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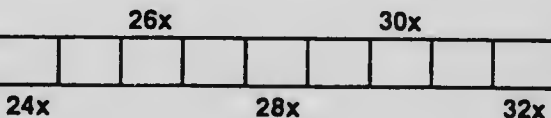
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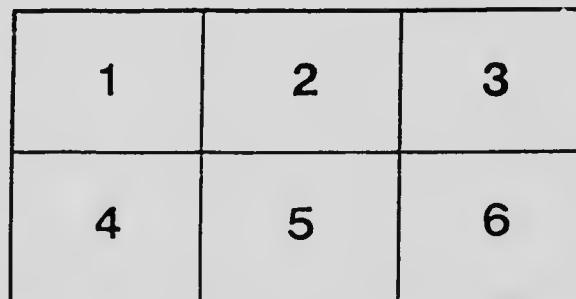
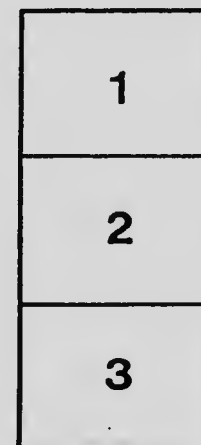
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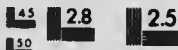
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PRELIMINARY REVIEW AND ESTIMATE

—OF—

MINERAL PRODUCTION FOR YEAR 1910.

—BY—

WM. FELT ROBERTSON,
Provincial Mineralogist.

TO THE HON. RICHARD MCBRIDE,
MINISTER OF MINES,
BRITISH COLUMBIA.

SIR,—With your kindly expressed approval, I beg to submit herewith a preliminary estimate of the mineral production of the Province for the year 1910, together with some notes on the progress of the mining and metallurgical industries during the year just closed; the information herein presented is, of course, subject to revision.

The object of this preliminary estimate and review is to give, as promptly as possible after the close of the year, an approximate statement of the condition of the mining interests, without waiting until the official returns from the mines have been received, and without the delay that of necessity must take place in carefully preparing the detailed information given each year in the Annual Report of the Minister of Mines.

I have the honour to be,

Sir,

Your obedient servant,

WILLIAM FLEET ROBERTS,
Provincial Engineer.

Bureau of Mines, Victoria, B. C.,
January 2nd, 1911.



PRELIMINARY REVIEW AND ESTIMATE

—OF—

MINERAL PRODUCTION FOR THE YEAR 1910.

—:0:—

In presenting this bulletin so soon after the close of the year and before the customary official returns of production have been received from the mines, the best that can be done is an approximate estimate, from sources available, of the mineral output made during the year 1910.

This bulletin must consequently be regarded as only what it purports to be—namely, a preliminary review of the mining operations with an approximate estimate of mineral production and some notes concerning the outlook for the year now entered upon.

A RECORD YEAR IN MINERAL PRODUCTION.

The accompanying table shows an estimated mineral production in the Province during 1910 of a total value of \$26,183,505. If the revised returns shall prove this estimate to be approximately correct, as is believed they will do, the total for the year will be the highest yet recorded in the history of mining in British Columbia, for it will compare favourably with that for 1907, which, at \$25,882,560, has been the largest yearly total on record.

It is of interest to note that this Province continues to maintain its average proportion of the mineral production of that of the whole of Canada. Placing the aggregate value of the production of the Dominion for the twenty-five years 1886-1910, included in the published official records, at \$1,120,000,000 (which allows about \$95,000,000 for 1910), it would appear that British Columbia may fairly claim to have produced between 27 and 28 per cent. of this large sum. The aggregate value of the mineral production of this Province for all years to 1910, inclusive, is nearly \$374,000,000. Deducting the total value of the minerals—chiefly for coal and placer gold—produced prior to 1886, which was nearly \$64,000,000, British Columbia's approximate aggregate for the twenty-five years is left at \$310,000,000, which is between 27 and 28 per cent. of that of the whole of Canada. It is a striking fact, as indicating the substantial increase in the value of the mineral production of the Province in recent years as compared with that prior to 1906, that fully 40 per cent. of this large value is the production of the last five years, 1906-1910, while more than half—53.7 per cent.—is that of seven years, 1904-1910.

MINERAL PRODUCTION FOR TWO YEARS, 1909-1910.

The following table shows the quantities and value of the several minerals produced in the year 1909, and the estimated production in 1910. It may here be explained that the prices used in calculating the estimated value for 1910 of silver, lead, copper, and zinc are the average prices for eleven months, to

the end of last November, as published in the *New York Engineering and Mining Journal*, less a deduction of 5 per cent. off for silver, 10 per cent. off for lead, and 15 per cent. off for zinc:—

	1909		1910		Increase.	Decrease.
	Quantity.	Value.	Quantity.	Value.		
Gold, placer..... oz.		\$ 477,000		\$ 482,000	\$ 5,000	
" lode..... "	238,224	4,024,000	251,500	5,198,505	274,415	
Total gold.....		\$ 5,401,000		\$ 5,680,505	\$ 279,415	
Silver.....oz.	2,532,742	\$ 1,230,270	2,500,000	1,282,500	43,230	
Lead.....lb.	44,306,316	1,709,250	57,000,000	1,180,000		\$ 220,250
Copper..... "	45,597,245	5,918,522	39,000,000	4,972,500		946,022
Zinc..... "		400,000	4,000,000	184,000		216,000
Total metalliferous.....		\$14,668,141		\$13,509,505	\$ 322,645	\$ 1,391,281
Coal.....tons, 2,240 lb.	2,006,478	7,022,606	2,800,000	9,800,000	2,777,334	
Coke..... "	258,703	1,552,213	214,000	1,284,000		268,213
Building materials, etc....		1,200,000		1,500,000	300,000	
Total value of production....		\$24,443,025		\$26,183,505	\$ 3,309,979	\$ 1,659,499
			Net increase for year....		1,740,480	

Summary:—

Net increase in coal and coke\$2,509,116
 " " " building materials, etc 800,000

\$2,809,116

Net decrease in metalliferous minerals 1,068,636

Net increase in year's production\$1,740,480

A comparison of the quantities of minerals produced in the respective years, as exhibited in the foregoing table, will serve to show that there appear to have been serious decreases in the production of lead, copper, and zinc, but these were more than compensated for in the unprecedented increase in that of coal. Never before in the history of coal-mining in the Province has there been so large an increase made in a single year, the two nearest annual increases having been that of 350,000 tons in 1891 as compared with 1890, and of 323,000 tons in 1909 as compared with 1908. Last year's increase in net production of coal over that of 1909 is, however, greater than that of the two largest increases previously on record added together, or 794,000 tons in this one year as against 678,000 tons in those two years. The decreases in the several metalliferous minerals will be commented upon under their respective separate heads.

PRODUCTION OF SEPARATE MINERALS BRIEFLY REVIEWED.

