog iron claims at Quatsino Sound are under option to Mr. Moore, but no information is just now obtainable as to what was done on them during the year.

COAL.

The gross output of the coal mines of Vancouver Island in 1906 was about 1,163,000 tons, as below. From this has to be deducted the quantity used in making coke and the usual loss in screenings, etc. The approximate tonnage of marketable coal is not yet available.

The Wellington Colliery Company mined 790,018 tons of coal in the following proportions: Comox (Cumberland) mines, 408,901 tons; Wellington (Extension) mines, 381,117 tons. The quantity of coke made at the company's coke ovens at Union was 13,058 tons. Total sales for the year, including from stock, were 17,000 to 18,000 tons. Last spring, after the San Francisco disaster, numbers of the men were permitted to leave the mines to seek employment elsewhere, which, as it transpired, was unfortunate, since, when late in the year the demand for coal became very active, it was found impossible to get enough men to work the mines at their full capacity. The result was that the output was not much more than one-half the producing capacity of the mines.

The year's work at Extension was very much the further development of the mines previously in operation, with no new mines opened up. The direct railway to the company's shipping bunkers at Ladysmith, known as the "short line," was completed and opened for the coal traffic, this rendering the company independent of the E. & N. railway, which had been sold to the C. P. R. Company. The opening of this branch line of 10½ miles in length was delayed by the necessity for the erection of a bridge over Nanaimo River, about 710 ft. long, including two centre spans of 100 ft. each. Some 800 men are employed at Extension and more are much needed. At Comox work was along similar lines to that at Extension. The chief new work undertaken was the substitution of water power for steam for operating the Luhrig coal washer at Union. A pipe line of some 2½ miles, of 14-in. steel pipe, was constructed and a Pelton wheel placed over the washer. Provision is thus made for power for driving the machinery as well as for washing the coal.

There is not much information available at the time of writing relative to the Western Fuel Company's operations at its Nanaimo and Northfield (Brechin) mines. The latter mine was idle four months, consequent upon the temporary falling off in the demand from San Francisco for coal. It was, however, reopened towards the close of the year. The company's productions for the year amounted to 373,700 tons gross, 290,000 tons of which were mined at Nanaimo (No. 1 shaft, Esplanade, and Protection Island mines), and the balance of 83,700 tons at No. 4, Northfield.

CEMENT.

The demand for Portland cement is very brisk, so much so that the Vancouver Portland Cement Company of Victoria, during the year enlarged the capacity of its works at Tod Inlet by one-half, making its capacity 900 barrels per day. A further increase is found necessary, and for this additional power plant, grinding machinery and another kiln are being obtained. The extension of the works requires the erection of four more buildings—64 by 100 ft., 20 by 163 ft., 58 by 91 ft., and 50 by 70 ft., respectively —two of which have already been built. The cost of both labour and materials has advanced, consequently the cost of making the cement is greater, but the company is endeavouring, by enlarging its manufacturing capacity, to keep down cost and thus avoid the necessity that would otherwise exist for raising the price of its product. Prices for export have been higher than were charged locally, but no advantage was taken of the opportunity to secure the higher rates. Whether local prices can be kept down will be determined by the result of present efforts to reduce cost of manufacture. Practically all the cement used in the Province last year was of this company's manufacture. Both Victoria and Vancouver used a considerable quantity, while much was also used in the mining districts and other parts where construction work called for the use of cement. It is hoped that with a larger output capacity a big export trade will be built up ere long. The company already has storage capacity at its works for 75,000 barrels and this will be enlarged as required. Its shipping facilities at Tod Inlet are sufficient for all the cement it will be practicable to manufacture.

The Nanaimo *Herald* recently reported W. J. Watson, superintendent of the Tyee Copper Company's smelter, as having stated that the works will be running full time in the new year, the company having secured a number of contracts which will keep the ore bunkers at Ladysmith full continuously.

With the exception of pumping, work at the Slough Creek deep-drift gold property, Cariboo, is suspended pending the arrival of the new boilers.

OPERATIONS OF THE BERRY CREEK MINING COMPANY IN 1906.

Satisfactory Results of the Season's Work.

CASSIAR DISTRICT, which outside of the Atlin mining division has not of late years produced any considerable quantity of gold, is at length giving promise of contributing more freely to the total gold production of the Province. This gratifying prospect is largely the outcome of the energy and enterprise of the Berry Creek Mining Company, Ltd., of Victoria, B. C.

Last January the MINING RECORD published a general report by Alexander Hamfield, then manager of the company, dealing with the operations since the inception of the company's hydraulic mine in Cassiar. This was illustrated by a sketch map and ten half-tone reproductions of views, and served to convey an excellent idea of the nature of the enterprise. In order that existing conditions at the mine may be better understood part of that report is here reprinted:

"Location.—The mine is situated in Cassiar mining division, in the northern portion of British Columbia, and is reached by ocean steamer from Victoria to Wrangel, Alaska; thence by river steamer to Telegraph Creek, B. C.; thence by pack train 72 miles to Dease Lake; thence by boat 26 miles to Porter's Landing, and lastly by pack train 8 miles to the mine. The elevation of the mine above sea-level is about 3,000 ft.

"History.—The Cassiar district was discovered in 1873, when a considerable rush to the new diggings took place. It produced during a few years gold to the value of something over $5,000,000 from three creeks, viz., Dease, Thibert and McDame Creeks; Thibert Creek being credited with about one-third of this amount. After this no work was carried on, except by a few Chinamen in a desultory way, until this company undertook to prospect and open up Thibert Creek.

"Title to Leases.—The Berry Creek Company is the owner of ten hydraulic leases, each 800 acres, in one continuous block fronting Thibert Creek for 15,000 ft. The title to this ground is held by lease from the British Columbia Government and is in perfect order.

"Character of Deposit.—The mine is situated on an ancient river channel, probably pre-glacial, on the south side of Thibert Creek, following the same general direction as the latter, from west to east, and is of similar nature to the channels in Cariboo, Atlin and Yukon.

"The general formation is schist, making a favourable bedrock for retaining the gold, which occurs from the size of nuggets to very fine, some being almost invisible and its existence having only become known through assays of concentrates, but the greater portion is of the size of small shot and is easily caught in the sluices. The principal part of it is found in the gravel on bedrock, although some also occurs through certain layers in the upper part of the deposit. The deposit shows the unmistakable river strata; first heavy gravel with boulders, then lighter gravel, then clay and sand, and lastly again finer gravel.

"Size of Deposit.—It is rather difficult to correctly estimate the size of a deposit of this nature as the width varies from 300 to 600 ft., and the height from 50 to 200 ft. Perhaps the average width may be put at 350 ft., the height at 125 ft., and the length at 15,000 ft. This will then give on the company's properties an estimated gravel deposit of about 30,000,000 cu. yd. of gravel, of which not more than between 400,000 and 450,000 cu. yd. have been washed by the company, and perhaps 100,000 cu. yd. by former miners.

"Water Rights.—The company is now the registered owner of water rights entitling it to 7,100 miner's in. of water, in all, on several creeks. This quantity is far in excess of what the creeks can supply, but the water rights were recorded, partly with a view of storing the surplus water in dams during the spring freshet, and partly from lack of knowledge in early days of the water supply. An estimate, as nearly correct as possible, of the water flowing in six of the creeks during an extremely dry season at the lowest stage gives a total of between 2,000 and 3,000 miner's in. It follows that the quantity varies considerably according to a wet or dry year and to time of season. For instance, Berry Creek, together with 1st and 2nd French Creek, will during the spring freshet and in a good season run about 2,000 miner's in. So far only the water from these three creeks has been available for the mine. Ditches from the 1st and 2nd Tributary of Dease Creek will be finished early next summer, giving their respective above stated amounts as an additional supply.

"Ditches.—Only short ditches were necessary to turn the water from 1st and 2nd French Creek into the Berry Creek water shed. Last summer a ditch 2,900 ft. long, capacity 600 miners' in., was dug from 1st Tributary of Dease Creek into the Berry Creek head waters, and a ditch 10,000 ft. long, capacity 500 miner's in., was nearly completed, leaving only about 1,300 ft. of ditch and flume to be finished next season. Lumber for this purpose is being hauled this winter.

"Flume.—Water for working the mine is delivered by a flume 6,000 ft. long, 30 by 30 in., with an average grade of 40 ft. to the mile, and a capacity of about 1,000 miner's in. At the end of the flume the water goes into a pressure box whence it is taken by the supply pipe to the mine, giving a head of 300 ft. to bedrock.

"Plant.—The plant in operation for washing gravel consists of 1,550 ft. of 18-in. pipe, 400 ft. of 14-in. pipe, 675 ft. of 12-in. pipe, 425 ft. of 10-in. pipe, 2 No. 6 giants, 2 No. 4 giants, 2 No. 2 giants, 2 No. 18 water gates, 2 No. 12 water gates, and 2 No. 10 water gates. Beside these there are on hand extras: About 800 ft. of pipe of different dimensions, one No. 4 giant, and extra nozzles, mining cars, headlights, etc. This plant will handle, with a head of 300 ft., all the water that the flume will carry, or 1,000 miner's in.

"Facilities for Washing Gravel.—The mine is at

present opened by five cuts, not following up the grade of the old channel, but cutting through the outer rim rock. As the old channel is 85 ft. above the modern stream at the junction of Berry Creek with Thibert Creek, where the work has been carried on, and the valley of the latter creek is between 300 and 600 ft. wide, it gives a splendid grade for the cuts and ample room for the tailings. The sluices in the cuts are 5 ft. wide, lined with 8-in. wooden blocks, are set on a grade of 9 in. to 12 ft., and vary in length from 100 to 225 ft. The giants and water gates are so placed that the water can in a few minutes be turned from one cut to another.

"Buildings.—The following buildings have been erected at the mine: General storehouse, frame, 20 by 16 ft.; boarding house, frame, 20 by 16 ft.; kitchen, frame, 10 by 10 ft.; office, frame, 12 by 14 ft.; house, log, 16 by 12 ft.; house, log, 16 by 14 ft.; two frames for men's sleeping tents, 20 by 16 ft.; blacksmith shop, and cellar. These accommodations are sufficient for the present working crew of 25 to 30 men.

"Sawmill.—On Dease Lake, 8 miles from the mine, the company owns a sawmill site of 40 acres, with about 50,000 ft. of standing timber. Beside this, there is plenty of timber around the lake which can be cheaply put into the water and towed to the sawmill. There are also: Sawmill; capacity from 4,000 to 5,000 ft. per day, 20-h.p. pipe boiler, 15-h.p. engine, with all necessary tools and fittings, and all properly housed.

"Labour.—The scale of wages at the mine is as follows: Foreman, $5; pipers, $4.50; blacksmith, $4; carpenter, $3.50; labourers, $3; to which must be added $1.25 per day for each man's board. Men brought from Victoria receive 50 cents per day less than this scale, as the company has to pay the cost of their transportation. The price of ordinary labour can probably be cheapened by hiring Japanese, or men from Eastern Canada.

"Freight.—The Hudson's Bay Company has had the handling of the company's freight for the last three years at 11 1-2 cents per lb. from Wrangel to the mine. This can probably be cheapened from 2 to 3 cents per lb. by the Berry Creek Company being prepared early in the season to enter into a fairly large contract.

"Working Season.—Preparatory work on the mine is commenced some time in April, and washing can usually be begun on May 10, and be continued until about October 20. If everything is in readiness for the spring work so that no time is lost, this will give from 150 to 160 days, 24 hr. per day, for washing gravel.

"Former Mining Operations.—The total output of gold has been $41,500, or about 9 3-4 cents per cu. yd., but it must be remembered that so far a larger proportion of top to bottom gravel has been washed, and if an equal amount of the two had been worked the result per cu. yd. would fully have come up to 13 cents. It may be of interest to note that former miners, who worked with a canvas hose, washed out certainly not more than 100,000 cu. yd. of gravel which yielded over $80,000. Only during 1903 has it been possible to arrive at a correct estimate of working costs for washing gravel, for during the other years the washing has been too intermittent, and mixed up with other work. In that year the mine was, as shown before, operated 98 days with 475 in. of water per 24 hr., and the total working expenses for the whole year were $17,400 in which was included a certain amount of new development work and all salaries, government fees, etc."

