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BRITISH COLUMBIA MINING RECORD

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BRITISH COLUMBIA
MINING RECORD

E. JACOBS,.....Manager and Editor

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CONTENTS.

NOTES AND COMMENTS.

Nelson has sent to the Winnipeg Fair an excellent mineral exhibit. T. G. Procter collected the specimens.

With three furnaces in operation the British Columbia Copper Company, Ltd., is smelting about 2,000 tons of ore a day.

Publication of some interesting notes on Mining in North Kootenay, contributed by a correspondent, has had to be deferred until next month.

The machinery has been transferred from the old smelter at Pilot Bay to the new concentrating mill at the Blue Bell mine, opposite Ainsworth.

The value of the gold bullion received at the United States Assay Office, Seattle, Washington, from Canada, during the fiscal year ended June 30, ulto., was $7,186,385—from British Columbia, $1,190,548; from Canadian Yukon, $5,995,837.

"The secrecy and mystery with which the business affairs of the Sullivan Group Mining Company has always been hedged about is now being thrown aside," states the Cranbrook *Prospector*. "The shareholders are much pleased with the new state of affairs, and greater interest is being taken in the future prosperity of the big silver-lead property."

The Spokane, Washington, chamber of commerce has had to postpone its intended excursion of 100 to 150 of its members to the Crow's Nest Pass Coal Company's coal mines and coke ovens near Fernie, B.C., owing to there not being sufficient railway sleeping cars available. A second railway connecting Spokane with these coalfields was lately completed and trade between the two places is being considerably increased.

A sign of returning interest in British Columbia mining operations in England is that the London *Critic*, in its "Reports by Cable" section, now publishes cables concerning British Columbia mines under their own black-letter sub-head "British Colum-

bia" instead of under the less noticeable "Miscellaneous." We hope to see other journals publishing mining news give this province similar prominence, now that several of its larger mining companies are on a dividend-paying basis.

Cabled advices from London intimate the declaration of an interim dividend of two shillings per share on its 120,000 £5 shares by the Le Roi No. 2, Ltd.; total, £12,000 (approximately $60,000). This company distributed £36,000, free of income tax, out of its last fiscal year's profits. This year developments at its mines at Rossland are satisfactory, new orebodies having been opened at the 700 and 900-ft. levels, respectively, and the diamond drill has entered ore of good grade at 317 ft. below the 900-ft. level.

The Yale Mining Company, operating the Nickel Plate mine near Hedley, Similkameen, has adopted the high wages scale known in the interior mining districts as the "Boundary scale." This wages scale went into effect at the Nickel Plate on July 1. Under it miners are paid $4.00 to $4.50, trammers and shovellers $3.50 to $3.75 (according to class of work) and other employees in proportion. The wages paid at the stamp mill at Hedley are also good. Space restrictions prevent the scale being printed in the MINING RECORD in detail this month, but this subject shall have notice later.

The Consolidated Mining and Smelting Company of Canada, which owns the Trail smelter and large mines at Rossland and in East Kootenay, is extending its holdings in the Boundary district, where for a year it has operated under lease and bond the Snowshoe mine at Phoenix. Recently it secured either by purchase or under option between 20 and 30 claims situated in Phoenix camp, near the Granby Company's mines. On one claim—the War Eagle—a small power plant was installed in 1900 and some development work done on the 100-ft. level, but no ore has been shipped from any of the claims.

The Portland Canal section of Skeena mining division is now producing copper. The report of the provincial bureau of mines, lately issued, shows a production in 1906 of 293,269 lb. of copper as against none in 1905 and only 17,407 lb. from the whole division in all previous years. Last year's output was practically all from the Outsiders' mine of the Brown Alaska Company of Seattle, Washington, which has this year (1907) considerably increased its production. Its ore is smelted at the Alaska Smelting and Refining Company's smelter at Hadley, southeast Alaska, and the resulting matte converted into blister copper at Tacoma, Washington.