While it is not intended to endeavour to explain at length the reasons for the several increases and decreases in production, it is, perhaps, desirable to suggest briefly some of the causes that led to the changes that appear to have marked the results of last year's operations as compared with those of the year immediately preceding. Some comments concerning the several minerals are, therefore, submitted.

Gold.

There appears to have been an increased production of both placer and lode gold, the estimate showing a total value higher by nearly \$280,000 than that of 1909. It is, however, \$270,000 less than that of 1908.

Placer Gold.—While a net increase of \$5,000 in value is credited to placer gold, the estimated gain comes from the Athlfield only, which is believed to have recovered about \$60,000 more than in 1909. Against this there seems to have been a loss of \$3,000 in other parts of Cassiar District, which makes the net increase for Cassiar District \$57,000. On the other hand, Cariboo District shows an estimated decrease of \$45,000, chiefly in the amount recovered from mines about Barkerville. There was not sufficient water available for cleaning up the sluices late in the season, consequently the quantity of gold recovered at hydraulic mines in the Barkerville portion of the Cariboo District was less than it would have been had water-supply conditions been as favourable as on the Athlfield creeks. The outlook for an enlarged production in Cariboo District in 1911 is thought, however, to be favourable, for reasons that will be given later. Beside the comparatively large decrease in the neighbourhood of Barkerville, there were small deficiencies in both Quesnel and Omineca Divisions, East Kootenay, Revelstoke, and Trout Lake Divisions of West Kootenay, Lillooet, and Clinton, and the Boundary, are all estimated to have made a decreased production in 1910.

Lode Gold.—It is believed that, with the single exception of the year 1903, the quantity of lode gold produced in 1910 is the largest on record in the Province. There is still a possibility that the yield of the former year has been exceeded, but until the revised returns shall be received this will remain uncertain. The difference between the two years is only a little more than 4,000 oz., so the margin is small, considering that several mining companies producing lode gold were not heard from in time to obtain a fairly accurate idea of their production of the metal.

Rossland mines contributed nearly 120,000 oz. of the total (estimated at 251,500 oz.), and rather more than two-thirds of that quantity came from the *Centre Star* group. The proportion from the *Le Roi* was about 9,500 oz., while nearly all the remainder came from the mines of *Le Roi No. 2, Ltd.*, the total from the smaller mines having been only about 1,000 oz. Boundary District mines are estimated to have yielded nearly 77,000 oz., of which about 44,500 oz. came from the Grauby Co.'s mines, nearly 22,500 oz. from those of the British Columbia Copper Co., and practically all the rest from the Consolidated Co.'s mines, chiefly from the *Snowshoe*. The *Nickel Plate* mines, near Hedley, are credited with more than 24,000 fine ounces. Next comes the

production of Nelson Mining Division, with a total in excess of 24,000 oz., of which about one-third was contributed by the *Queen* mine, on Sheep creek, and the remainder by the *Nugget* (Sheep creek), *Yankee Girl* (Ymir), *Second Relief* and *Arlington* (Erle), and *Granite-Powwow* (Nelson), in proportions varying from 2,300 up to 4,000 oz. The only other district worthy of mention in this connection is that of the Coast, the total of lode gold from which is estimated at about 5,000 oz., the greater part of which was from gold-copper mines on Texada Island. Although produced some lode gold, which was the first noticeable quantity from that division, Mines in the Lardeau were credited with a total yield for the year of about 500 oz., which is far short of what should come from the many promising mineral claims scattered over the big area contained in the Trout Lake and Lardeau Mining Divisions.

Silver.

The quantity of silver produced in 1910 was a little less than in 1900, the estimate showing a decrease of nearly 33,000 oz., but, as the average price for the year was higher, the metal has been credited with an increase in value of rather more than \$43,000.

Decreases in East Kootenay, Alnsworth, and the Lardeau are estimated to have totalled about 340,000 oz., but the increase from Slovan mines, together with some assistance from the Coast District, nearly offsets this loss. In East Kootenay there was a decrease of nearly 200,000 oz. in the yield of the *St. Eugene* mine, but the production from the *Sullivan* mine, which was idle in 1900, of about 172,000 oz., made good the greater part of the *St. Eugene* shortage. In Alnsworth Division the larger decreases in production were about 53,000 from the *Blue Bell* mine, which was idle nine months, and more than 200,000 oz. from the *Whitewater* group, consequent upon the destruction by fire last summer of the *Whitewater* concentrating-mill. Forest fire did so much damage to the Kaslo & Slovan railway that, without transportation facilities, the mines between McGulgan and Kaslo lost the best part of the season, which unfavourably affected the production of silver, lead, and zinc. However, the larger production of silver at mines near Silverton—the *Standard*, *Hewitt-Lorna Doone* group, and *Van Rot*—made the Slovan District as a whole appear to greater advantage in the production figures than would otherwise have been the case.

Lead.

Some of the same causes that unfavourably affected the production of silver militated against that of lead, only in much larger degree. The estimated production of lead in 1910 was nearly 7,400,000 lbs. less than the quantity on official record as having been produced in 1900. Alnsworth Mining Division was largely responsible for this loss, both the *Blue Bell* and *Whitewater* group mines having produced much less lead in 1910. The greatest falling-off was in the production of the *St. Eugene* mine, East Kootenay, but the *Sullivan's* production went against that loss, so that the net decrease of the district was reduced to about 2,500,000 lbs. There were a number of smaller decreases in East Kootenay, Alnsworth, and Slovan. Among the increases were the *Standard* mine, near Silverton, Slovan, about 1,500,000 lbs.; the *Emerald*, at Salmon, Nelson Mining Division, about 450,000 lbs.; and some smaller gains.

Summarising the causes for the considerable decrease in lead, the following may be regarded as chief among the unfavourable influences against a production of either West Kootenay or the Coast District, so whatever large production: The apparent diminution of the known ore-bodies in the *St. Eugene* mine; the closing of the *Blue Bell* mine, pending the reorganization of the French company owning it, and the provision of additional capital for new power machinery required at the mine; the extensive damages done last summer by forest fires in the Slocan, which destroyed railway bridges and trestles along several miles of the Kaslo & Slocan railway, and concentrating and power plants at mines; and, in much smaller degree, the cessation of production for the time at several mines, among them the *North Star* in East Kootenay, the *Cork* on south fork of Kaslo creek, and the *Reco* in the Slocan. It may be mentioned, in passing, that the outlook is favourable for a larger production in 1911 of this metal at several Slocan mines, notably the *Rambler-Carlboo*, *Slocan Star*, *Ruth-Hope* group, *Steward*, *Van Rol*, and *Hewitt-Lorna Doone* group.

The low price of lead in 1910 had the effect of making the bounty on lead, by which the Dominion aids the lead-mining industry, payable throughout the year.

Copper.

The production of copper has been estimated at 39,000,000 lbs., of which 32,000,000 lbs. is credited to Boundary District mines; about 3,600,000 lbs. to Rossland mines; 215,000 lbs. to three mines situated in the vicinity of Nelson; and the remainder to Coast mines, chiefly the *Britannia*, on Howe sound, and the *Marble Bay* and *Cornell* mines, on Texada Island.