The report of the mine manager, D. R. Irvine, for the 1906 season has just been received. From this it is learned that during last winter the foreman, who was left in charge of the property, cut and hauled 3,000 riffle blocks for sluice boxes, and that 30,000 ft. of lumber was hauled from the sawmill on Dease Lake to the mine and sites of new ditches. With four men the foreman had all preliminary work requisite for the season's operations completed early in May, on the 9th of which month piping was commenced, working one shift with five men. Warburton Pike arrived from Victoria with three men on May 22, and on June 17 others came in with the manager, the latter party having been unavoidably detained *en route*. The report continues:

"The first work done after water was turned on in May was to wash down the ridge of gravel between pits 1 and 2. It was decided to abandon No. 1 pit at once. There was no dump left and the rock cut was continually being undermined and falling in, endangering the main pipe line, which crosses it. By the beginning of June the ridge between the two pits had been cut down to bedrock and No. 1 machine moved forward into No. 2 pit. A very large amount of dirt was moved in cutting down this ridge, the greater part of which was top soil and gravel. The best of the bottom paystreak line was found to have been worked out by the early placer miners some 20 years ago.

"The total number of 24 hr. days run during the season was 109. This was divided between the different pits as follows: No. 2 pit, 50 days; No. 3, 21 days, 19 hr.; No. 4, 17 days; No. 5, 20 days, 5 hr.

"The total value of gold recovered was $21,750. This gives an average of about $200 for each day run.

"There were three clean-ups from No. 2 pit. The first was on July 8, after running for 23 days, 7 hr. This included 15 days in May and early June, when the top gravels and partly worked-out bottom gravel and cement between pits 1 and 2 were removed, and when there were no men available to handle boulders, so that only the lighter gravel and mud reached the boxes, leaving only 8 days, 7 hr. run with a full crew of men.

"The value of the gold saved from this clean-up was $4,000, giving a return per day's run of $170. A large amount of top gravel which came down in the big cave last autumn had to be moved before the lower gravel and bottom cement was reached, and out of the 23 days' run there were not more than five days in which this bottom ground was moved.

"The next clean-up in this pit was on August 14, after 12 days' run, when $5,400 was recovered, giving a daily average of $450. Very little top gravel was

moved during this run; it was almost all from the lower half of the bank and bottom cement.

"The last clean-up was on September 22, after running 14 days, 16 hours. The gold saved was $7,400, giving a return per day's run of $500. This run also was from the lower half of the bank and bottom cement.

"There were two clean-ups from No. 3 pit. The first was on July 4, after a 12 days' run, which gave a return of $1,300. This shows an average per day of $108. The second was on September 20, after a run of 9 days, 19 hours. The gold recovered was $400, giving an average of $41 per day The conditions in this pit, which explain the small returns for the amount of work done, also existed in No. 4 pit, so one explanation will serve for both.

"No. 4 pit was not cleaned up until the end of the season, on September 26, after a total run of 17 days, 16 hours. The amount of gold recovered was $750, giving a return for each day's run of $43.

"The centre part of the ground, so far opened up, occupied by pits 3 and 4, has had, since the mine was opened, a succession of large slides from the bank above. The gravels of the old channel are here capped by a heavy covering of boulder clay, which has kept sliding down into the pits as the underlying gravel has been cut away. The slope of the hill is steep here, and the caving and slipping of the surface has extended back for 500 ft. from the edge of the bank. A small stream, which runs across the old channel between these two pits, has helped to cause the slides. It has cut a deep narrow gulch through the boulder clay and gravel, and this has kept filling in with material falling from the sides. This dams back, for a time, the water, which then breaks through, filling the pits and cuts with mud and boulders. During the last three seasons most of the lighter material brought down by these slides has been washed off, leaving an accumulation of boulders on top of the lower gravels. We had to remove this mass of boulders this season before the good ground could be reached. Most of the mass had been got rid of when we closed down. This work would have been finished, at least in No. 3 pit, before the end of the season, and some good lower gravel been washed out, had we enough 18-in. pipe to allow of one of the big No. 6 monitors being moved from No. 2 pit, across the rock cut, into No. 3 pit. To do this 630 ft. more pipe was required than was on hand at the mine, and a new supply could not be got in in time this year.

"We had two clean-ups in No. 5 pit. The first was on July 15, after running 11 days, 22 hours. The value of gold recovered was $1,020, which gives an average of $85 a day. The second clean-up was on August 24, after a run of 8 days, 7 hours. Value of gold recovered was $1,100, showing a return of $133 a day. Most of the ground washed from this pit was boulder clay and beds of sand and upper gravels. Two big caves of ground in June and July filled the pit and cut with this upper material, and buried two of the machines, but did no serious damage. It took several days' piping, on each occasion, to clean away this stuff, and, as the boulder clay and sand carried no gold values, this, of course, considerably lowered the average value of each day's run. Very little of the bottom gravel and cement was reached.

"The rock cut from this pit was so deep that not much fall was left for the sluice boxes, and the dump filled up so quickly that a new box had to be added to the sluice after each 24-hours' run. By August 20 the boxes had been extended to the creek, and the pit was closed for the season. Next spring, the sluice boxes will have to be carried further up the cut and raised 16 ft. or more, before piping shall be started here. The floor of this pit is very flat and the rock cut, which at present is only cut through the outer edge of the rim rock, will have to be carried further back into the pit to admit of the bottom gravels being washed out freely. Two drillers were employed during the last two weeks of the season, making a new branch rock cut through the rim rock to the floor of the pit. This was just completed when we closed down.

"Water Supply.—The work laid out and commenced last year, to bring in an additional supply of water from two tributaries of Dease Creek, was not completed until August 18 of this year. There was an abundant supply of water from Berry Creek to run the machines at their full capacity of 1,000 miner's in. per day, until the end of July. During May and June there were not less than 2,000 in. in the creek, half of which ran to waste. By August 1 the water in the creek had fallen so much that the supply was only enough to give a full head for 16 hours, and, for a few days, only 12 hours, a day, the water being stored in the dam the remaining hours of the 24.

"A gang of men was sent up to the Dease Creek camp, on June 24, to complete last year's work of turning two branches of Dease Creek into Berry Creek. This work entailed building two flumes, one 1,100 ft. long, the other 350 ft., and digging two ditches, one two miles long, the other half-a-mile. The work was finished and the water turned in on August 18. It took several days for this water to fill in some low, swampy hollows before reaching Berry Creek, and it was 10 days before the full effect of the new supply was felt at the mine.

"From August 28 to the end of the season there was an abundance of water to give a full head of 1,000 in. a day, and surplus water running over the dam gates; and this although September was an exceptionally dry month.

"The long ditch, from the larger of the Dease Creek branches, carries 500 miner's in. a day. The shorter ditch and flume from the smaller tributary, into which the larger creek is led, has a capacity of 700 in. During the very dry weather in August and September the combined creeks did not yield more than 550 to 600 in. This may be given as the minimum quantity to be expected from them in any year, and, with the smallest amount Berry has given since the mine was opened, will always insure a sufficient supply for the present equipment of the mine.

"Present Condition of the Mine, and Prospects for Next Season.—The result of this season's work has, I think, fully confirmed former estimates of the values

to be obtained from the gravels of this old river channel.

"The only new ground reached in the mine this year was in Nos. 2 and 5 pits.

"In No. 5 pit, out of a total run of 20 days, probably half the time was taken up in getting rid of an absolutely valueless mass of boulder clay, brought down by the slides already mentioned. Upper gravels and sand beds were washed during the remainder of the run, the bottom cement being barely touched, yet the returns from the 20 days' run showed an average of $105 a day. As yet this pit has only been worked in for about 140 ft. from the northwest edge of the old channel. The face of the bank is about 60 ft. high at present, but, as the old channel here lies in a steep hill-side, the height will increase rapidly as more ground is taken out. So far, only the outer edge of the old channel has been touched at this point.

"The work done in No. 2 pit gives the fairest idea of the values to be obtained from this deposit. Here the face of the bank is 400 ft. from the outer edge of the old channel, and it is impossible to say yet how much wider it will prove to be. The height of the bank is 210 ft., and all gravel, with no boulder clay covering. During this season there was a total run of 50 days on this ground and top, middle and bottom gravels were removed. The total return for that time was $17,000, giving a daily average of $335 a day. As I have already mentioned, about 15 days of this time were spent in washing top gravels from the ridge between pits 1 and 2, and in removing some of the top gravel brought down by the big cave last year. The rest of the time was spent washing middle and bottom gravel, of which the lowest 70 ft. of the bank is composed. The bottom gravel and cement averages about 6 ft. in thickness, lying on the bedrock. For the last 26 days' run only this middle and bottom gravel was washed and the daily average value obtained was $475.

"I have not been able to make a correct estimate of the number of cubic yards of gravel removed. To do this would require a careful survey of the ground before beginning the year's work, and another at the end of the season. If the nature of the deposit were much the same from top to bottom, one might estimate the number of cubic yards moved by the number of miner's in. of water used. But, in this case, that would not be correct, as much more of the loose upper gravels can be moved per miner's in. of water than of the heavier lower gravel and hard bottom cement.

"After testing many samples of the gravels at different heights and making a rough estimate of the quantity of middle and bottom gravel put through the boxes per day, I think a fairly correct estimate of the values would be as follows: Lower gravel and cement, average thickness, 6 ft.; value per cubic yard, 25 cents. Lower gravels, thickness, 70 ft.; average value per cubic yard, 14 cents. Upper gravel, average value per cubic yard, 8 cents. In giving these values I believe I have under-estimated the value of the bottom gravel and cement, but prefer to be on the safe side. There is no doubt that in places this bottom cement and gravel is much richer than I have stated, running up to several dollars a cubic yard.

"This paystreak of rich bottom gravel and cement can be traced the full length of the mine. The whole distance from No. 1 pit to the end of No. 5 is 1,100 ft., and this paystreak shows wherever the bottom has been uncovered in all the pits.

"The condition of the mine at the end of this season gives a better prospect for a profitable season's work next year than at any previous time. There is now, between the high bank and the bedrock in the several pits, a shelf of lower and bottom gravel and cement with an average thickness of 70 ft. and a width of 150 ft., and from No. 2 to No. 5 pit, a length of about 1,100 ft. This can be worked out with very little fear of a cave from the high bank at the back, except in No. 2 pit, where during the last few days of the season part of the high bank showed signs of caving, and I think it will probably come down with the first thaw in spring, if it has not already fallen. This is all clean gravel, which will more than pay for working. Apart from this, the shelf of middle and lower gravel I have mentioned will give a total of about 400,000 cu. yd. of material. This, at a very conservative estimate, should be worth at least 13 cents a yard all through, giving a total value of between $50,000 and $55,000.

"I have already mentioned that the surface of the hill slope above No. 4 pit has broken and slidden down for a distance of 500 ft. back from the top of the bank. This brings the break in the surface close to the line the continuation of the flume would take if it were carried down towards Boulder Creek. As the Berry Creek water supply would be essential to work the middle part of the company's ground, it will endanger the continuation of the present flume if future work should cause the breaking and slipping of the ground to continue further up the slope of the hill. So long as no more of the high bank is caved in the centre of the mine, above pits Nos. 3, 4 and 5, I do not anticipate any danger of more surface slides occurring here.

"I ran a line of levels from the end of the present flume to Boulder Creek, on the same grade as the present flume, viz.: 40 ft. to the mile. The total distance is 3,600 ft. and the ground is either smooth hill-slope or flat bench. There are no difficulties here such as the series of rock bluffs presented on the line of the existing flume. No high trestles would be required, and when the present flume shall be extended to Boulder Creek, enough timber can be got, close at hand, to supply all that will be wanted for posts, sills and stringers. The lumber would have to be hauled from the sawmill on Dease Lake.