Owing to the high rate charged by express companies, miners in Alaska have this year been sending gold to Seattle by registered mail. One steamer which reached that city lately from the North brought about $600,000 in gold sent by mail. In order to comply with the postal regulation requiring that packages thus sent shall not exceed 4 lb. in weight, the gold has been sealed in cans of that weight and registered. It is stated that the steamship company having the mail contract will probably decline to carry it out, preferring to forfeit its $10,000 bond rather than continue incurring the great risk of carrying such large quantities of gold as registered mail.

Money prizes totalling $1,250 will be offered for two rock drilling contests to be held at the Spokane Interstate Fair, Spokane, Washington, which will be open September 23 to October 5. For a double-hand contest the prizes will be: First, $500; second, $250; third, $150. For a single-hand contest: First, $250; second, $100. Entries which will close September 23, are expected from Washington, Oregon, Idaho, Montana, Colorado, and British Columbia mining camps. Several trophy cups (including one of $100 value), cash prizes and diplomas will be awarded for camp and district mineral exhibits. More space will be allotted for mineral exhibits than at any previous Spokane fair, with the object of adequately demonstrating the importance of the mineral resources of the northwestern states and southeastern British Columbia.

It is expected there will be at least nine gold dredges operating in the Yukon this season, viz., the Canadian Klondike Mining Co.'s electrically operated dredge with a capacity of 3,000 cu. yd. per day, working on the Boyle concession; the Bonanza Basin Gold Dredging Co.'s steam driven dredge, stated capacity 3,750 cu. yd. per day, working near the mouth of Klondike River; the Lewes River Dredging Co.'s steam dredge, capacity 1,200 cu. yd. per day, operating on Bonanza Creek; Ogilvie Dredging Co.'s steam dredge, capacity 400 cu. yd, working on Klondike River; the Forty-mile Dredging Co.'s dredge, similar to that of the Bonanza Basin Co., working on Forty-mile River; another large dredge to work in the Forty-mile district; and the three big dredges the Yukon Consolidated Goldfields Co. intends operating on its Bonanza Creek claims.

The Yukon Consolidated, a Guggenheim company, has begun work both above and below Discovery, Bonanza Creek, and has made a departure from hydraulicking methods heretofore prevailing in the Klondike. The new system involves first the ground-sluicing of the creek bottom proper by hydraulic head, then setting sluice boxes in the bedrock, and then hydraulicking down the gravel banks into the bedrock flume, whence it is conveyed to a sump at the lower end of the claim. An endless conveyor belt acting as a tailings stacker carries the water and washed gravel well clear of the creek bed, thus allowing of bedrock being thoroughly cleaned up.

The creek bottom will afterwards be used as a dump for tailings from the hill and bench claims on both sides of the creek. The conveyor and pump are electrically operated, the power being transmitted by pole line from the company's hydro-electric power house on Twelve-mile, about 30 miles distant. Operations are being directed by Chester A. Thomas.

Japanese fishermen fishing off Moresby island of the Queen Charlotte group last year found near the shore "float" copper ore. Prospecting back from what is now Ikeda bay they discovered a strong copper-bearing ledge. The Ikeda Bay Mining Company was formed in Japan and mining operations undertaken. An old stern-wheel steamer has been beached and converted into a camp. Beside sleeping quarters for the company's 86 men, (including officials and resident physician), there are on the steamer an assay office and a small hospital. The company has 13 mineral claims, each named after a Japanese flower, commencing with the Chrysanthemum claim. There is a paystreak of high-grade copper ore in the ledge. About 1,200 tons of roughly sorted ore are awaiting shipment to a Vancouver Island smelter. A wharf 160 ft. long with an L 50x110 ft. has been built and construction of a tramway to the mine is in progress. The success of the Japanese has attracted much attention to Moresby Island which is being extensively prospected and already other promising mineral claims have been located.