There do not appear to have been any very marked differences in the totals. Important change there was in the year's results must be attributed to the mines of the Boundary District, which, however, continue to maintain a comparatively large production, mainly from those properties that have been producing with little or no intermission during the last ten years.

No important new sources of supply contributed to the total production during the year under review, although it had been expected that two or three would be established, and that production would be increased accordingly. Neither Vancouver Island nor Moresby Island of the Queen Charlotte group produced copper-ore in appreciably large quantity in 1910; indeed, remembering the favourable statements published during 1909 as to the available copper-ore in these parts of the Province, they proved distinctly disappointing. The only mines that may be classed as important producers of copper last year in the Coast District were those already mentioned—namely, the *Britannia*, *Marble Bay*, and *Cornell*, respectively. There will probably be an improvement in 1911, for a company has been organized to operate the *Ikeeda* mine, on Moresby Island, while the Hidden Creek Copper Co.'s mine on Observatory Inlet is being further developed by the Granby Consolidated M. S. & P. Co., under option of purchase. It is not unlikely that copper-ore will again be produced by one of the Kamloops District mines during the present year, and, now that railway transportation is assured for the copper-bearing region near Princeton, Similkameen, a commencement to mine copper-ore in quantity should be made there as well.

Zinc.

The expectations of those directly interested in the production of zinc, that there would be an increased output in 1910, were by no means realised, for the quantity actually marketed was small in comparison with the production of 1909. An unfortunate combination of circumstances brought about this decrease, which was certainly not the result of lack of ore, for there is plenty of zinc-ore obtainable in several of the larger mines of Alusworth and Slocan.

The total quantity of zinc produced in 1910 has been estimated at 4,000,000 lbs., which is probably a liberal estimate for the actual production of the year, though it may be found that concentrate produced in 1909 but not shipped in that year was also sent out during 1910. On the other hand, some of the 1910 product is being held, this including about 450 tons made at the *Ruth* mill, Sandon, Slocan. The mines that made a production were the *Whitewater* group, about 1,921,600 lbs.; *Van Ral*, 1,362,000 lbs.; and *Lucky Jim*, 570,000 lbs.

Reverting to the circumstances that unexpectedly combined to prevent an enlarged production of zinc being made in 1910, it may be stated that they were as follows: (1) Work was suspended last spring at the *Blue Bell* mine, so that there was no production there of zinc in marketable form; (2) the burning of bridges and trestles along several miles of the Kaslo & Slocan railway last July took away from the mines their transportation facilities, so that continued shipment of mine products was quite impracticable during the remainder of the year, and, at the same time, the destruction by fire of the *Whitewater* concentrating-mill prevented the lessees of the *Whitewater* mines from continuing to make concentrates—both silver-lead and silver-zinc—and so compelled a cessation of production there; (3) the zinc concentrate made at the *Ruth* mill was stored, so was not available for inclusion in the year's production; and (4) the Van Ral Mining Co.'s lease of the *Wakefield* concentrating-mill, in the vicinity of Slocan lake, expired in August, so production was suspended there pending the erection and equipment of a new mill by that company. Little zinc has been produced by others, so that there was none to make good the shortage caused by the several adverse conditions just narrated.

No production was made at either the zinc claims in Arrow Lake Division, opposite St. Leon Hot Springs, or from mines in Fort Steele Division.

It is noteworthy that the Dominion Department of Mines is making investigations in connection with the smelting of zinc-ores, with a view to finding a solution of the problem of how to turn to profitable account the great quantities of zinc and lead-zinc ore known to occur, in Kootenay mines especially. Mr. F. W. Harbord, of London, England, has been authorised by the Department to investigate and report upon the zinc-smelting plants and processes of Europe, and Mr. W. R. Ingalls, the prominent authority on zinc in America, is acting in an advisory capacity to the Department. Meanwhile, bulk samples of zinc-ore have been sent from Kootenay mines to McGill University, Montreal, so that reduction tests may be made with a view to determining what treatment process will best suit the ores respectively.

Iron.

No production of iron-ore in 1910 has been reported, nor, so far as known, has there been much activity in the direction of further developing known iron-ore-bearing properties. There has not been any change in the position as regards the Puget Sound Iron Co.'s property on Texada Island, on which, late in 1908, an option of purchase was secured by Americans who were understood to intend organizing a company financially strong enough to acquire and operate the *Iron mine*.

Some time ago the Dominion Department of Mines published a report, by Mr. Eluar Lhudeuan, on a number of iron-ore deposits on Vancouver and Texada islands. The only additional information since received is concerning the discovery, near Upper Campbell lake, Vancouver Island, of what is stated to give promise of proving a deposit of magnetic iron of high grade and purity. The discoverers are reported to have leased from the Esquimalt & Nanaimo Railway Co. 1,290 acres situated on the north side of the lake at its eastern end. Outcroppings of iron are said to occur throughout the whole area. The depth and extent of the deposit, however, can only be ascertained by boring. Samples from the property have shown, on analysis, as high as 70 per cent. iron; also that it is exceptionally pure, an average sample analysing: Sulphur, 0.04 per cent.; titanium, 0.08 per cent.; and phosphorus, 0.0087 per cent. There has been some boring for coal about eight miles north of the mouth of Campbell river, but no particulars have been received.

Coal and Coke.

The gross output of coal in 1910 was nearly 3,120,000 tons. Of this quantity about 320,000 tons was made into coke, leaving the net production of coal as approximately 2,800,000 tons. This production shows a marked increase over that of 1909—about 720,000 tons gross and 794,000 tons net. Against the latter, though, there must be placed a decrease in the quantity of coke produced—nearly 45,000 tons—which, however, does not affect the gain in gross production.

A comparison with the net production of five years ago—in 1906—exhibits for last year a gain of 84 per cent., beside which there was nearly 15,000 tons more coke produced in 1910. If the money value of the production of the two years, 1906 and 1910, be compared, after making calculations at similar prices per ton for each year, it will be found that the total value of the coal and coke produced last year was \$11,084,000, as against nearly \$6,506,000 in 1906, which means a gain for 1910 of \$4,578,000; as compared with 1909 the gain was \$2,509,000.

The distribution of the production is shown in the following approximate figures, with those for 1909 in brackets for purposes of ready comparison: From five collieries on Vancouver Island, 1,617,000 tons [1,386,000 tons]; from Nicola and Similkameen, 157,000 tons [62,000 tons]; from four collieries in the Crow's Nest Pass District, 1,026,000 tons [558,000]. There was, however, 74,000 tons more coal made into coke in 1909 than in 1910. In considering the production of coke, it is well to bear in mind that last year the Granby Company was unable to operate its smelting-works to full blast-furnace

capacity, owing to the destruction by fire of some of the surface works at the mines at Phoenix, which necessitated a curtailment of production of ore during several months. Further, the British Columbia Copper Co. obtains its supply of coke from an Alberta colliery, so the production figures of this Province lose the benefit of that much coke, which, if required, would be made in British Columbia.