"To open up new ground at Boulder Creek, making use of the present water supply by continuing the flume, would cost from $20,000 to $25,000. The ground is known to be good at Boulder Creek. The thickness of the old channel gravels there is from 60 to 100 ft., and there is no danger of serious trouble from bad caves or surface slipping down there, since the old channel either occupies flat ground or lies on a very gentle slope."

The following comments have been extracted from a review of the position prepared by Mr. Pike for the information of his co-shareholders at their request:

"Of course the size of the rich patch in No. 2 cut is undetermined, and it will be impossible to give any estimate upon the subject until next year. The present indications are good, as the bedrock rises sharply at this point and dips again below, with a thick layer of blue cemented gravel, and, in the early history of mining on Thibert Creek, these conditions existed wherever a good patch was discovered. It is obvious that high bedrock would, at an early period of the mine's existence, have protruded above the water and caused an eddy on its lower side, in which the gold would lodge. We know that this high point of bedrock lay directly in the course of the gold run, as we have followed the run down stream with good results ($475 per diem) for 300 ft. below the occurrence of the last rich patch, from which the early miners took out $80,000 in quite a small area.

"Having stated the facts about this discovery, and my reasons for saying that the indications are good, I leave it to the shareholders to estimate the future possibilities which must, however, be merely guesswork till the next cleaning up of the sluice boxes.

"In regard to the future working of our property, I must draw your attention to the existence of a considerable quantity of the metals of the platinum group in the black sand which is systematically going to waste every year. Very high assays were obtained from the concentrated black sand obtained by hand-panning a few years ago, and in 1905 an attempt was made to save this product by means of an under-current and concentrating tables. From lack of knowledge, this experiment was not a great success, as it failed to concentrate the blank sand sufficiently. The under-current was continually clogged, and its operation interfered with the output of gravel through the main sluice. Only top gravel was being run at the time; most of the platinum appears to lie in conjunction with the gold in the lower beds.

"In spite of these drawbacks, however, samples of the product assayed as high as 60 oz. of platinum, osmium and iridium and 7 oz. of gold to the ton. When I mention that this product had run nearly to the end of the main sluice, dropped through a grating into a hopper, passed through a line of small sluice boxes, across a wide under-current, over a long run of wire screening and cocoanut matting, and appeared on the concentrating tables still carrying this amount of platinum and fine gold (in conjunction with iron and invisible) you can see how easily it would rush through the main sluice with a big head of water and be lost altogether.

"Taking into consideration the rapid increase in the value of platinum, I would suggest that for next season we should secure the services of a practical man who has had former experience and kept up with new methods of saving black sand, and, having satisfied ourselves of his capability, should erect a plant according to his instructions and give him charge of this department of our mining. This plant should, if possible, be in operation before we begin to run off the rich patch of gravel above-mentioned, which is likely to contain high value in platinum."

COAL MEASURES OF THE TELKWA.

Preliminary Report by Geological Survey Official.

COAL IN THE TELKWA BASIN was dealt with by the provincial mineralogist in his report on "The Northern Interior Plateau," published in the "Annual Report of the Minister of Mines for 1905." The following information was obtained by W. W. Leach, of the Geological Survey of Canada, who spent the greater part of the 1906 field-work season in the Telkwa country.

Mr. Leach says, in part: The problem of delimiting the coal areas in this district is one of extreme difficulty. The exceedingly soft nature of the coal-bearing rocks and their consequent failure to resist erosion has resulted in their removal everywhere from the higher ridges, only a few isolated patches remaining in the valleys. The total thickness of the coal formation being small, probably not in excess of 300 ft., and the folding and faulting considerable, it is probable that even in the lower valleys the volcanic rocks occupy a large extent of the area, the coal rocks having been removed by denudation. This is proved to a certain extent by volcanic outcroppings in various places in the valleys of Goat Creek, Mud Creek and the Telkwa River, usually brought up by the action of faulting, but in several instances cropping along the axis of a denuded anticline.

The only natural exposures are to be found in the creek bottoms in the few places where the streams have cut through the heavy covering of drift of the wide terraced valleys. Away from the creeks no exposures need be looked for until the higher ridges are reached, and these are in all cases composed of volcanic rocks, the contact being invariably masked by drift covering. It will, therefore, require very close prospecting before the extent of the coal areas shall be proved.

There are, at present, four companies holding coal locations in this neighbourhood, all of which have done some prospecting of a desultory nature.

The Cassiar Coal Company, the property of which lies in part on Goat Creek, a large tributary of the Telkwa from the southwest, has stripped several seams about six miles up that stream.

This coal should make an excellent fuel as it is fairly hard and well able to stand considerable handling without much loss in slack; it is, however, apparently not suited for the manufacture of coke.

The strata here are dipping irregularly at low angles and show several small faults.

A short distance above these openings, in a high-cut bank, what are probably the same beds are seen, but, in this case, it appears that the two upper seams have been burned leaving in their place thin beds of ash and slaggy material and colouring the neighbouring shales a brick red. A fourth seam overlying the others crops at the top of the cut bank; it shows

about two ft. of coal, but no regular roof was seen, the present overlying material being the gravel wash of the terrace. It does not seem probable that the burning extends over any large area here as there is no further sign of it higher up the creek, although a couple of miles down Goat Creek a similar occurrence was noted.

These exposures give what is probably the best section of the coal measures in the district, about 200 ft. of strata being uncovered between the creek bed and the top of the terrace, but it is by no means complete.

Several other small coal exposures were seen on the property of this company farther down Goat Creek, but no other work of any extent has been done.

To the north and west of this property a number of locations are held by the Kitimat Development Syndicate. No work has been done beyond merely surface stripping at various places. On Mud Creek, a branch of Goat Creek, from the southwest, near its mouth, and on the Telkwa River a few miles above the mouth of Goat Creek, the coal has been exposed by the action of the streams; several good seams are uncovered of a nature very similar to those of the Cassiar Company, but in all cases are subject to faulting, as elsewhere in the field.

The coal lands of the Transcontinental Development Syndicate are situated on Goat Creek above those of the Cassiar Coal Company. During the past season two prospecting tunnels have been driven and a shaft sunk with the intention of proving the number, size and condition of the seams at this point. At the time of the writer's visit No. 1 tunnel had been driven a distance of 85 ft. across the strike of the measures, the strata here dipping at about 30 deg. Three seams had been cut in ascending order 4 ft., 3 ft. 3 in. and 4 ft., respectively, in thickness.

No. 2 tunnel, 76 ft. in length, also cross-cutting, had passed through two seams, the lower 6 ft. and the upper 4 ft. thick. The roof of the 6-ft. seam is missing, a fault having cut through the seam here, but it is probable that this is the same bed that has been shown up in a natural exposure a short distance down the creek, where about 10 ft. of coal is in sight.

No. 2 tunnel cuts the strata at a slightly higher horizon than No. 1, and it is possible that other seams exist between the end of No. 1 and the entrance to No. 2.

Near the entry to No. 1 tunnel a shaft had been sunk to a depth of 23 ft. to prospect the strata at a lower horizon than could be reached by the tunnels, but no coal had been found.

The coal measures at this point being nearer to the later eruptive areas are more highly flexed than those farther down Goat Creek, evidences of faulting are abundant and the basin has narrowed down to a great extent. Although in all probability the same seams are represented here as those mentioned before on the Cassiar Company's land the character of the coal is entirely different.

This coal is firm and bright and may be classed as a semi-anthracite and should make excellent fuel of its class.

As has already been mentioned, on the nearer approach to the newer eruptive areas the older rocks, including the coal beds, have been highly disturbed and the resultant heat and pressure have had a marked effect on the coal, altering it from a bituminous to a semi-anthracite; it must be expected, however, that more difficulties will be met with in mining due to the probable greater frequency of faulting and increased intensity of the folding.

Similar conditions, probably intensified, prevail at the property of the Telkwa Mining, Milling and Development Company, situated on Coal Creek, a small stream running into Goldstream, one of the headwaters of the Morrice River, and not far from the head of the south fork of the Telkwa River. Here a number of seams of good coal have been opened up. The disconnected nature of the work done, with the disturbed condition of the strata, render it almost impossible to be sure of the relative positions of the seams and whether several of the openings are on the same or different seams. It is fairly certain, however, that four different workable seams have been uncovered; in descending order these have the following respective thickness: 4 ft. 2 in., 4 ft. 6 in., 4 ft., and 7 ft. 3 in. No analyses have, as yet, been obtained from this coal, but in general appearance it bears a strong resemblance to that from the Transcontinental Syndicate's property; if anything even more anthracitic in nature.

Where these seams have been uncovered the area of coal-bearing rocks is very narrow, probably not more than a few hundred feet in width. It appears to lie on the line and on the downthrow side of a great fault and represents a small remnant of a once great coal field now mostly removed by erosion. It is probable, however, that to the southeast, in the main valley of Goldstream, a much wider belt of coal land will be found to exist.

With regard to this field as a whole it may be said that wherever the coal formation has been exposed faults were seen, not, as a rule, of any great size, but in such numbers as to be a matter of serious importance to future mining operations. The coal has also been cut by numerous dykes and nearly everywhere is somewhat severely flexed. These facts, taken in connection with the uncertain extent of the second areas, seem to render it imperative that systematic and careful prospecting should be undertaken, well in advance of regular mining. Some method of boring could possibly be utilized to determine the position and the nature of the strata underlying the great gravel deposits of the terraces; until something of this sort is done it will be impossible to define the limits of the several coal areas. It is possible that in certain cases mining could be successfully carried on by stripping the overlying gravel and shales from the coal, where not of too great depth, a method that has been somewhat extensively utilized in the anthracite fields of Pennsylvania.

THE BOUNDARY DISTRICT.

About 35,000,000 Lb. of Copper Produced in 1906.

BOUNDARY DISTRICT MINES made an output of nearly 1,200,000 tons of ore in 1906. The story of their operations during the year, as told by the Phoenix *Pioneer,* is one of steady progress in every direction of metallurgical effort. Not only have the large producers been doing a gradually increasing business in mining and smelting, but the smaller and higher grade mines have been showing up well and have been a source of satisfaction and profit to their owners and promoters. More men are today employed in the Boundary mines and smelters, and more by the railways in handling the mineral products, than ever before in the history of this growing and progressive section. This fact tells the story in words that cannot fail to carry conviction as to the productiveness of this district from a mineral standpoint.

One feature of prime importance in assuring capitalists that Boundary mines can be made profitable is the fact that the Granby Consolidated M., S. & P. Company was this year placed on a 12 per cent dividend-paying basis, the fourth 3 per cent dividend for 1906 being payable to the shareholders on December 31. As the Granby Company is the largest concern of its kind in the province, having operated on the most extensive scale, its record has been more closely watched, perhaps, than that of any other mining company in British Columbia—for on its success depended much. Its undoubted success, evidenced by the fact that with the above-stated payment of $405,000 the company will have paid a total of $1,753,000 thus far in dividends, places the question of profitable mining in the Boundary beyond doubt.

One result is that the other two large companies, the British Columbia Copper Company and the Dominion Copper Company, are increasing their operations to a considerable extent, thus being but a step or two behind the Granby Consolidated in proving that Boundary's low grade ores can be mined and smelted at a profit—especially with the present high price obtainable for copper.

When 1906 opened the prediction was made that Boundary mines would send out this year at least 1,250,000 tons of ore. This quantity has not quite been reached, but another year will see it largely exceeded, unless all signs of the times in a mining and smelting way fail. This year the output approximates 1,190,000 tons, and 1907 should see the production of district mines reach 1,500,000. There would be no trouble in getting out that quantity of ore, if the capacity of the district smelters was sufficient to handle the output. And this phase of the question is receiving constant attention. But building smelters is slow work at best; nevertheless those in the Boundary are constantly being enlarged.

MORE THAN 4,600,000 TONS OF ORE.