At a meeting of members of the Royal Institution for the Advancement of Learning in British Columbia held lately in Vancouver, it was reported that a site for the new college building had been secured from the Government, for a term of years. Under the terms of the lease the society will be required to spend $150,000 for educational purposes during the first seven years, and during the term of the lease $150,000 in permanent improvements. It was decided to take immediate steps towards erecting the new building, to cost approximately $100,000. Up to the present time four chairs have been endowed in part or in whole in the college. . The Robert Dunsmuir chair of mining and chemistry by Hon. James Dunsmuir; the chair of civil engineering by Mr. A. C. Flumerfelt; the chair of pure and applied mathematics by Hon. F. Carter-Cotton, and the chair of modern languages by the McGill University graduates resident in British Columbia. The board expressed the hope that in the near future other chairs would be endowed by friends of the institution. A summer school, for instruction in practical mining, is to be established in one of the mining districts of the Province. It is announced that the mining department of McGill University, Montreal, Quebec, will make British Columbia the headquarters for practical mining education for the university mining classes, as well as for local students.

PRODUCTION OF LODE GOLD IN THE SIMILKAMEEN.

THE HEDLEY Board of Trade appears to consider it has grounds for complaint against the MINING RECORD. A letter has been received from the secretary as follows:

"In your issue of June, you state that according to the 'Annual Report of the Minister of Mines' the Similkameen, Nicola, and Vernon mining divisions produced in 1906 only 6 oz. of lode gold, value $124. Now, while this statement is officially correct, your publication of the bare facts has already done this camp and valley a great deal of harm.

"As one of the leading mining journals of this country, we expect fair treatment from you, and thought that if the matter was brought to your attention you would publish the facts, which would correct the wrong impression of the Similkameen Valley created by your June issue.

"Camp Hedley, though situated in the centre of the Similkameen Valley, is included in the Osoyoos mining division and if you will enquire at the Department of Mines, Victoria, you will ascertain what was the production of the Osoyoos division which, in the Minister of Mines Report, is linked with the Grand Forks and Greenwood divisions of Yale district, for reasons we cannot understand. You will then find what the Similkameen Valley produced last year, and every ounce of lode gold of that production can be credited to Camp Hedley.

"By making public such facts you will only be doing that which is fair and just to this section."

The Hedley Board of Trade may rest assured the district it represents, in common with all others in the Province, will always be fairly treated by the MINING RECORD which, as is generally conceded, endeavours to publish facts only concerning the mining industry.

It is unfortunate that a small portion of the big Similkameen district is officially designated the "Similkameen mining division," but of course we are in no way responsible for the adoption and long-continued use of nomenclature which is in a measure misleading. We admit that if it had occurred to us to do so at the time we printed the official statement to which exception has been taken, we would have directed attention to the distinction between the Similkameen "district" and "mining division." If, however, we were required to be always making explanations of this nature there would be practically no end to them. Rossland does not demand that whenever we mention the production of Trail Creek mining division we state that all the ore produced in it is from Rossland mines; Ymir does not hold an indignation meeting to protest against its important production being credited to Nelson mining division; Fernie and Michel, with their big coal mines, and Moyie with the largest lead mine in Canada, do not

claim that great injury is done these camps, respectively, by recording their production as that of Fort Steele mining division; Texada Island does not take strenuous objection to its product appearing under the head of Nanaimo mining division, nor does Howe Sound protest against being included in New Westminster. Yet all these have stronger grounds for protest, if such be necessary, than has Hedley, which, by the way, seems to have been a long while in discovering that an injustice is being done its camp by the continuance of a custom established years before there was even one producing mine in the vicinity of Hedley.

While we are of opinion that changes in names of certain mining districts and divisions can be made with advantage, and in some instances should in justice be made, we think it improbable that, under existing conditions, the department of mines will accede to the evident desire of the Hedley board of trade that the production of its camp shall be shown separately in the published official returns. To do this when there is only a single producing mine in that locality would be, in our opinion, to violate the spirit of the law which while making compulsory the sending in periodically to the department sworn returns as to mineral production, etc., forbids the publication of the information thus obtained. Should there later be several producing mines in that camp, the existing difficulty will disappear; meanwhile, though, we think the government will not be justified in making any change that practically involves the disclosure of the returns of the Yale Mining Company which, if so inclined, may at any time supply the Hedley board of trade with the tonnage and value of its production and authorize publication of same. The Hedley board of trade will speedily ascertain the very proper attitude of the department of mines in this connection if it apply for the particulars it wishes made public, for they will not be supplied by the government.