Progress was general at the collieries, and the prospects are in favour of still greater activity in the near future. The sale of the Dunsmuir collieries, on Vancouver Island, heretofore operated by the Wellington Colliery Company, promises to result in a much larger production being made from the mines at Extension and Cumberland. The buyers were the Mackenzie and Mann interests, who are also at the head of the Canadian Northern Railway Co.; they immediately organized a new company, named the Canadian Collieries (Dunsmuir), Limited, and a policy of expansion has been entered upon which is expected to result in a large and increasing output of coal from the company's mines, beside the opening of several new mines. The Western Fuel Co., with two collieries in the vicinity of Nanaimo, made what is probably the largest output of any year it has mined coal—namely, about 512,000 tons. The Pacific Coast Coal Mines, Ltd., with a production of about 168,000 tons, made an increase of nearly 100,000 tons over its 1909 output. The Nicola Valley Coal & Coke Co. also made excellent progress, with an output of 141,000 tons, as compared with 62,000 tons for 1909. The Princeton colliery, Similkameen, produced more than 10,000 tons, as against only 150 tons the year before. These figures, which show the production in long tons, indicate a total increase from all the Coast District (including the production of several small mines not mentioned above) of about 325,000 tons; that of the Crows' Nest Pass District collieries was approximately 468,000 tons; together these make the total increase of 794,000 tons first above mentioned.

The decrease in production of coke has already been in part accounted for. Reports show that there was no coke made on Vancouver Island in 1910, owing to there having been a sufficient quantity in stock to supply the local demand, which was not large because of there having been too little ore obtainable to keep the Tye Copper Company's smelting-works operating full blast. It is expected that the Crow's Nest Pass collieries which make coke will this year be required to supply more than in 1910, for it is expected more ore will be smelted this year than last.

The prospects appear favourable to a further increase in production in 1911, and, since railway construction is proceeding apace, there will be a larger demand for coal for the locomotives. In the Coast District there will probably be two new mines opened by the Canadian Collieries (Dunsmuir), Limited, and the Pacific Coast Coal Mines, Ltd., may be expected to commence production at its Squash mine, now in course of development. It is unlikely that this year there will be any production worth mentioning, either on Graham Island, of the Queen Charlotte group, or in the Skeena country. Prospecting the coal-measures in parts of the Skeena District was active last year, but until railway transportation, now being provided, shall be available, shipment of coal will remain out of the question.

In the Nicola valley country, and about Granite Creek and Princeton, the development of the coal resources of these district is being actively proceeded with, and, since railways are being built in the district, transportation difficulties will soon be removed.

In the Crow's Nest Pass country there is no immediate prospect of production from new mines. The Upper Elk river properties described in the last Annual Report must await the construction of a railway before commencing production on a commercial scale; similarly the coalfield south of the Crow's Nest country, in the Flathead District, must remain non-productive until a railway shall be built through it.

Taken as a whole, the coal-mining industry of the Province may be regarded as in a flourishing condition, and its prospects for further activity and expansion decidedly favourable.

Building Materials, etc.

With no statistics of production available, the value of these can only be estimated in a general way. A slight allowance has been made for an increase in 1910, as it is practically certain that, with the large amount of building that has been going on, especially in the chief cities of the Coast District, much more material has been used than in earlier years. It is known that there was an increase in the quantity of Portland cement produced on Vancouver Island, but there has been a decrease in the value of marble sold, for both the Nootka and Kootenay marble-quarries were unworked during practically the whole of the year.

Nothing of especial interest relative to other materials constituting part of the production of the Province calls for particular mention, production having been continued without any special features to notice.

FEATURES OF THE YEAR'S OPERATIONS.

Among the occurrences of the year in connection with the mining and metallurgical industries of the Province were the following:—

CARIBOO DISTRICT.

In Cariboo Mining Division, John Hopp's placer-mining operations were on a larger scale than in previous years. This was especially the case at the *Lowhee* mine, where the gravel moved in 1910 was approximately 200,000 cu. yds., as against 60,000 cu. yds. in 1909. Many important improvements and enlargements of the plant were made in 1910. Of the improvements made by Mr. Hopp on other mines, the most important was the extension to Willow river of the new sluice-flumes at the *Mosquito Creek* mine, at which the new plant put in the year before was operated with satisfactory results, about 50,000 cu. yds. of gravel having been removed.

On Lightning creek, C. H. Unverzagt's company is stated to have succeeded in sinking a shaft to a depth of about 100 ft., and is continuing to make fair progress towards reaching the ground from which rich prospects were said to have been obtained by drilling.

A company promoted by L. A. Bonner to develop hydraulic mining ground on the old *South Wales* property, just above Van Winkle, made progress with the construction of a ditch and flume, and also drove a bedrock tunnel to open ground which, it is believed, will yield profitable results from working.

The Waverley Co. is understood to have opened, late in the season, by a bedrock cut, ground that promises good results.

H. H. Jones did much work on Last Chance creek towards opening, for hydraulic mining, ground that in the early days produced considerable gold. He also began the installation of a plant on Donovan or Poorman creek, a tributary of Lightning creek. The opening of the Isaac and Johnson property, on Stewart creek, a tributary of Big valley, was also undertaken by Mr. Jones.

B. A. Laselle's operations on Chinm creek and Nugget gulch are reported to have been satisfactory, considering that there, as in other parts of Cariboo Division, the water-supply was short and the gold recovery restricted accordingly.

Quesnel Division.

Not much information has yet been received concerning the season's work in the vicinity of Quesnel Forks. It is reported that John B. Hobson has put in a ditch to bring water on some gravel leases he holds.

Quesnelle Hydraulic G. M. Co.—The Quesnelle Hydraulic Gold Mining Company has made much progress with one of the largest and most important enterprises yet undertaken in this division. This is bringing the water of Swift river over the divide to Twenty-nine creek, on Quesnel river, for the purpose of hydraulic mining gold-bearing gravels contained in 1,500 acres of

ground situated near the junction of Twenty-mile creek with Quesnel river, at a distance of about twenty miles below Quesnel Forks. The water-supply system, now well forward towards completion, includes a dam and other works at the intake on Swift river, and from here a water-line seventeen miles and a half to Pass lake, at the head of Twenty-mile creek, which lake is to be used as a pooling reservoir. The water will flow thence three miles and a half down the creek, after which it will be conveyed by ditch and flume about 6,000 ft. to the ground to be hydraulicked. By November the headworks and about thirteen miles of the water-line had been completed, including the construction of three inverted syphons of wood-stave pipe 60 in. in diameter, these syphons being, respectively, 5,635 ft., 2,290 ft., and 1,050 ft. in length. It is expected that by midsummer of 1911 the whole work will be finished and gravel-washing commenced. Two No. 6 monitors will be used, under 300 ft. effective head, for hydraulicking. The distance from the penstock to the monitors will be about 6,500 ft. There will be a double sluiceway, each sluice about 6 by 4 ft. for about 75 ft. in length. It is calculated that 3,500 miner's inches of water will be delivered and from 12,000 to 15,000 yds. of gravel washed daily. The gravel banks on Twenty-mile creek range up to 500 ft. in height. It is claimed for this enterprise that it possesses all the essentials to success in hydraulicking on a large scale, and that, the water-line having a southern exposure, it will be practicable to hydraulic for fully 200 24-hour days in an ordinary season. To date, approximately \$500,000 has been expended on this undertaking, including the cost of four years of prospecting the gravel beds secured, surveying for water-supply, and the building of about forty miles of road to gain access to the various parts of the property and works. It is estimated that by the time the necessary construction work and equipment shall have been completed the total cost will be about \$700,000.