In six years and a half the mines of the Boundary have sent to district smelters approximately 4,660,000 tons of ore. This is from 1900, in the middle of which year ore shipments were commenced, to the end of 1906. It will thus be noted that the progress has been little short of marvellous. In 1900 but 97,000 tons were shipped, while in 1906 there was about 1,191,000 tons of ore dug out of Boundary mines and sent to the three district reduction works —eleven times as much in 1906 as in the year 1900. To show the yearly progress and increase of output the following table is given:

1900.....	97,000 tons
1901.....	390,000 "
1902.....	509,000 "
1903.....	690,000 "
1904.....	830,000 "
1905.....	953,000 "
1906 (Dec. estimated)	1,191,000 "
Grand total.....	4,660,000 tons

Of the above total the Granby mines have sent out nearly three-quarters, or more than 3,000,000 tons, this ore all coming from Phoenix camp; the British Columbia Copper Company's Mother Lode mine has produced about 830,000 tons; some 380,000 tons by mines now controlled by the Dominion Copper Company, and the remaining 450,000 tons by the B. C., Snowshoe, and numerous small shippers.

That the next seven years will see several times the above total sent out from our mines is regarded as morally certain, for the mines were never before in such excellent condition for maintaining heavy and even enlarged shipments over what they are producing today. In fact, a total of 1,500,000 tons for 1907 alone would show only a normal increase, while every indication points to the shipment of a larger and larger tonnage as years roll by. An average rate of shipping 5,000 tons daily for the next calendar year is entirely probable, when everything is considered.

OVER A HUNDRED MILLION POUNDS OF COPPER.

The recovery of copper per ton from the ore of Boundary mines is known to be low, comparatively speaking. An estimate of an average of 25 to 30 lb per ton is considered conservative. On this basis, the copper fine production of the Boundary mines for the first year of ore shipping—1900—was but 3,000,000 lb. On the same basis, the recovery for 1906 will amount to about 35,000,000 lb. — an amount sufficient to be taken into consideration in the world's grand total. Altogether the mines of the Boundary in seven years have contributed approximately 140,000,000 lb. of copper. In addition to this there are gold and silver values to be taken into account as well. The values of the ores thus treated would amount to more than $25,000,000.

IMPROVEMENTS AT THE MINES.

Nearly all the large Boundary producers have been making extensive additions to their machinery plants this last year, for the purpose of preparing for larger

outputs generally in the near future. Probably hundreds of thousands of dollars have been and are still being expended in this manner.

Granby Co.—At the Granby mines work has been progressing steadily on what is known as the Victoria shaft and headworks. This will be the permanent working shaft of these great mines, and the company is spending something like $100,000 or more in fitting up the shaft and the accompanying headworks with the requisite machinery. The shaft is now down 400 ft., has been timbered, and is being put in condition for use some time this winter or in the early spring. The hoisting engine is of 250 h.p.; it will be driven by an electric motor of that capacity. There will also be a third mammoth ore crusher at this Victoria shaft, a duplicate of the other two now in operation at the Granby mines, capacity 150 tons per hour at the maximum. Both the Canadian Pacific and Great Northern railways are arranging to reach this shaft, and both will be fed from the extensive ore bins erected at that point.

Beside this, betterments have been going on steadily all about the Granby mines, and development work has been kept well ahead of needs for months and even years to come. The Gold Drop group exploitation has been successful from every standpoint and an immense tonnage of ore has been opened up here. On the Curlew, one of the several new claims purchased in 1906, a large tonnage has been developed, and this claim being below the Gold Drop, may eventually be used, by means of the tunnel, to tap the Gold Drop ore reserves, when needed.

In one particular the Granby mines are in a fortunate position. If one of the openings should, for any reason, be placed out of use, the regular output of ore could be easily maintained from either one of two or three others. In fact this has been done in the past, and having two railways to haul the ore to the smelter is another advantage in this connection.

B. C. Copper Co.—For the past year the British Columbia Copper Company's mines have been working towards a large increase in output when the smelter should be enlarged. This having been done, the tonnage will, with the new year, coke supplies and the railway not failing, be trebled. The Mother Lode mine has been extensively developed at depth, and with the force of 200 men there now, it can maintain shipments up to 1,000 tons daily, if required. This company's Emma mine, in Summit camp, is one of the best of its properties, aside from the Mother Lode, and it has been developed satisfactorily this last year, more and better copper ore having been found there. At both the Mother Lode and the Emma the company is substituting electricity for steam power, at a great saving in cost of operating.

During the year the B. C. Copper Company bought outright the Oro Denoro and B. C. mines, both situated in Summit camp—and these acquisitions are known to be advantageous to the company. The B. C. mine has shipped more than 100,000 tons of ore in past years—some of the best ever sent out of Boundary mines—while the Oro Denoro, adjoining the Emma, has large deposits of ore that can be cheaply mined and shipped.

In the Napoleon mine, near Marcus, Washington, U. S. A., the B. C. Copper Company also has a splendid propositon, giving the sulphur needed at the smelter, and having other values, which are improving. Much is expected from the Napoleon. The company is also working the Lone Star and Washington group, near Danville, Wash., so far with good results.

Dominion Copper Co.—Steadily and surely the Dominion Copper Company has been working its way through the last year, having shipped and treated more than 200,000 tons of ore from its mines, mostly in Phoenix camp.

While shipments have been steady from the Brooklyn, Idaho, Mountain Rose, Sunset, Rawhide, etc., it is to the Idaho and Rawhide that the company looks for the increasing tonnage needed at the company's enlarged smelting works situated at Boundary Falls. The management feels well satisfied with the extensive plan of exploitation thus far carried on, especially at the Rawhide, where three shafts are now in use. The Sunset also is showing up well, and the values there are improving, there now being more copper in the mine, the ore of which was previously thought to be largely iron.

At the Idaho mine in Phoenix camp the Dominion Copper Company is now assembling the parts of a 30-drill Rand air compressing plant, to supply power for the Brooklyn, Stemwinder, Idaho and Rawhide mines. This plant will be operated by electricity, thus making a large saving in operating costs. A smaller plant will be installed at the Sunset mine, Deadwood camp. Beside this, the company has just commenced operations at the Athelstan, Wellington camp.

Snowshoe.—One important feature of the year's development in the mines of the Boundary was the advent of the Consolidated Mining and Smelting Co. of Canada in Phoenix camp, that company having taken a lease on the well-known Snowshoe mine here. That this company, which is operating so successfully at Rossland, Trail and East Kootenay, should reach out to the Boundary and take up one of its large properties, is another evidence that the Boundary is attracting the attention of more and more mining men of note. The Snowshoe is now shipping ore daily.

HIGH-GRADE SILVER-GOLD PROPERTIES.

While Boundary's copper mines have been exceeding all previous records for output, etc., the high-grade silver and gold mines of this section have also been making progress Chief among these is the Providence, near Greenwood, which is today a better mine than ever before. A dividend of about $16,000 was paid in September, and development with some 35 men has been steadily kept up all the year. The company will doubtless make an even better record during the year 1907

The Skylark is another silver mine that has done

well, having paid for development and the purchase money also from the proceeds of the ore shipments in the last two years. Its Phoenix owners should begin to receive dividends this coming year.

Among the large number of mines on the high-grade belt that are looking well and doing satisfactorily may be mentioned the Elkhorn, Prince Henry, Strathmore, Bay, Mavis, Crescent, Don Pedro, E. P. U., Helen, Tip Top, Greyhound, Moreen and a dozen others.

HIGHER CUSTOMS DUTIES ON ZINC AND ZINC PRODUCTS.

Tariff Changes Sought to Assist Zinc Industry.

ZINC AND PRODUCTS THEREOF are admitted into Canada from other countries under a Customs tariff that does not foster the establishment in the Dominion of a zinc-producing industry. The "Report of the Commission Appointed to Investigate the Zinc Resources of British Columbia and the Conditions Affecting Their Exploitation," having been made and its conclusions duly considered, the next necessary step would seem to be to give the new industry such protection in the shape of increased Customs duties and assistance by bounty (the latter having already been given to iron and lead with encouraging results) as shall appear to be warranted by the surrounding conditions. On pages 425-7 the MINING RECORD last month gave the views of one who has for five years past been interested in the intermittent efforts have been made to market Slocan zinc ores. The subject is now having the serious attention of the owners and managers of the chief British Columbia mining properties in which zinc ore occurs, and of others more or less directly interested. Concerted action has been taken to bring the situation before the Dominion Government and the following petition, addressed to Hon. W. S. Fielding, minister of finance and chairman of the Tariff Commission, has been forwarded to Ottawa by Fred Starkey of Nelson, acting chairman of the Associated Boards of Trade of Southeastern British Columbia:

Sir,—Your memorialists, who are interested in the mining and smelting of zinc ores in the province of British Columbia, have withheld their case for tariff changes, awaiting the report of the special commission appointed to investigate the zinc resources of British Columbia, which has only at this moment come into our hands.

During the year which has elapsed since the collection of the information embodied in that report, conditions as therein set forth have not materially changed, certainly not for the better. The tariff ruling of the United States imposing a duty of 20 per cent on zinc ores remains in force, and has been somewhat unexpectedly construed to include duty on the silver as well as the zinc contents of the ore.

The Canadian Metal Company's plant at Frank, Alberta, has produced a few tons of spelter, but is now idle and requires, in addition to the sum of $400,000 already expended, a further sum of $100,000 for its completion.

The tendency of the silver-lead mines to become zinc mines is now more pronounced, but owing to the lack of market either at home or abroad, shipments have almost entirely ceased and such zinc ore as is necessarily produced in connection with lead mining is accumulating at the mines and concentrators.

The Frank plant has presently installed five blocks of furnaces, of which at least three blocks must be kept in continuous operation to secure any economically profitable result.

The total capacity of five blocks is 5,500 tons per annum and the chief problem which confronts the company is that of finding a market for this quantity of spelter.

The Canadian market (*vide* "Report of Zinc Commission," page 55) is good for over 3,000 tons per annum, and is at present supplied largely from United States sources, the zinc smelters of New York having a freight rate of 25 cents, and those in Illinois a freight rate of 30 cents per 100 lb. to eastern Canadian points, as against a rate of 65 cents per 100 lb. obtainable from Frank.

The principal uses of zinc ore are as a constituent of paints, also of brass to the extent of 40 per cent; in sheets and pipes, and largely in the galvanic coating of iron and steel sheets, pipes and wire.

The Page-Hersey Iron, Tube and Lead Co., Ltd., of Guelph, Ontario, is a large, perhaps the principal, importer of zinc in Canada.

Outside of Canada the only available market is the European, to reach which we must pay for freight charges a rate of 88 cents per 100 lb., leaving, with spelter at the present high quotation of £27 per long ton, a net return of $4.95 per 100 lb. This amount (*vide* "Report of Zinc Commission," page 100) does not promise to afford any profit.

Unfortunately the prospect for improvement in price is not favourable owing to the expected enormous production of the waste dumps of the Broken Hill mines, New South Wales.

The production of 5,500 tons of spelter will involve the shipment and treatment of 15,000 tons of concentrates, and this in turn would be produced from 75,000 tons of raw ore and the fuel requirement of the smelter would amount to 40,000 tons of coal, involving a turn over of more than $500,000 per annum, nearly all of which would be spent in the country for labour and supplies.

In aid of the efforts of those endeavouring to create this new industry in Canada, we beg to request that your honourable body will recommend to Parliament such changes in the Customs tariff as will put zinc and its products on the same basis as commodities of similar classes.

We beg to submit, subject to such revision as to details as your honourable body may see fit to make, the accompanying schedule which we believe to be substantially equitable:

Zinc and products thereof: The first column gives the present tariff; second, the proposed tariff.

Nos.		Per cent.	Per cent.
158	Zinc white	5	30
234	Galvanized plates	5	25
251	Galvanized tubing	15	20
262	Galvanized barbed wire	Free	25
277	Zinc man. of N. E. S.	25	35
402	Brass blocks (40 per cent zinc)	Free	25
603	Wire, galvanized	Free	25
633	Spelter blocks, pigs, sheets, etc.	Free	25

These changes to come into effect upon proclamation of the Governor-General-in-Council.

Referring again to the "Report of Zinc Commission" (*vide* pages 53-54), we call attention to the heavy handicap against which this industry in its initial stages must contend, owing to the heavy cost (equal to about 40 per cent above that occurring in United States smelters) of all labour, and the entire lack of labour having the necessary technical skill.