A few words in conclusion as to a mis-statement made editorially in the Hedley *Gazette*—The MINING RECORD did not, as charged, ignore the fact that in 1906 the Nickel Plate mine produced in 1906 35,000 tons of ore. This information was in type last month, but the extract from the "Annual Report" in which it occurs was, with much other matter, unavoidably held over until this month. The MINING RECORD, it may be added, is too careful of its reputation for reliability to descend to such tactics as those of the *Gazette* when it takes improper advantage of a similarly misleading designation to that the local board of trade objects to, and thereby makes it appear that Rock Creek and Camp McKinney are in the Similkameen. This we regard as a deliberate attempt to show the Similkameen district, as generally understood, to be entitled to credit for the gold production of a district quite distinct from it. Anyone familiar with the situation will at once admit that Camp McKinney and Rock Creek are not in the Similkameen, and it is the merest quibble to use the designation Similkameen *electoral district* as warrant for crediting the Similkameen proper with a production made outside of its well recognized limits. Suppose, for instance, we should claim that all the losses of mining enterprises at Camp McKinney—and the editor of the *Gazette* was in charge of one of the several that were decided failures—were evidences of the unproductiveness of mining in the Similkameen, would not the Hedley board of trade strongly protest—and it would be justified in doing so. Does it, then, approve the equivocation of the *Gazette* in the opposite direction? We give it credit for more honesty of purpose. The *Gazette* charges the MINING RECORD with "misrepresentation" in quoting what the local board of trade admits to be "bare facts officially correct." What about the "misrepresentation" of the *Gazette*? Is it not deliberately intended to deceive?

CLAY DEPOSITS OF ANVIL ISLAND.

By Herbert Carmichael, Provincial Assayer.*

ANVIL ISLAND is situated up Howe Sound, 23 miles from Vancouver City. It is a granitic peak rising to a height of 2,700 ft., and is three miles long by two miles wide. At its southern extremity there is an extensive deposit of glacial clay, which is being worked by the Columbia Clay Company, Ltd., under the management of J. A. Brownsword. The clay bank has an area of some 90 acres and a thickness of about 100 ft. For a glacial clay it is uniform in texture, being practically free from stones. A floor has been run into the bank, slightly above the level of the mixer and brick machine, so that the clay is shovelled into small cars and run by gravity a short distance to the hopper; the brick machine is of the "soft mud" type. The bricks are burned in a continuous kiln, the draught being maintained by a fan and exhausted through a dryer, in which the bricks are dried before being burnt. The kiln is only a few feet from the water, the bricks being loaded direct from the kiln by small cars on to scows, which are towed to market. The plant has a capacity of 30,000 per day.

The following is an analysis of the Anvil Island clay, made by the Provincial Government assay office:

Loss by ignition	3.0 per cent.
Silica	58.6 "
Alumina	26.7 "
Oxide of iron	7.5 "
Lime	4.0 "
Magnesia	Trace.
Fusion point	2,000 Fahr.

The gross output of coal from British Columbia mines in 1906 was 1,899,076 tons of 2,240 lb., or 2,126,965 tons of 2,000 lb. After deducting amount made into coke the net output was 1,517,303 long, or 1,699,379 short, tons.

*In "Annual Report of Minister of Mines" for 1906.

A REVIEW OF PROGRESS IN THE MINERAL PRODUCTION OF BRITISH COLUMBIA.

*By E. Jacobs, Victoria, B. C.