CASSIAR DISTRICT.

Of the several mining divisions constituting the Cassiar District, those in which there was most activity in 1910 were Atlin, Portland Canal, and Skeena. The largest and by far the most important work in progress in Cassiar District during the year was the construction of the Grand Trunk Pacific railway, which will provide transportation facilities for much of the Skeena country and thence eastward to and beyond the eastern boundary of the Province.

Briefly reviewing the progress of mining in the district in 1910, the following summary is presented:—

Atlin Division.

Placer-mining is estimated to have been more productive on Atlin creeks than during the years 1908 and 1909. The largest operator was the North Columbia Gold Mining Company, which had the advantage of a large water-supply throughout the season, consequently it recovered a proportionate quantity of gold. Other placer-mining operators are also stated to have had a successful season.

Increasing interest has been evinced in quartz properties, and on some of these development work has been done. The several localities to which this interest has extended are Klehini river (Rainy Hollow), the neighbourhood of

Birch creek, Taku arm, the head of Tutchl lake, and other parts of the district. Information relative to the *Northern Partnership* (formerly the *Engineer*) group, on Taku arm, from which some unusually rich gold-quartz was taken last summer, was included in Bulletin No. 1, 1910, prepared by the Provincial Assayer and published by the Bureau of Mines in the autumn.

Portland Canal.

The year's developments in Portland Canal camp justify reasonable expectations concerning its future. The only property from which production was practicable on a commercial basis by the close of the year was that of the Portland Canal Mining Co., which has driven three adits, together about 900 ft., these workings being in pay-ore practically the whole of their length. The ore contains gold, silver, lead, and zinc; average value of mill-feed is \$13 per ton. A concentrating-mill was erected and equipped, this having a crushing and screening capacity of 100 tons daily, but with only one 50-ton unit of the concentrating plant yet installed. Concentration results obtained during the last three months of the year were reported to be satisfactory.

This camp was fully described in Bulletin No. 2, 1910, by the Provincial Mineralogist, recently issued by this Bureau.

Late in the year ore was reported to have been encountered in the lower adit of the *Red Cliff* mine, at about 1,300 ft. from its portal and 275 ft. below the ore-shoot opened by the short adit comprising the upper workings. The further development of this property is awaited with much interest, importance being attached to the finding of copper-gold ore at the depth above stated.

By the prompt construction of a waggon-road up Bear river valley to Bitter creek and thence to American creek, by the Provincial Government, the transportation of supplies to the mining properties has been much facilitated.

Observatory Inlet.

The Hidden Creek Copper Co.'s copper-mine, situated near 'Goose bay, is being further developed, under option of purchase, by the Granby Consolidated Mining, Smelting & Power Co. The production of ore from this mine is now probable, as, also, is the erection at Goose bay of a plant for making low-grade copper matte for shipment to the Granby Co.'s smelter in the Boundary District.

Skeena.

No considerable production of mineral will be practicable in the Skeena country until after the Grand Trunk Pacific railway shall be available for transportation, but progress has been made in the development of both metaliferous and coal properties. The most interesting feature of the year was the finding of silver-lead ores in several localities in the mountains surrounding Hazelton. One trial shipment of a few tons was made to the smelter at Trail, but, necessarily, there was no production of ore in quantity.

EAST KOOTENAY DISTRICT.

The outstanding feature of mining in East Kootenay in 1910 was the large increase in the production of coal at the several collieries in the Crow's Nest portion of the district. This was approximately 45 per cent. in gross

production—a tonnage of between 1,340,00 and 1,350,000 long tons in 1910, as compared with nearly 924,000 tons in 1900. The Crow's Nest Past Co.'s gross output was rather more than 25 per cent. greater than in 1900, while the Corbin Coal & Coke Co. more than doubled its 1900 output, and the Hosmer Mines, Ltd., did better still. A result of this big increase in coal production is that East Kootenay stands third among the districts in point of value of mineral production in 1910. The coal properties of the Flathead country, in the south-eastern part of the district, were further prospected, with promising results; but little or nothing was done on the big coal-measures of the Upper Elk river, which are awaiting the provision of railway transportation facilities for their further development.

Conditions were not favourable in connection with metalliferous mining, for there was a considerable decrease in tonnage of ore produced from the *St. Eugene* mine, which was only about 77,500 tons, as compared with 150,000 tons in 1900. In part compensation for this decrease, however, there was nearly 25,000 tons produced from the *Sullivan* mine, which mine was not worked during the previous year. The suspension of operations at the *North Star* mine was another loss, against which there was no compensating set-off. An important betterment at the *St. Eugene* mill was the putting-in of an ore-testing plant, designed to make tests on large tonnages of ore, and having as well appliances for amalgamation and cyanidation tests on a smaller scale.

The resumption of work at the *Sullivan* group mine, under the auspices of the Consolidated Mining & Smelting Company of Canada, Ltd., gave employment to seventy or eighty men, and restored confidence in the future of mining in that part of the Fort Steele Mining Division.

While not much progress was reported from the *Aurora* mine, near Moyle lake, an encouraging improvement took place at the *Society Girl* mine, at which a commencement was made in December to take out ore for shipment.

The progress being made with the construction of the Kootenay Central railway, which will eventually connect the C. P. R. main line at Golden with the Crow's Nest line east of Cranbrook, renewed hope relative to mining in the Windermere Division, as well as in the northern part of the Fort Steele Division. The completion of this railway may be expected to lead to a resumption of mining at the *Estella*, on Tracy creek, and the *Paradise*, *Ptarmigan*, *Delphine*, and other properties, in Windermere Division, on which, years ago, much work was done, until the outlook for the transportation facilities seemed so hopeless that suspension of operations became unavoidable.

Little of moment took place in the Golden Mining Division last year. Some ore was shipped from the *Monarch* mine in the earlier part of the year, but no other production is known to have taken place.

WEST KOOTENAY DISTRICT.

West Kootenay District last year yielded third place in the list, as regards total value of mineral production, thereby changing places with East Kootenay. The general condition of the mining in this district, nevertheless, appears to be more promising for expansion than for several years.

Ainsworth Mining Division.