We cannot guarantee that the tariff changes herein asked for will be the limit of the public aid necessary to put this industry on a stable footing.

It may become necessary, as it has in the case of iron and lead, that the Dominion Government be asked to aid this industry by the way of a direct bounty, but as your honourable body is concerned at present with tariff changes, we bring before you now only that aspect of the situation.

NOTES ON SLOCAN MINING.

SLOCAN MINES working in 1906 are mentioned in the following summary review, which was supplied to the Nelson *Daily News* by a special correspondent. It will be noted that a number of mines have been doing development work, while some have also been shipping ore or concentrates. The outlook seems to be improving in the Slocan and it is thought that there will be much more work done and ore produced in 1907 than during the year now closing:

ABOUT SANDON.

The Slocan Star property owned by the Byron N. White Company, has done no work to speak of during the past year on account of its lawsuit with the Star M. and M. Company over the famous Rabbit Paw apex case. It has worked only a few men and has shipped no ore to mention. Experimental work under the order of the Supreme Court has just been started by W. E. Zwicky.

The Payne mine has been under lease to Walker Smith and has been working a small crew of men for the past year, about 15 to 20 men. A few cars of ore have been shipped and now several sub-lessees are working the property. The mill was run most of the summer. The chief work in the way of development has been to sink a shaft from the No. 8 level a distance of 100 ft., and this shaft is now down about 60 ft. Trouble with the water is the cause of its not being put down more quickly. This will determine whether it will justify the company to run another level on the Sandon side of the mountain.

The Reco mine has done nothing all summer, only a watchman being engaged, consequently this property will not make its usual shipments this winter. The cause of this shut down is attributed to its chief owner being in litigation with the Byron N. White Company on account of other properties.

The Last Chance has worked some 25 men for the past six months or more and is again on the shipping list. This company some time ago purchased a lower tunnel from the American Boy and this will enable them to develop the property at a lower depth without sinking. The property is looking fairly well and will make good shipments in the future.

The Ruth worked its mill at Sandon for four months last summer but at present it is idle. The company employed about 25 men and made some 100 tons of zinc and about 120 tons of lead concentrates during the four months' run. It is developing the old workings of the Ruth and also working a small force on the Hope, an adjoining property.

The Ivanhoe, owned by the Minnesota Silver Company, has been idle all summer. An adjoining property, called the Sunshine, and owned by the same company, is under lease to Carley and Holmquist, and is looking fairly well; they have struck some rich ore.

The American Boy is working a small force doing chiefly development work; it is now under the supervision of W. E. Zwicky. The money being spent has been raised from assessments, which the company had to make to provide for development work. The mine is looking well and should soon be on the shipping list again.

The Rambler-Cariboo at McGuigan, is still raising for the bottom of the shaft in which there is plenty of ore. Somewhere about 200 ft. additional will have to be raised to meet the bottom of the shaft, which will give a total depth of over 1,400 ft. When the raise is completed the big cross-cut will be again started ahead to strike the lead. This tunnel is now in 5,000 ft.

The Idaho-Alamo has been employing a force of about 15 men, chiefly on development work. So far this year nothing has been shipped. R. Roberts is in charge of the work.

The Canadian group, above the Idaho, which is under lease to the Brandon Bros. shipped three cars of ore last summer, but had to shut down when the snow came on account of the dangerous place in which the mine is situated. The mine is looking well and work will be resumed in the spring.

The Eureka, a property owned by the Centre Star people of Rossland, and situate about a mile from Sandon, opposite the Slocan Star, has employed about 12 men all summer. It is looking exceptionally well and there are several cars of ore mined. Work, however, will have to be stopped on account

of the snow slides and also the fact that the company has no quarters for their men during the winter. In the spring buildings will be erected and work pushed extensively. Jas. Cronin is superintending the development.

The Goodenough has worked a small force this summer and taken out about two cars of rich zinc ore and one car of lead. This property is near the Reco and is chiefly owned and worked by J. A. Whittier.

The Bachelor group, near Three Forks, and which is under lease and bond to Low, Cameron and Sloan, has worked some 15 men all summer and shipped considerable ore. At the present time it is not working on account of a deal pending.

Besides the above-mentioned properties several small ones are working a few men, notably the Colonial, Majestic, Sunshine, Slocan Sovereign and Cinderella.

The Whitewater mine at Whitewater, which is under lease from the company to Retallack, Fowler and Koch, is looking well and they are employing about 25 men and working the mill one shift, turning out over 120 tons of lead concentrates per month beside double this amount of zinc concentrates; they also ship considerable clean ore. This partnership has also the Whitewater Deep under lease, from which it is extracting some rich ore.

SILVERTON CAMP.

This camp has made marked progress in the past year and should be the liveliest camp the coming summer, several deals of large sums having been made. The Standard which was owned by Briggs and Grady, and under lease to Finch and Aylard, has been purchased by the latter people for some $27,000. Buildings are being erected and quite a large force is employed. This property promises to be one of the largest mines of the camp as it has large bodies of ore, both concentrating and clean, in its lower levels. The Vancouver, which is under lease and bond to M. S. Davys of Nelson, and purchased from him for a very good sum by the Le Roi No. 2 Company of Rossland, is looking very well and employing quite a force of men. A new tramway has been erected to connect the mine with the Wakefield mill and the mill is being put in shape for large shipments. This property is credited with having large reserves of ore. The Hewitt is looking very well and shipping regularly, working about 15 men. It is in charge of J. Stillwell. The McAllister group on the north fork of Carpenter creek, about four miles from Three Forks, has been under lease and bond to Sandon people from W. Hunter of Silverton. The bond has been taken up and the property purchased. The owners shipped one very rich car of ore. It is a dry ore proposition.

These are facts worth noting—the carefully and officially estimated value of the mineral production of British Columbia in 1906 exhibits an increase of quite 50 per cent. over that of 1903, and 250 per cent over that of 1896.

THE PROVINCIAL MINERALOGIST ON EXTRA-LATERAL RIGHTS.

EXTRA-LATERAL RIGHTS in British Columbia have lately been commented on by the Provincial Mineralogist in the following letter to *Economic Geology*:—

Sir,—Extra-lateral rights, to the dip, bounded by the production of the planes passing through the end lines, together with a claim of 1,500 ft. long by 600 ft. wide, existed in British Columbia, at least as far back as 1884—which was prior to any productive lode mining—and continued until April 23, 1892, when it was repealed and a rectangular claim 1,500 ft. by 1,500 ft. was substituted therefor with rights only within four vertical planes through the four sides. This Act of 1892, of course, did not invalidate any rights acquired prior to its passage.

These "old style claims" have proved a fruitful source of litigation and some important suits are still pending. With the vertical lines there can be no dispute except as to accuracy of survey, with occasional disputes as to identity and location of record posts, which troubles are incident to any style of location.

In making the change from 600 to 1,500 ft. wide, it was intended, by the extra width given, to about compensate the miner for the loss of the extra-lateral rights.

I have been all over British Columbia and have probably come in contact with a greater number of mining men, both operators, miners and prospectors, than anyone else and I have only found one man who even suggested a preference for the "extra-lateral rights" system.

This gentleman had lived the greater part of his life in California and is by profession a hydraulic placer miner, to which branch alone he has confined his attention in British Columbia.

This public endorsement of the vertical boundaries system is the more emphatic, inasmuch as the majority of our mining men are from the United States, or have had their experience there. They came with preconceived ideas and have been converted. The public in British Columbia is firmly fixed in its adherence to this principle.

Personally, from the standpoint of a disinterested observer, obliged to officially observe, I have not the slightest hesitancy in endorsing most emphatically vertical lines, in preference to extra-lateral rights—as giving a more secure title, freedom from litigation and the doing away with the crushing, through weight of expensive litigation, of the poor by the richer individuals or corporations.

WILLIAM F. ROBERTSON,
Provincial Mineralogist.

It is expected that an output averaging between 4,000 and 5,000 tons of ore per month will shortly be maintained at the Emma mine, Boundary district.

COMPANY MEETINGS AND REPORTS.

HASTINGS (BRITISH COLUMBIA) EXPLORATION SYNDICATE, LTD.

The ninth ordinary general meeting of the shareholders of the Hastings (British Columbia) Exploration Syndicate, Ltd., was held in London, England, on November 7 ulto. The Directors' Report, and Balance Sheet for the financial year ended May 31, 1906, were submitted as under:

The directors beg to submit the Eighth Statement of Accounts and Balance Sheet for the year ended May 31, 1906. Shareholders will find in the manager's advices an explanation of the short delay which has occurred on this occasion in the issue of the Annual Report.

The financial condition of the company shows: Cash on hand at bankers, London, and Nelson, British Columbia, £3,032. 7s 7d. The administration expenses for the year, in London and British Columbia are substantially the same as those for the previous twelve months, but the cost of development work at the mines during the same period has increased to the extent of £777. 17s. 1d., and this was incurred on the Arlington group.

The ore shipped to the smelters during the year under review realized £10,070. 5s. 8d. net, this compares with £10,099. 16s. net in 1905. The returns show an increased output, but owing to the lower grade of ore, the average value was nearly $5 per ton less than that for the preceding year, otherwise the result would have been more advantageous.

From the carefully compiled statements furnished by Mr. Leslie Hill, the company's local manager and consulting engineer in British Columbia, your directors have extracted the following from the advices of August 23, which they consider will be interesting to shareholders:

ARLINGTON MINE.

"During the year 1,470 ft. of development work was done at the Arlington mine, consisting of drifts 929 ft., cross-cuts 47 ft., winzes 44 ft., and raises 450 ft. Of this work 369 ft. was done on the 770 ft. north level, 14 ft. on the 500 ft. north level, 101 ft. on the Head Arlington adit, and 986 ft. on the No. 2 prospect adit. The total cost of this development work was $8,790.37, or an average cost of $5.98 per foot.

"The 770 ft. north level was continued for 224 ft., and the No. 2 prospect adit was driven 428 ft., and these levels were connected by two raises. The vein between the No. 2 prospect adit and the 770 ft. north level formed a sag or roll, and an intermediate level was driven from the second upraise 113 ft. north and 88 ft. south. The shoots of ore found on the 770 ft. north level continue to the intermediate level, and are from 2 to 6 in. thick, and occasionally thicker. In the south intermediate level the porphyry in the vein is distorted and irregular, and the ore uncertain. The north intermediate drift looked very promising, but the ore became broken up and irregular. It has now widened out and become more solid and regular, there being two seams, that next the hanging wall about 18 in., and that next the porphyry about 30 in. thick.

"Some small seams of ore were met with in the No. 2 prospect adit, but cross-cutting on these has failed to disclose any shoots of ore which can be stoped.

"The Head Arlington level was driven 62 ft., and cross-cuts aggregating 39 ft. were driven. The vein is entirely cut off by the fault plane, and all the ore disclosed has been stoped out.

"The track from the Head Arlington adit has been taken up and relaid in the old 365-ft. level. Some high grade ore was left in the workings on this level, and I propose to follow this up and take out all that will pay for stoping.

"A new ore-bin of three bents and with a capacity of 60 tons, together with a high trestle for dumping the waste, was built at the No. 2 prospect adit, and is now being used. The cribbing was built with a view to enlarging the ore-bin, and four more bents will be added this season, which will make the total capacity about 140 tons. All the ore below the 770-ft. level will be brought to this ore-bin.

"The ore shipped during the year was stoped chiefly from the ground below, or to the west of the 770-ft. north level. Some ore which had been left in the upper workings was also followed up and stoped out, and now practically all the ore above the 770-ft. level is stoped out.

"During the year 1,231.94 tons of ore were shipped to the Hall Mining and Smelting Company, at Nelson, which yielded net smelter returns amounting to $52,352.90, beside which the lead bounty amounting to $382.43, was paid by the Government, making the total receipts $52,735.33, or $42.81 per ton. The average value of the ore sent to the smelter was $4.94 per ton less than the average value of that shipped during the previous year.

"The cost per ton of ore shipped was as follows: Development, $7.14; stoping, $11.08; sorting and tramming, $4.56; timbering, $0.14; supplies, $2.61; general expenses, $2.34; total, $27.87.

"Altogether 1,370 mine-cars of ore were taken out and 12,327 mine-cars of waste put on the waste-dump. Adding the waste broken and used to fill up the stopes, the average would be 10 tons of waste to one ton of ore, which would make the average cost of the rock mined $2.53 per ton.

"The 770-ft north level has been driven to within a short distance of the boundary line of the Arlington claim. The No. 2 prospect adit is in the Directorate mineral claim, but if the ore continues it will be advisable to drive the 770-ft. north level into and through the ground of the Canadian King mineral claim, and to connect these levels in order to secure a supply of air. For this purpose I have obtained a lease of the latter claim for two years from July 1, 1906, at a royalty of 10 per cent., direct from the Canadian King Consolidated Mining Co.

"The ore body on the north intermediate drift has not been developed sufficiently to form an estimate of the amount of ore exposed, but if it continues to develop in length and width, and of equal thickness, the supply of ore for the coming winter is assured."

In a later letter Mr. Hill advises that the foreman at the mine had informed him the ore was still holding its own, and if anything improving, and says:

"I delayed sending you the Annual Report in order to be able to give fuller information in regard to the ore in the north intermediate drift, as the shipments this year will depend principally upon the development of this shoot."

Nothing has been done during the year on any other of the mineral properties owned by the company, but renewed activity is reported at the North Star mine, and there are rumors of a valuable discovery on the Stemwinder claim, both of which are adjacent to the company's properties in East Kootenay district, and any discoveries made by them are likely favourably to affect this company's holdings there.

BLAIRMORE COAL LANDS.

The payment of the second instalment of the purchase price of these properties, due to the Dominion Government of Canada, has been completed, and all interest paid up to April 1, 1906; these absorbed £915 of the company's funds. It will be necessary to provide a sum of about £1,300 for the third instalment, due in June, 1907, and a like amount for the final payment in 1908.

No satisfactory offers have been received for the properties, but your directors are taking further steps toward negotiations, which they trust will lead to a satisfactory result.

BALANCE SHEET AS AT MAY 31, 1906.

Dr.

	£	s.	d.	£	s.	d.
To Capital Account—						
Nominal. £100,000		0	0			
(100,000 shares of £1 each)						
Issued—						
60,375 shares of £1 each, fully called up				60,375	0	0
To sundry creditors in British Columbia				780	18	11
				£ 61,155	18	11

Cr.

	£	s.	d.	£.	3.	d.
By Purchase Account				3,500	0	0
By Property Account—						
Mining claims at East and West Kootenay, as per last Balance Sheet				10,481	6	3
By Blairmore Coal Lands (expenditure in respect of interest in).				5,103	6	2
By Plant, Machinery, Buildings, Live and Dead Stock.				9,623	2	5
By Sundry Debtors—British Columbia				278	1	7
By Cash at Bank, London (current account).	319	3	1			
Cash at Bank, British Columbia (deposit account)	2,191	12	4			
Cash at Bank, British Columbia (current account).	517	17	2			
Cash in hand, London.	3	15	0			
				3,032	7	7
By Expenditure—						
Balance brought forward from last Balance Sheet, May 31, 1905	23,338	16	5			
Expenditure (London) from June 1, 1905, to May 31, 1906, and (British Columbia) from May 1, 1905, to April 30, 1906:—						
London Office expenses. .	350	0	0			
Directors' fees as voted. .	500	0	0			
Audit fee, 1905 (London)	36	15	0			
Petty cash, stationery, cablegrams and legal expenses (London) . . .	69	7	2			
Income tax.	30	0	0			
Insurance, accident and fire (British Columbia)	160	10	2			
Government ore tax (British Columbia) . . .	184	9	9			
Salaries in British Columbia and Nelson Office expenses.	1,571	10	7			
General expenses (British Columbia) including £200 bonus to employees.	285	3	9			
Development Expenses—						
Fort Steele claims.	15	17	0			
Arlington group	6,575	9	7			
Head Arlington	148	14	2			
	33,266	13	7			
Deduct—Interest.	96	3	0			
	33,170	10	7			
Less Bullion account, proceeds of ore shipped to smelters . . 10,622	19	8				
Deduct Expenses. . . 664	5	3				
9,958	14	0				
Lead Bounty 111	11	8				
	10,070	5	8			
				23,100	4	11
Dividend of 1s. per share on 60,375 shares (March, 1902)	3,018	15	0			
Dividend of 1s. per share on 60,375 shares (March, 1905)	3,018	15	0			
				6,037	10	0
				£61,155	18	11

The chairman (Mr. James Head) in moving the adoption of the report and accounts, said:—

"The report and accounts show that we have won an increased output of ore over the previous year, though owing to its grade being somewhat lower, the net result of our earnings does not show an increase. It speaks highly for the direction of the operations at the mine that the production has been so continuous and unchecked since Mr. Leslie Hill assumed the management in British Columbia. Although in many cases the ore shoots (which as you know are very erratic) have become exhausted, Mr. Hill has never yet failed to report fresh discoveries to take their place and maintained the regular flow of ore to the smelter; and his report before you again indicates a change in the source of our supply. It is encouraging to note that there appear to be some signs of life in the company's properties in East Kootenay which have lain dormant so long, and should the reported strike in the Stemwinder prove true, it may have an important bearing upon the adjoining claims which you hold."

The report and accounts were adopted without discussion; the retiring director, Mr. G. L. Whately, was re-elected; the auditors were re-appointed, and the meeting closed with the customary vote of thanks to the chairman.

CASCADE (1906) POWER COMPANY, LTD.

The statutory meeting of shareholders of the Cascade (1906) Power Company, Ltd., was held in London, England, on November 17, ulto. Mr. F. Faithful Begg, chairman of the company, presided. He said:

"This is a statutory meeting of the company which, according to the Act of 1900, falls to be held within three months from the date at which the company is entitled to commence business. The only business obligatory in connection with this meeting is that a report be forwarded to each member of the company containing certain particulars. This has been done, and you will see from that report that altogether 52,262 shares have been allotted. Of these the debenture stockholders of the old Kettle River Power Company have received 49,755 shares as fully paid; 2,500 have been issued to the liquidator of the old company, with which he will settle with that company's creditors; and the remaining seven shares have been issued to the signatories to the memorandum of association, and have been paid for in cash. Since the report was printed we have received out of the funds which were in court to the credit of the Kettle River debenture holders' action, a sum of £3,000, which is, of course, working capital of this company, and we anticipate that after settling all the costs of the action and after paying the formation expenses of this company, there

will be some further amount to come to us."

After having explained the circumstances which had made the formation of the new company advisable, the chairman gave the meeting the following further information:

"The capital of this company has been fixed—£75,000 in shares and £75,000 in debenture stock. Of this about £50,000 in each class has been issued to the holders of the £100,000 debenture stock in the old company. The interest upon the debenture stock has been fixed at 4 per cent. The annual charge, including sinking fund, equals £3,200, beyond which amount the business will only have to provide for the expenses of management in British Columbia and London, and these we shall do our best to keep at the lowest figure consistent with efficiency. The remainder of the debenture stock and shares is reserved to provide further capital for the extension of the plant of the Cascade Company. * * *

'The present position of the business is as follows: The West Kootenay Power and Light Company, having failed to obtain legislative powers, is for the present debarred from doing business in our area. That company has, however, spent large sums in building pole lines throughout our district and in erecting a fresh plant at their central station, and has also made provisional contracts to supply our customers—contracts which, of course, at present they cannot proceed with. We must therefore, anticipate a keen fight in the Legislature next year. Meanwhile, however, our plant is fully employed, and we are hopeful that we shall be able to enter into contracts with our customers for the extension of the period of supply, thus putting ourselves in a position to compete successfully with our rivals. The directors, though, wish you to clearly understand that the situation is full of difficulty. Our policy is, and has been, to come to some arrangement with the West Kootenay Company, if that can be done on reasonable terms. Failing that we must fight for our existence. Contracts already entered into will probably be sufficient to enable us to pay our operating expenses for some years. The Cascade Water Power and Light Company was at the end of August—the largest accounts to hand are to that date—well supplied with funds for all current purposes, including the erection of pole lines and sub-stations for the purposes of a fresh contract recently obtained. If, then, we are obliged to fight and the West Kootenay Company succeed in taking up their provisional contracts with our customers, we shall have an available margin of power which can, if necessary be offered at a very small rate, and, in any event, our existence in the field will be a very material factor in influencing rates in the district.

"We have every confidence in Mr. Anderson, our manager at Cascade, and our plant has already proved itself most efficient under his charge."

LE ROI MINING COMPANY, LTD.

As supplementary to the annual reports and statements of accounts of the Le Roi Mining Company, Ltd., published last month in the MINING RECORD, the following condensed account of the proceedings at the meeting of shareholders of the company, held in London, England, on November 27, has been taken from the London *Mining Journal* of Dec. 1:

"The seventh ordinary general meeting of the shareholders of the Le Roi Mining Company, Ltd., was held on Tuesday, Mr. T. D. Grimke-Drayton, J. P., (chairman of the company) presiding.

"The secretary (Mr. Harold A. Wesson) having read the notice convening the meeting and the auditors' report,

"The chairman, in moving the adoption of the report, said that the present directors had only been in office since last December, when, as a result of the vote of the shareholders at the annual meeting, held on the eighth of that month, the late board retired from office and the present directors were called upon to take charge of the company's affairs. The discussion of the amalgamation for two or three months during the latter part of last year had interfered very much with the management of the company's business. Nevertheless, a profit of £37,138 was made in the year, after writing off £28,628 in respect of exploration and development, £18,163 on account of depreciation, and paying £3,727 for expenses incurred by reason of the proposed amalgamation, and £3,464 for taxes claimed by the Government of British Columbia during various years since July, 1900. During the year they spent a larger amount than for several years past on development work, and he was satisfied that the results had justified their action. In mines like theirs the principal thing was to keep their development up, so that there was plenty of ore in sight; in his opinion the failures in the past were largely the result of taking out ore in sight and not pushing development forward in a proper manner. Referring to his recent visit to the property, he stated that the mine was in very good order, and that there was far more ore in sight than at any previous time. It was clear to him that in the past there was bad management, chiefly owing to the constant changes and to the uncertainty as to policy. The mine was excellently equipped, and he was of opinion that there was far more ore in their property than had come out of it. His firm conviction was that they had done well to decide that Le Roi should stand alone. His opinion was that they should leave the capital as it was, that if at any time they should wish to extend the company's operations or the scope of their work, they should pay for what they wanted out of profits, and that they should go on pushing development as fast as possible, at the same time giving the Northport smelter a fair trial. If they did this, he was convinced that they would smelt at less than the Trail contract price, and would be doing their smelting at their own works and retaining a valuable property. The managing director, Mr. McMillan, had shown capital judgment in his selection of those who managed the company's property.

"Mr. G. W. Wilson seconded the motion, which was unanimously agreed to without discussion.

"Mr. A. J. McMillan, managing director, addressing the meeting, said that to him it was especially gratifying that the company had at last reached the point where they were able to pay a dividend. To this end he had been working since he became a director in July 1902, when their affairs were in a deplorable condition. At that time they owed their bankers £275,000, whereas they now did not owe them anything; the whole of the property was free and unencumbered, and, according to the last monthly return received from Rossland, they had over £100,000 of cash in the bank. A little more than two years ago he was strongly urged to come to London and recommend an assessment of 10s. a share, but, believing in the property, and recognizing that it was not so much the mine as the management which required attention, he vigorously opposed the scheme, and events had, he thought, shown the wisdom of the policy then pursued. Some of the shareholders might, perhaps, think that a dividend of 3½ per cent. was not very much for a mining company to pay, but they should remember that their capital was £1,000,000—a fact for which the present directors were in no way responsible. The amalgamation scheme was rejected by the shareholders last December, and the Trail smelter contract of last year having now been cancelled, the veil fell upon one of the most discreditable chapters in the history of British Columbia mining—a chapter which told of a deliberate attempt, carefully engineered from across the Atlantic, to put through this extraordinary 'deal' by trading upon the presumed ignorance of some of those in authority and of the British owners of the Le Roi mine. Nothing that had happened in recent years had done so much to shake the confidence of British investors in the *bona fides* of the proposals submitted to them relating to British Columbia mining; and one could only hope that for the sake of the reputation of Canada, if for no other reason, it might be long before a similar chapter was written. On the whole, he thought that

the shareholders might look forward to the future with confidence.