Mention has already been made of some of the adverse conditions experienced during the year in this division. There does not appear to be any immediate prospect of a much larger tonnage of ore being shipped than in 1910. Efforts are being made to arrange for deep development in two or three mines in the vicinity of the town of Ainsworth, confidence being felt that ore will be found, as a result, in quantity to more than repay the expense such further exploration would involve. It is hoped the French shareholders in the New Canadian Metal Co., owning the *Blue Bell* mine and mill, will soon agree upon a settled policy that will admit of an early resumption of work and provide for an enlargement of production at that mine.

Another mining company, with headquarters in France, endeavoured last year to place a stamp-mill on the *Joker* property, situated at the head of the south fork of Kaslo creek. Machinery was brought from England, but it was not found practicable to haul it from the K. & S. railway to the mill-site. It is expected that it will be taken up soon, sufficient snow having fallen lately to make heavy hauling possible. While several of the smaller mines in the south fork shipped some ore in 1910, the year was not a good one in this camp, speaking generally.

Work at the *Whitewater* mine (outcrop) was stopped when fire destroyed the concentrating-mill and other surface buildings and plant last summer. Messrs. J. L. Retallack & Co. and the Deep Mines, Ltd., are doing development work of much importance on the deep of the *Whitewater* vein; should success result, it may be expected to encourage the deep development of other mining properties in the district. The loss of transportation facilities, consequent upon the stoppage of traffic on the Kaslo & Slocan railway, is a serious deprivation to mines in and about Whitewater camp, and the failure of the Great Northern Railway Co. to relieve the situation has given rise to indignant protests against its indifference to the great loss mine-owners are consequently incurring.

The expectations of 1909 that an important marble-quarrying industry would be permanently established in this division have not thus far been realised. Heavy loss resulted from the shipment to prairie cities of faulty material, and a suspension of work ensued. However, an early resumption of operations is probable.

Slocan and Slocan City Divisions.

The set-back the *Lucky Jim* zinc-mine, at Bear lake, and the *Rambler-Cariboo* silver-lead mine, in McGulgan basin, experienced last summer, when forest fires destroyed mine buildings and surface plant, and cut off transportation facilities, is being overcome. While shipment of ore was stopped pending the making of new arrangements for transportation, development of the mines was only temporarily interfered with. Both mines now have larger quantities of ore available for shipment than at any previous time. A low-level adit is being driven to cut the *Lucky Jim* zinc-ore body at between 450 and 500 ft. below the No. 5 adit, above which there is still much ore awaiting stoping. It is expected the new level will reach the ore before the end of February. The *Rambler-Cariboo* is taking out ore down to the 1,050-ft. level; expectations

are that an output of about 200 tons per month will be maintained. The development of the *Washington* mine has also been continued throughout the winter.

Above Cody creek, the *Surprise*, *Sunset*, and *Noble Fire* group have all been worked. The deep development done on the *Surprise* is of much importance, giving a depth between 1,100 and 1,200 ft. below the outcrop. A raise of 800 ft., to connect the low-level adit with the old workings, is now up nearly 500 ft. Ore was found lately in the *Deadman* claim of the *Noble Fire* group, and this and the *Noble Fire* vein are being developed.

Near Sandon, the *Richmond-Eureka*, *Slocan Star*, and *Ruth-Hope* groups have been shipped, the production of the first mentioned of these mines having exceeded 4,000 tons of silver-lead ore last year. The *Ruth* mill was operated; some 500 tons of silver-lead product was shipped, and 450 tons of zinc concentrate stored for shipment later.

On Four-mile creek, near Silverton, the *Standard*, *Van Ral*, and *Silverton* mines were worked. Developments at the *Standard* mine were the most important and satisfactory known in the Slocan for years. In No. 5 adit the ore-body has ranged up to about 23 ft. of ore, most of it galena of a shipping grade. Production for the year was about 1,800 tons, but the big ore-body was not opened until the latter part of the year. The Van Ral Mining Co. mined and milled 32,000 tons of ore before its lease of the *Wakefield* mill expired about the close of the summer. This company is erecting and equipping its own mill farther up Four-mile creek. Meanwhile, it has been exploring its main vein and a south vein, and has much ore available for stoping. The Silverton Mines, Ltd., continued blocking out ore in the *Hewitt* and *Lorna Doone* mines.

There was little mining done in Slocan City Division, that at the Ellis Silver Mining Co.'s *Eastmont* mine having been most noteworthy. More than 700 tons of ore was shipped from this mine. Mr. S. S. Fowler has leased the *Enterprise* mine, also on Ten-mile creek, and is driving to ent the ore at lower levels than it has heretofore been worked.

Nelson Division.

About Nelson, the Consolidated Mining & Smelting Co., having acquired the *Molly Gibson* mine, has been improving the transportation facilities, by constructing an aerial tramway four miles and a half in length towards the shipping place on the west arm of Kootenay lake. The quantity of ore put through the *Granite-Poorman* mill was smaller than in 1909. A company is being organized to acquire the *Granite-Poorman* mines and operate them on a larger scale, and to enlarge the stamp-mill accordingly. The *Eureka* shipped about 400 tons of copper-ore to Trail. The *Silver King* group and neighbouring mining properties on Toad mountain were purchased by a syndicate which is organizing a company to do much development work and to continue mining operations for a long period.

In Ymlr camp, the *Yankee Girl* group shipped 4,900 tons of ore to the smelter; made a raise in ore 426 ft., from No. 2 to No. 1 level; and put in a compressor plant. Other properties worked in this camp were the *Wilcox* and the *Dundee*; at the latter a compressor was installed to facilitate driving an

adit which late in the year encountered ore at about 500 ft. In this ore being at much greater depth than that opened some years ago in the old workings.

The *Emerald* mine, near Sulmo, during the year shipped 1,000 tons of lead-ore to Trail. The *Arlington*, at Erle, produced 1,100 tons of ore, from which about 2,900 oz. gold and 5,800 oz. silver were recovered. The *Second Relief* milled more than 3,000 tons of gold-bearing ore. Arrangements were made to reopen the *Big Dump* mine and have its ore treated at the *Second Relief* mill close by.

Production at the *Queen* and *Nugget* mines, Sheep creek, resulted in the recovery of gold to a total value of between \$200,000 and \$250,000. Developments in both mines were satisfactory, the *Queen* particularly having opened a large shoot of ore in the lowest level. While no production was made by either the *Kootenay Belle* or *Mother Lode*, development work proved the considerable value of both properties.

Trail Creek Division.

Rossland mines, with the exception of the *Le Rol*, continue to do well. The total tonnage for the year is placed at about 256,000 tons, of which the Consolidated Mining & Smelting Co.'s *Centre Star* group produced fully three-quarters. Diamond drilling was continued in the lowest levels of the *Centre Star* mine, the approximate vertical depth of which is 2,000 ft. Assays from 5 ft. of ore entered by the diamond drill at 75 ft. below the 12th level of the *War Eagle* gave assay returns up to 3.24 oz. per ton. During the year, new shoots of ore were found in the *Centre Star*, *War Eagle*, *Idaho*, and *Iron Mask* mines of this group.

The *Le Rol* Mining Co. shareholders have resolved upon voluntary liquidation of the company, and endeavours are being made to sell the company's mines, smelter, etc. Ore shipments for the year totalled more than 14,000 tons. The *Le Rol* No. 2, Ltd., mined about 47,000 tons, one-third of which was milled at the mine and the remainder shipped to the Trail smelter. In a crosscut from the *Josic* shaft, on the 1,300-ft. level, a large ore-body was entered at about 1,000 ft. from the shaft. In other parts of this company's mines, at various depths down to the 900-ft. level, much work was also done, and in several instances important shoots of ore were discovered.

Other mines worked in 1910 were the *Cliff* (by the Granby Co.), *Nickle Plate*, *I. X. L.*, *Mayflower*, and *Blue Bird*. In the two last mentioned, galena-ore has been found.

Consolidated Co.'s Smelter at Trail.

The year's operations at the smelter, at Trail, of the Consolidated Mining & Smelting Co. of Canada, Ltd., included smelting about 445,000 tons of ore. The metal contents were, approximately: Gold, 138,900 oz.; silver, 2,017,000 oz.; lead, 33,872,000 lbs.; copper, 5,282,000 lbs.; total value, \$5,543,500. Some 550 men, altogether, were employed. Five copper-furnaces were in blast and two lead-furnaces, the latter alternately. The Huntington-Heberlein roasters and converters are used here, and in the lead-refinery the Betts electrolytic process for refining lead. Improvements were made in both smelter and refinery, and the works generally kept ahead of the immediate requirements of the Interior mining districts.

Trout Lake, Lardeau, and Revelstoke Divisions.

In the Trout Lake Division, the Feguson Mines, Ltd., did about 1,000 Ha. ft. of development work and mined between 800 and 900 tons of ore of shipping grade. The winze from the lower *Sunshine* tunnel of the company's *Silver Cup* mine entered ore, and drifts from it also opened ore-shoots. A little work was done on the company's *Nettle L.* mine. The *Broadview*, worked under lease, sent out some ore—less than 100 tons. Development work was done on the *Free Colonge*, situated above the *Silver Cup*. The *Ethel* shipped some ore, but no particulars were obtained. In or near the southern part of the division, in the vicinity of Poplar creek, development work was done on one property held by a Scottish syndicate under option of purchase.

The only information obtained relative to the Lardeau Division was to the effect that late in the year development work was resumed in the *Beatrice* mine, and that ore would be shipped while raw-hiding remained good. There does not appear to have been much mining done in Revelstoke Division, other than placer-mining on some of the gold-bearing creeks in the Big Bend District, and further development of some mica occurrences on End creek, to which the Provincial Government constructed a trail in 1909.

LILLOOET AND CLINTON.

It is thought the yield of placer gold was less in these divisions last year than in 1909. There was no material change in the position in regard to dredging for gold in the Fraser river, those contemplating putting in a modern dredge not yet having done so. A little lode gold was obtained in the Bridge river section. The Provincial Mineralogist visited this district in the summer, and his observations thereon will be printed in the Annual Report.

BOUNDARY DISTRICT.

While the estimated total value of the mineral production of the Boundary District is \$700,000 to \$800,000 less than that recorded for 1909, the quantity of ore mined and smelted appears to have been larger by about 250,000 tons. Published figures give a total of approximately 1,080,000 tons, in the following general proportions: From Granby Co.'s mines, 1,100,000 tons; British Columbia Copper Co.'s mines, 437,000 tons; Consolidated Co.'s mines, 143,000 tons.

The output of the Granby mines was curtailed as a result of the destruction by fire last autumn of the surface works at the outlet from No. 3 tunnel, which, during several months, prevented shipment of ore therefrom and necessitated the blowing-out of two furnaces at the smelter. Normal conditions were, however, restored by the close of the year. Substantial fire-proof buildings were erected near the entrance to No. 3, these including a main structure 40 by 125 ft. of solid brick, with concrete floor, and iron roofs for the several mechanical shops and the storehouses; a generator building of similar construction; a large car-repair shop of iron, and a dry-room. Some 13,000 ft. of development work was done, and 6,000 ft. of diamond drilling. At the company's smelter, claimed to be the largest copper-reduction works in the British Empire, the total treatment capacity of the eight blast-furnaces is now 4,000 to 4,500 tons of ore a day. The total capacity of the converters is about

35,000,000 lbs. of blister-copper per annum. Further economies in working-methods at both mine and smelter are proving effective in reducing cost of making copper still lower than in past years. The company is working, under option of purchase, the *Cliff-St. Elmo* group at Rossland, and the Hidden Creek Copper Co.'s mine, on Observatory Inlet, both of which it is expected will produce heavy sulphide-ores that will allow of a change being made in the smelting practice at the big works at Grand Forks, with a resultant lessening of both copper losses in the slag and cost of making copper.

The British Columbia Copper Co. had a progressive year, in which it enlarged its blast-furnace capacity at its smelter at Greenwood and arranged for a proportionately increased supply of ore. Its smelting operations during the calendar year resulted in the following: Material smelted (including a small tonnage of foreign ore), 456,000 tons. The main ore receipts were from four mines—namely, *Molter Lode*, 352,000 tons; *C. J. Demore*, 11,400 tons; *Wellington* group, 49,200 tons; and the New Dominion Copper Co.'s *Bauchide* mine, 51,400 tons. Production of the last-mentioned is being increased to 1,000 tons a day. The year's progress included settling down to regular production at the company's *Wellington* group mine, and reopening of the *Bauchide* and *Atchelstan* mines, both now controlled by this company. An aerial tramway has been constructed, five miles in length, to connect with the C. P. R. at Boundary Falls, three miles from the smelter, the company's *Long Star* mine, which is situated immediately south of the International Boundary-line, from which mine about 100 tons of good matte-making gold-copper ore will be obtained daily. The company's *Napoleon* mine, at Boyds, Washington, will also supply ore regularly—about 2,500 tons of sulphide-ore monthly. The smelter blast-furnace capacity was increased in 1910 to a maximum of 2,600 tons of ore a day, or an ordinary average of 2,400 to 2,500 tons. This was done by increasing the hearth area of two of the three furnaces by 50 per cent. A corresponding increase has been made in the plant for feeding the furnaces and taking away the molten slag, this including the addition of an electric locomotive capable of hauling at the same time two 25-ton cars filled with slag. Late in December the statement was published that the company's net earnings for the fiscal year, to November 30th, had been approximately \$275,000. The profit and loss account for the year to November 30th, 1909, showed a balance of \$261,973 net profit. Cost of producing, refining, and marketing per pound of fine copper, after crediting expenditure with value of gold and silver, is estimated at 9.624 cents, as compared with 9.829 and 9.936 cents for 1909 and 1908, respectively.