"Mr. Bedford said he thought they were very fortunate in finding a man with the grit Mr. McMillan had in him. He was sure the best thanks of the meeting were due to him, and he hoped they would show their appreciation of Mr. McMillan in a very hearty manner. (Applause.)

"The chairman seconded the motion, which was carried unanimously.

Mr. T. D. Grimke-Drayton was re-elected a director, and the auditors, both in London and British Columbia were re-appointed.

Before the proceedings terminated Mr. Wilson moved: "That the thanks of this meeting be given to the staff in British Columbia and London." He remarked that he was sure they would all appreciate that a good deal of the company's success was due to the intelligent work those gentlemen gave to its affairs. When he was in Rossland some eighteen months ago he made the acquaintance of all their principal men, and he could say, without hesitation, as the chairman had done, that they all impressed him most favourably. Consequently it was with the greatest personal confidence that he could recommend this resolution for the acceptance of the meeting. (Applause.)

The vote was unanimously accorded.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Cariboo Consolidated.—During the entire month of November washed 1,150 cu. yd. of gravel, yielding 275 oz. of gold.

Le Roi.—November: Shipments amount to 8,100 tons, containing 2,300 oz. gold, 3,100 oz. silver, 147,000 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation and repairs Northport smelter, $1,000. Expenditure on development work during the month $10,750. Owing to coal shortage on railway, mine closed down 10 days during the month. (Office note—As mentioned at the recent annual meeting, owing to the strike at the Crow's Nest Collieries, the railway company has been short of fuel, and so unable to furnish us with sufficient cars to take ore to the smelter—hence the reduced shipments. The strike is now at an end.)

Le Roi No. 2.—Mine manager cables: "Have struck ore at 700-ft. level, which assays 2.32 oz. gold, 7.80 per cent. copper; 10 in.; 50 ft. to the west of porphyry dyke might be downward extension of No. 20 stope. Impossible at present to form any reliable judgment."

In a later cable the manager advised: "With reference to 700-ft. level, the dimensions of the ore body are 81 ft. long by 1 ft. 2 in. wide. Average assay of ore is 0.55 oz. gold, 6 per cent copper. About 1 ft. 6 in. additional scattered. Still continues."

Tyee.—November: Smelter ran 12 days, and smelted: Tyee ore, 2,059 tons; custom ore, 228 tons; total, 2,287 tons. Matte produced from same, 159 tons. Gross value of contents (copper, silver, and gold), after deducting costs of refining and purchase of custom ore, $29,279.

U. S. A.

Alaska Mexican.—November: 120-stamp mill ran 30½ days; crushed 22,080 tons ore; estimated realizable value of bullion, $38,517. Saved 386 tons sulphurets; estimated realizable value, $32,308. Working expenses, $41,947.

Alaska Treadwell.—November: 240-stamp mill ran 30½ days, 300-stamp mill ran 29½ days; crushed 82,488 tons ore; estimated realizable value of bullion, $91,698. Saved 1,645 tons sulphurets; estimated realizable value $80,892. Working expenses, $83,734.

Alaska United.—November: Ready Bullion claim, 120-stamp mill ran 30½ days; crushed 20,850 tons ore; estimated realizable value of bullion, $23,372. Saved 305 tons sulphurets; estimated realizable value, $10,919. Working expenses, $32,186.

DIVIDENDS.

On December 4 the directors of the Granby Consolidated Mining, Smelting and Power Company, Ltd., declared a dividend of three per cent. upon the par value of the stock outstanding, out of the net earnings of the company, payable December 31, 1906, to all stockholders of record at the close of business on December 12. This is the Granby Company's fifth dividend and brings its total of distributed profits up to $1,753,630.

On December 12 the directors of the International Coal and Coke Company, Ltd., declared a dividend (the first) of one per cent. upon the par value ($2,800,000) of the company's issued and outstanding stock, payable February 2, to all stockholders registered at close of business on January 15. The amount to be divided is $28,000.

The customary quarterly dividend of two-and-one-half per cent., being at the rate of 10 per cent. per annum, has been declared by the directors of the Crow's Nest Pass Coal Company, Ltd., payable on January 3, 1907. The total of dividends paid by this company to date, including that mentioned above, is about $1,843,500.

NOTES.

The registered office in England of the Snowshoe Gold and Copper Mines, Ltd., and the British Columbia (Rossland and Slocan) Syndicate, Ltd., has been removed from 7 Poultrey, London, E. C., to 717 Salisbury House, London Wall, London, E. C.

The appointment has been gazetted of Charles Robert Hamilton, of Rossland, B. C., barrister, as attorney of the Snowshoe Gold and Copper Mines, Ltd., in the place of Anthony John McMillan, whose appointment has been revoked.

John Edgar McAllister, resident manager of the company, at Greenwood, B. C., has been appointed attorney of the British Columbia Copper Company, Ltd., in the place of Frederic Keffer, the appointment of whom has been revoked.

Three months after December 5, inst., the Black-Mackay Mining Company, Ltd., will apply for an order-in-council, changing its name to the Cambrian Mining Company, Ltd. This company was incorporated with the object of tunnelling under Moyie Lake, East Kootenay, to intersect and mine ore from the extension of the St. Eugene lead-silver lodes believed to pass under that lake.

The directors and officers of the Nicola Valley Coal and Coke Company, Ltd., incorporated last month with an authorized capital of $1,500,000 in 15,000 shares of $100 each, are as follows: President, John Hendry; vice-president, W. H. Armstrong, secretary, J. J. Plomer (of Clarkson, Cross & Helliwell), managing director, F. H. Lantz; R. P. McLennan, F. R. Stewart, Jonathan Rogers, and Dr. L. N. McKechnie. Alexander Faulds, M. E., is mine superintendent, and S. J. Castleman, general agent. The company has acquired from the old Nicola Valley Coal and Iron Company its property, consisting of 2,661 acres of coal lands on Coal Creek and Coldwater River, Nicola district, and has commenced development work on the former. Coal of excellent quality is being mined, and the installation of plant and machinery will be proceeded with as expeditiously as shall be found practicable.

The Steger Canadian Sand-Lime Brick Company, which is about to begin operations, met in Vancouver on November 30, and elected five directors as follows: I. A. Russell, E. W. Maclean, J. F. Maguire, James Amess, C. P. Shindler. It is understood that more directors will be elected if it shall later be deemed advisable. The following office-bearers, etc., were appointed: J. A. Russell, president; E. W. Maclean, vice-president; J. F. Maguire, secretary-treasurer; Northern

Bank, bankers; John Kendall, auditor; Russell, Russell & Pottenger, solicitors. The contract agreed to and signed by Colonel Dickey, of Vancouver, and Colonel Steger, patentee of the process, was read and adopted. By this contract Colonel Dickey secures the rights of manufacture for the West, on behalf of the company.

CERTIFICATES OF INCORPORATION.

Chemainus Copper Mine Company, Ltd., with a capital of £200,000, divided into 200,000 shares of £1 each. Among the objects for which this company has been incorporated are the following: To purchase or otherwise acquire the mineral claims known as the Victoria Mine Group, comprising the Queen Victoria, King George, Duke and Duchess, with a total acreage of 228.91 acres. Also two fractional claims named the Princess and the Countess, containing 13.05 acres, and all of which are situated in Bright district, Vancouver Island. And also all water rights appurtaining thereto, and to pay for the same partly in cash and partly in fully paid up shares of the company.

Old Dominion Copper Development Syndicate, Ltd., with a capital of $35,000, divided into 35,000 shares of $1 each. Included in the objects for which this company has been incorporated are the following: In particular to purchase, lease or otherwise acquire and work, develop, lease, sell or otherwise dispose of or turn to account the Old Dominion, Esperanza, and Globe mineral claims, situate on Coal Hill, six miles southwest of Kamloops, Yale district, British Columbia, and to pay for the same either in money or fully paid-up shares of the company, or partly in money and partly in fully paid-up shares of the company.

United Empire Company, Ltd., with a capital of $500,000, divided into 500,000 shares of $1 each. This company has been incorporated to acquire the properties of the United Empire Company (Foreign), situate at or near Princeton, Similkameen, British Columbia, and for other stated purposes.

Bay Gold Mining Company, Ltd., with a capital of $200,000, divided into 200,000 shares of $1 each. Objects, to purchase the Bay fractional mineral claim, situate in Osoyoos mining division of Yale district, British Columbia, and for other mining purposes.

REGISTRATION OF EXTRA-PROVINCIAL COMPANY.

Copper Cliff Mining Company.—Head office at Seattle, Washington, U. S. A. Capital, $10,000, divided into 10,000 shares of $1 each. Head office in British Columbia at Heriot Bay. Attorney (not empowered to issue and transfer stock) C. W. Carter, secretary, Heriot Bay.

COMPANIES REGISTERED IN ENGLAND.

Canadian Northern Exploration Company, Ltd.—Registered November 21, by Parker & Richardson, 52 New Broad Street, E. C. Capital £10,000, in £1 shares. Objects: To adopt an agreement with the Rt. Hon. Viscount Templetown and J. A. MacDonald, for the acquisition of certain options and rights; to acquire, deal with, and turn to account any leases, concessions, mines, lands, and claims in Canada, the United States of America, and elsewhere; to carry on business as prospectors and explorers, etc. No initial public issue. The first directors are not named. Remuneration, £100 each per annum and 5 per cent. of the distributed profits in excess of 10 per cent. on the shares, divisible. Registered office: Clock House, Arundel Street, W. C, London.

London & Canadian Land Corporation, Ltd.—Registered December 4, by Wilson, Bristow & Carpmael, 1 Copthall Buildings, E. C. Capital £300,000, in £1 shares. Objects: To acquire any lands, buildings, and other immovable property in Canada or elsewhere; to adopt an agreement with the North British & Canadian Land Company, Ltd., and to carry on the business of land and property owners and dealers, concessionnaires, financiers, mine owners, etc. Minimum cash subscription, one-half the shares offered to the public. The first directors (to number not less than three nor more than nine) are G. D. Link, Major G. T. C. Paget, W. Emden, J.P., W. F. Robinson, J. D. Forbes, and W. T. Pressland. Qualification, £250. Remuneration (except any managing directors), £700 per annum, divisible.

SAFETY BLASTING FUSE.

Mussens Limited, formerly W. H. C. Mussen & Co., of Montreal, Quebec, sellers of railway, mining, and contractors' machinery and supplies, has been sending to its numerous patrons and other probable customers for this article a sample of White Jacket safety blasting fuse, made by Bickford, Smith & Co., Ltd., the original manufacturers of safety blasting fuse which was invented in 1836 by the late William Bickford of Cornwall, England. The accompanying printed matter sets forth that White Jacket fuse is the latest production of Bickford, Smith & Co., Ltd., successors to William Bickford. It takes the place of Blue Jacket fuse, which was introduced into South Africa and Australia four years ago, and into Canada quite recently.

The blasting fuse, which is ordinarily used all through the Dominion of Canada at the present time, is white countered gutta percha. One of the properties of gutta percha is that, on keeping for several months, it perishes and owing to this property, it has always been necessary to be sure that gutta percha fuse was fresh from the factory, or at any rate not more than six months old, in order that it might be perfectly safe in wet ground. If the gutta percha has perished in any way, the fuse is very likely to crack and let damp into the powder, which would prevent the fuse burning through, to the end, and probably cause one of those misfires, which frequently lead to serious loss of life.

In the White Jacket fuse the water-prooling is put on twice with a special black varnish, the composition of which is the property of Bickford, Smith & Co., and which no one else has yet been able to successfully copy.

As stated on the sample envelope, White Jacket fuse will stand 24 hours' immersion in water, and this is far more than is ever required in practice.

Instead of having to be used as soon as possible after leaving the factory, it can be kept for one or two years without in any way deteriorating. This is of great importance in the case of a commodity like fuse, which is held in stock by dealers in different parts of the country, making it almost impossible for the user to tell how long it is since it was manufactured.

Besides these special qualities, the burning speed of the fuse is very regular, and is guaranteed to vary less than 10 per cent. on either side of the standard. It also stands rough handling and rapid changes of climate and temperature better than fuse which has been on the market in Canada before.

The finding of tin ore in place is reported this month from a locality near New Ross, Lunenburg county, Nova Scotia. The ore is said to occur in a small vein intrusive in the granite.

The record for provincial mining charters of incorporation in Ontario was broken during the week ended December 16. The list contained 24 companies, mostly Cobalt organizations, with an aggregate capitalization of $30,840,000.

MINING MEN AND AFFAIRS.

Chester F. Lee, of Seattle, has gone to Juneau in connection with Alaska-Perseverance matters for London clients.

John Hopp of Cariboo, who is spending part of the winter on the Coast, has been in Victoria several times lately.

Robert A. Kinzie, superintendent of the Treadwell gold mine, southeast Alaska, was in Seattle recently.

J. A. Whittier, manager of the Goodenough Company's mines in Slocan district, has gone to California for the winter.

James Cronin, formerly manager of the several mines of the Consolidated Mining and Smelting Company of Canada, recently spent a few days in Victoria.

G. G. S. Lindsey, general manager of the Crow's Nest Pass Coal Company, Ltd., has been called to Victoria, where his son lay ill with typhoid fever.

R. Gilman Brown, of San Francisco, who is consulting engineer for the Ymir Mines, Ltd., sailed from New York for London on December 8.

Eugene Coste of Toronto, Ontario, is superintending oil well boring operations at Langham on the Saskatchewan River, northwestern Canada.

A. G. Larson of Rossland, superintendent of the Le Roi mine, has been visiting the big copper mines and smelters in the Boundary district.

P. J. Dermody, who has been superintendent of the Providence mine, Greenwood, Boundary district, for three years, has resigned that position.

J. C. Haas of Spokane, Washington, U.S.A., who has the supervision of development work at the Golconda mine, Boundary district, has gone East for six weeks.

H. C. Bellinger has resigned the management of the Britannia Smelting Company's smelting works at Crofton, Vancouver Island, and has been succeeded by S. S. Raymond.

Robt. H. Anderson, superintendent of the Sullivan Group Company's lead-silver mine in East Kootenay, has had one of his hands injured in an accident on the Great Northern Railway.

E. M. Sandilands, long associated with the business affairs of a number of Slocan mines, who is leaving Sandon for Calgary, Alberta, has been given a valedictory banquet by residents at Sandon and other Slocan friends.

O. E. S. Whiteside, manager of the West Canadian Collieries, Ltd., which company owns several coal mines in the Blairmork-Frank district, southwest Alberta, has returned to Blairmore from an extended business trip in the East.

Lewis Stockett of Banff, Alberta, manager of the Pacific Coal Company's Bankhead colliery, spent Christmas at Nanaimo, Vancouver Island, with his brother, T. R. Stockett, Jun., manager of the Western Fuel Company.

M. D. McIntosh, for two years a shift boss at the mines of the Le Roi No. 2 at Rossland, has been appointed mine superintendent at the British Columbia Copper Company's Mother Lode mine, Boundary district, in succession to S. C. Holman, who has resigned.

The issue of certificates of efficiency to A. Harry Hook, Arthur D. Miles, Curt A. Schroeder and B. A. Stimmel, who

last April passed the examination of assayers under the "Bureau of Mines Act Amendment Act, 1899," has been gazetted.

Norman Carmichael, formerly of Nelson, British Columbia, and for some time past in charge of the Arizona Copper Company's mines at Morenci, Arizona, has been appointed general manager of that company with headquarters at Clifton.

N. O. Lawton, formerly mining in Michigan, and later in Newfoundland, has been appointed manager of the mines in northern British Columbia and southwest Alaska, of the Brown-Alaska Company of New York, in place of J. L. Parker.

J. E. McAllister, manager for the British Columbia Copper Company, is in New York for expert medical advice, illness preventing him from carrying out his duties. In his absence G. F. Beardsley, of West Somers, Westchester County, N. Y., is in charge of the company's smelting works at Greenwood, Boundary District.

Examinations of applicants for certificates for the various grades of mine overmen were held at Frank, Alberta, late in November. Provincial coal mine inspector N. Fraser, superintendent C. E. Emmerson of the Bellevue mine, and J. Dunlop, sat as the examining board. There were 16 applicants for certificates, among them being Charlton Dixon, manager for the Canada West Company, operating at Taber.

C. H. Unversagt of New York, notorious for the publication of glowing word pictures relative to the alleged gold mining venture known as the Great Cariboo Gold Mining Company, also as the Lightning Creek Gold Gravels Drainage Company, was in Cariboo this month. S. Keast, local superintendent on Lightning Creek, accompanied Mr. Unversagt to the Coast on the latter's return journey to New York.

The miners and others employed at the British Columbia Copper Company's Mother Lode mine in Deadwood camp, Boundary district, presented S. C. Holman with a valuable gold watch, chain and fob, costing about $275, upon his retirement from the position of mine superintendent, under Frederic Keffer, engineer. Mr. Holman has found it necessary, for health reasons, to give up mining for a time, so has decided to try ranch life.

TRADE NOTES AND CATALOGUES.

From the Canadian Westinghouse Company, Ltd., of Hamilton, Ontario, has been received its Circular No. 1139, Starting and Field Rheostats, with descriptions and half-tone illustrations of a variety of electric apparatus in this connection. An illustrated booklet on Westinghouse Type C Integrating Wattmeters, with lists of standard forms, capacities, and prices, also came from the same manufacturers.

The Canadian Rand Drill Company of Montreal, Quebec, has issued a folder describing and illustrating its "Imperial" Motor Hoist, which consists of one of the company's high-pressure three-cylinder motors geared to a hoisting drum provided with lifting rope and hook. These hoists, which are especially suitable for places where head room is limited, are built in capacities from 1,000 to 10,000 lb.

A director of the Canadian General Electric Company and the Canada Foundry Company, of Toronto, Ontario, is reported in the press to have stated that the week ending December 15 was the banner week in the history of these companies, as contracts for upwards of $900,000 of miscellaneous machinery and supplies were secured during that week. These included locomotives, steam shovels, bridges, large electric generators and electric railway motors, etc., to be shipped when completed to nearly every section of the Dominion.

It is estimated that a deposit of iron ore near Port Arthur, Ontario, contains 200,000,000 tons.

COAL MINING NOTES.

The West Canadian Collieries, Ltd., of Blairmore, is stated to have purchased the Mutz and Scott coal lands, lying between Blairmore and Coleman, southwest Alberta, and which the old owners had announced their intention of working.

The installation of a new tipple and other coal-handling plant at the colliery of the Canadian-American Coal and Coke Company at Frank, southwest Alberta, having been completed and provision thereby made for an increased output of coal, a cross-cut is being driven from the main haulage way of the present workings with the object of cutting an 8-ft. seam of coal occuring about 100 ft. west of that now being worked. This cross-cut has been started at a point about 4,500 ft. in from the portal, so as to admit of coal being mined in both directions from where the new seam shall be entered.

The Hillcrest Coal Company, operating in the Blairmore-Frank district, has substituted a small steam locomotive for mule haulage for hauling the larry cars to the incline.

The Alberta Coal Company, in which A. C. Flumerfelt of Victoria is largely interested, is opening up a promising coal property situated near Lundbreck, Alberta. H. N. Galer (who is also manager of the International Coal and Coke Company with coal mines and coke ovens at Coleman, Alberta), is manager, and he has placed David Davis, formerly of Frank, in charge of the development work. The coal is described as being lignite of excellent quality and a market for it is being found at Spokane, Washington. Tunnels are being driven on seams Nos. 1 and 2, the former showing about 8 ft. of coal.

The Pacific Coal Company's main tunnel and parallel air tunnel at Hosmer are now in 400 ft. and a cross-cut has been started about 250 ft. from the entrance. Three machine drills are in use and progress is being made at the rate of about 150 ft. per month. The tram-line grade has been extended to some 600 ft. from the tunnel entrance. The company is employing about 100 men on the property, which is in the Crow's Nest Pass, between Fernie and Michel.

The Canada West Company, operating at Tabor, Alberta, is putting in the foundations for a steel tipple and for engines. It is reported to be employing some 300 men and mining about 700 tons of coal per day.

The Reliance Coal Mining Company, says an exchange, whose plant is situated 70 miles west of Medicine Hat, Alberta, has discovered a bed of fire clay 17 ft. thick, lying just above a 4-ft. seam of coal it is working.

The Nicola Valley Coal and Coke Company is opening an 18-ft. seam of bituminous coal on its Coal Creek property, Nicola Valley. The coal has been used in the contractors' locomotives running on the new railway from Spence's Bridge to Nicola, and has been found of excellent quality for railway purposes.

The Diamond Vale Coal and Iron Company is arranging to erect necessary mine buildings at the Forks, Nicola Valley, and to sink two shafts. Boring with the diamond drill has proved the occurrence of coal of good quality in considerable quantity, so development work is to be proceeded with as expeditiously as is practicable.

A brief review of the production in 1906 of the Wellington Colliery Company and the Western Fuel Company, both operating on Vancouver Island, and of the Crow's Nest Pass Coal Company, will be found elsewhere in this issue.

In connection with the world's production of copper during the past twenty-five years, it is stated that in 1880 the principal producing countries were Chili, Spain and Portugal, United States, Australia, and Japan. In 1905 they were United States, Mexico, Spain and Portugal, Australia, and Japan, the United States producing 44 per cent. of the world's copper supply. In 1880 Chili produced 28 per cent., and in 1905 only 4 per cent. of the world's supply.

COAL MINES REGULATION ACT.

Boards of Examiners.

NOTICE is hereby given that the following constitute the Boards of Examiners for the various Collieries during the year 1907:—

CUMBERLAND COLLIERY.

Appointed by the Owners—Charles Matthews.

Alternates—David Walker,
David Nellist.

Appointed by the Lieut.-Governor in Council—John Kesley.
Elected by the Miners—Thomas Ripley.

Alternates—Joseph W. Horbury,
Daniel Stewart.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. John Kesley, of Cumberland, B. C.

EXTENSION COLLIERY.

Appointed by the Owners—James Sharp.

Alternates—Alex. Bryden,
Alex. Shaw.

Appointed by the Lieut.-Governor in Council—W. G. Simpson.
Elected by the Miners—Thomas Doherty.

Alternates—William Anderson,
Benjamin Berto.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. W. G. Simpson, of Ladysmith, B. C.

NANAIMO COLLIERY.

Appointed by the Owners—Thomas Mills.

Alternates—George Wilkinson,
Charles Graham.

Appointed by the Lieut.-Governor in Council—Thomas Budge.
Elected by the Miners—John Carr.

Alternates—Thomas P. Piper,
George Moore.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. Thomas Budge, of Nanaimo, B. C.

MICHEL COLLIERY.

Appointed by the Owners—Robert Strachan.

Alternates—John John,
James Derbyshire.

Appointed by the Lieut.-Governor in Council—Evan Evans.
Elected by the Miners—Sidney Birt.

Alternates—Joseph Thomas,
John Laurenson.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. Evan Evans, of Michel, B. C.

COAL CREEK COLLIERY.

Appointed by the Owners—David Martin.

Alternates—John Hunt,
Henry Miard

Appointed by the Lieut.-Governor in Council—John McCliment.
Elected by the Miners—W. H. Moore.

Alternates—Charles Webber,
Abraham Brown.

All persons interested may obtain full information by applying to the Secretary of the Board, Mr. John McCliment, of Fernie, B. C.

Note.—Alternates act as Members of the Board in the absence of those regularly appointed or elected to act thereon.

Dated this 20th day of December, 1906.

RICHARD McBRIDE,
Minister of Mines.