The Consolidated Mining & Smelting Co. made an output of 142,000 tons of ore from the *Snowshoe* mine, and about 1,000 tons from the No. 7. The latter was connected with the C. P. R. at Boundary Falls by an aerial tramway about three miles long. Preparations were made to mine ore at the company's *Phoenix Amalgamated* group for shipment to Trail.

The 15-stamp mill at Long Lake, for the *Jewel* gold-mine, was reported completed and a trial run made, but no information was given by the management. Work was resumed by the Greenwood-Phoenix Tramway Co. in the tunnel it is planned to drive from the Boundary creek valley towards

Phoenix, with the object of cutting the ore-shoots believed to occur in the intervening country. Nearly 1000 ft. had been driven by the end of the year. The *Argo* tunnel, at Greenwood, was also driven some distance.

THE SIMILKAMEEN.

The only productive metal-mining done last year in this big district was that by the Hedley Gold Mining Co., at the *Nicket Plate* group of mines, near Hedley, from which about 47,000 tons of ore was sent to the 40-stamp mill at Hedley. The approximate value of the gold recovered was \$516,000. At the mines, some 2,200 lin. ft. of development work was done. Additional power plant and mill equipment put in during the year cost about \$115,000.

The Princeton Coal Co. mined between 10,000 and 11,000 long tons of coal in 1910, and put in more power plant. The Columbia Coal & Coke Co. had thirty-five to forty men employed during part of the year exposing the coal-seams on its property between Granite creek and Otter flat. The Osoyoos Coal Co. and United Empire Mining Co. both prospected some promising coal fields.

Regular railway communication was established between Princeton and Spokane by the extension of the V. V. & E. railway from Princeton. The grading of the line to the Tulameen is practically finished.

NICOLA VALLEY.

Good progress was made with coal-mining in Nicola valley, but the only company that reported production was the Nicola Valley Coal & Coke Co., which mined about 141,000 long tons of coal at its Middlesboro colliery. Further development work was done in its Nos. 1, 3, 4, and 5 mines, and arrangements were made for putting in a new fan of a capacity of 150,000 cu. ft. Plans were prepared for a modern surface equipment, to be proceeded with next spring.

The construction of the Kettle Valley railway, now in progress, is expected to give further impetus to coal-mining in this valley, for when completed it will provide direct rail communication with the Boundary country, to which coal and coke will thereafter be shipped from Nicola.

KAMLOOPS AND YALE.

In Kamloops Division, boring for coal along the route of the Canadian Northern railway in the North Thompson valley was commenced.

The chief work among the copper properties was that done at the *Iron Mask*, where twenty-five men were employed overhauling the workings, re timbering the main shaft, etc., preparatory to resuming mining, which, it is expected, will be commenced next spring.

Some interest was shown in a part of the district known as the Steamboat mountain country, and numerous mineral claims were staked. So little effective development work has yet been done that little is known of the real value of the new field for actual mining purposes.

THE COAST DISTRICT.

At the *Britannia* mine, near Howe sound, the year's work was restricted to further exploration of the big ore-bodies occurring there. A small tonnage of ore of good grade was mined; the year's output was about

26,000 tons. Some ore of a different character was opened in the *Bluff* mine of the group, and for several months the concentrating-mill was operated experimenting with it.

Mining on Vancouver Island was chiefly of coal, of which a large tonnage was produced—about 1,616,000 long tons, as compared with 1,385,000 tons net in 1909. Of this increased tonnage, about 100,000 tons was from an enlarged output from the Canadian Collieries (Dunsmuir), and a similar gain was made by the Pacific Coast Coal Mines Co.'s South Wellington colliery, while the remainder of the increase was contributed by the Western Fuel Co.

The Tyeo Copper Co. during the year smelted 47,000 tons of ore, of which about 20,000 tons was from British Columbia mines. The metallurgical contents of the total tonnage were: Gold, 5,300 oz.; silver, 47,000 oz.; and copper, 4,500,000 lbs.: total value, \$726,311. Additional improvements were made at the smelter at Ladysmith, and the company has decided to put in a lead blast-furnace as soon as there shall be sufficient lead-ore obtainable to warrant this being done. The company did much exploratory work on several of the Gulf Islands, including diamond drilling, in prospecting for coal. Quite recently it successfully closed negotiations for a transfer of leases of the *Cornell* group of mines on Texada Island.

Both the *Marble Bay* and *Cornell* mines shipped ore in 1910—together about 15,000 tons. Work was also done at the *Little Billy* and on several mining properties on the island. Several runs were made, under the supervision of Mr. Thomas Kiddle, at the Van Anda smelter, where copper-ore was smelted, using oil as fuel. These experimental demonstrations were regarded as satisfactory, and it is probable that operations will be shortly tried on a commercial scale.

Work was done on Lasqueti, Valdes, and Princess Royal islands, respectively, but little information was obtained concerning its extent or results, though these were reported to be encouraging at Valdes Island, where a small steam-power plant has been put in.

On Graham Island, of the Queen Charlotte group, prospecting for coal was carried on by several different parties, while on Moresby Island some of the copper properties had attention. A company has been formed to acquire and develop the *Ikeda* mine, on the latter island, following development work done since the former owners suspended operations. Results of this work were stated to be satisfactory, and it is planned to now proceed with extensive development and production.

CONCLUDING NOTES.

During the year the Provincial Mineralogist made trips of examination to Tatlayoko lake, near Bute inlet; to Bridge river, in the Lillooet District; and to Portland Canal. The Provincial Assayer visited the Northern Partnership group, on Taku arm, Atlin Mining Division; Bella Coola; and Valdes Island, in the Nanaimo Division. Both officials prepared bulletins, which have since been published by the Bureau of Mines.

Field work was done by Dominion Geological Survey parties in the following districts: Atlin, Portland Canal, Skeena, Vancouver Island, Tulameen, Boundary, Slocan, and in East Kootenay, at Ice river, and Field.

New railways were in course of construction in the Skeena country, Portland canal, Vancouver Island, Fraser valley, Similkameen, Boundary, and East Kootenay. All these will be of more or less benefit to mining in the several districts mentioned.

Roads, trails, and bridges were built or improved in all the mining districts to an extent never before approached, and the Provincial Government thereby much facilitated the work of both prospectors and mine operators.

A specially notable event of the year was the installation of mine-rescue apparatus at some of the coal-mines, and the establishment by the Provincial Department of Mines of mine-rescue stations adequately equipped and placed at points of advantage.

Finally, it is gratifying to note that several mining companies paid dividends in 1910. These were: Hedley Gold Mining Co., four quarterly distributions of profit and a bonus, totalling 14 per cent. of the issued capital, £1,200,000; Le Roi No. 2, Ltd., three dividends of two shillings each per share on 120,000 shares; Crow's Nest Pass Coal Co., two dividends, each of 1 per cent.; Granby Consolidated M. S. & P. Co., one payment at the rate of 1 per cent. on about \$14,850,000; and the Hastings (British Columbia) Exploration Syndicate, Ltd., operating the Arlington gold-mine at Erle, Nelson Mining Division, a dividend of sixpence per share on 60,375 issued shares.

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