MINERAL PRODUCTION in British Columbia is steadily increasing in value and importance. Its progress during many years to the end of 1906, was the subject of a short paper contributed to the *Journal of the Canadian Mining Institute,* as follows:

British Columbia's total mineral production to the end of 1906 is shown by official records to have been $273,643,000. This production was apportioned as follows:

Placer gold		$68,721,000
Lode metals—		
Gold	$41,016,000	
Silver	25,586,000	
Lead	17,626,000	
Copper	35,546,000	
Iron and zinc	270,000	
		$120,044,000
Total metalliferous		$188,765,000
Coal and Coke—		
Coal	$72,815,000	
Coke	6,520,000	
	$79,335,000	
Building materials, etc.	5,543,000	
Total non-metalliferous		$ 84,878,000
Grand total of production		$273,643,000

Reviewing several periods it is seen that from the time of commencement of mining operations in the Province to the end of 1886, the total value of production was $64,246,000 in the following proportions: Placer gold, $53,797,000; coal, $10,449,000. In the ten years, 1887-1896, a total of $37,809,000 was produced; this consisting of placer gold, $5,006,000; lode metals, $8,126,000; coal and coke, $23,537,000, and building materials, etc., $1,140,000. For the ten years 1897-1906, the total was $171,588,000, comprising placer gold, $9,917,000; lode metals, $111,979,000; coal and coke, $45,349,000, and building materials, etc., $4,343,000. Recapitulating, the production of the respective periods above-mentioned was as follows:

To end of 1886	$ 64,246,000
Ten years, 1887-1896	37,809,000
Ten years, 1897-1906	171,588,000
Total production, all years	$273,643,000

The progress of British Columbia's mining industry is further indicated in the following summary:

PLACER GOLD.

The production of placer gold dates back to 1858, in which year a total of $705,000 was recovered. The maximum production in any one year was that of 1863, with a value of $3,914,000, followed the next year by a total of $3,736,000. This was when placer mining was at its best in the Cariboo district. In the seventies there was a gradual reduction, while through the eighties the decrease was more marked, continuing into the early nineties. The minimum yearly total was reached in 1893 with a production for that year of only $356,000. Thenceforward there was a steady increase. The yearly average total recovery during ten years, 1897-1906, was about $991,700. The total production during 49 years has been in round figures:

Period.	Value.
In nine years, 1858-1866	$23,674,000
In ten years, 1867-1876	19,787,000
In ten years, 1877-1886	10,336,000
In ten years, 1887-1896	5,007,000
In ten years, 1897-1906	9,917,000
Total	$68,721,000

LODE METALS.

The tables of production of lode mines, published yearly in the "Annual Report of the Minister of Mines for British Columbia," show that a commencement was made in 1887, in which year silver and lead to a total value of $26,500 was produced. The first official record of lode gold was a value of $23,400 for the year 1893, and of copper $16,200 for 1894.

Gold.—Out of a total of $41,016,000 of lode gold, only $2,178,000 was produced during four years, 1893-1896, but in five next following years, 1897-1901, there was an increase to $14,984,000 for that period, while still greater progress was made during the five years, 1902-1906, the total for which was $23,854,000, or an average of rather more than $4,770,000 a year.

Silver.—Production of silver during ten years, 1887-1896, totalled $4,028,000, of which amount $2,100,000 was produced in 1896. For the ten years, 1897-1906, the total was $21,558,000, with a maximum of $3,273,000 in 1897, and a minimum of $1,521,000 in 1903. The total for the whole period reviewed was $25,586,000.

Lead.—The production of lead during the ten-year period, 1887-1896, was small, having totalled only $1,581,000. During the next ten years, 1897-1906, an average yearly output of rather higher than $1,604,000 was maintained, with a maximum value in 1900 of nearly $2,692,000, and a minimum in 1903 of about $690,000. The total for this period was $16,045,000, and the aggregate of production for all years, $17,626,000.

Copper.—No copper was produced until 1894, in which year a beginning was made, with an output valued at $16,234. For the three years 1894-1896, a total of $254,802 is recorded. Thereafter the production for ten years, 1897-1906, totalled $35,292,000. The output of 1906, valued at $8,288,000, was by far the highest for any single year since production of this metal was begun in the Province.

*Editor British Columbia Mining Record.

Other Metals.—The production of other metals than the foregoing, placed at a total value for all years of about $270,000, may be subdivided, approximately, as follows: Zinc, $160,000; iron, $100,000; platinum, $10,000. Of these, both iron and zinc are expected to show increased production in the near future.

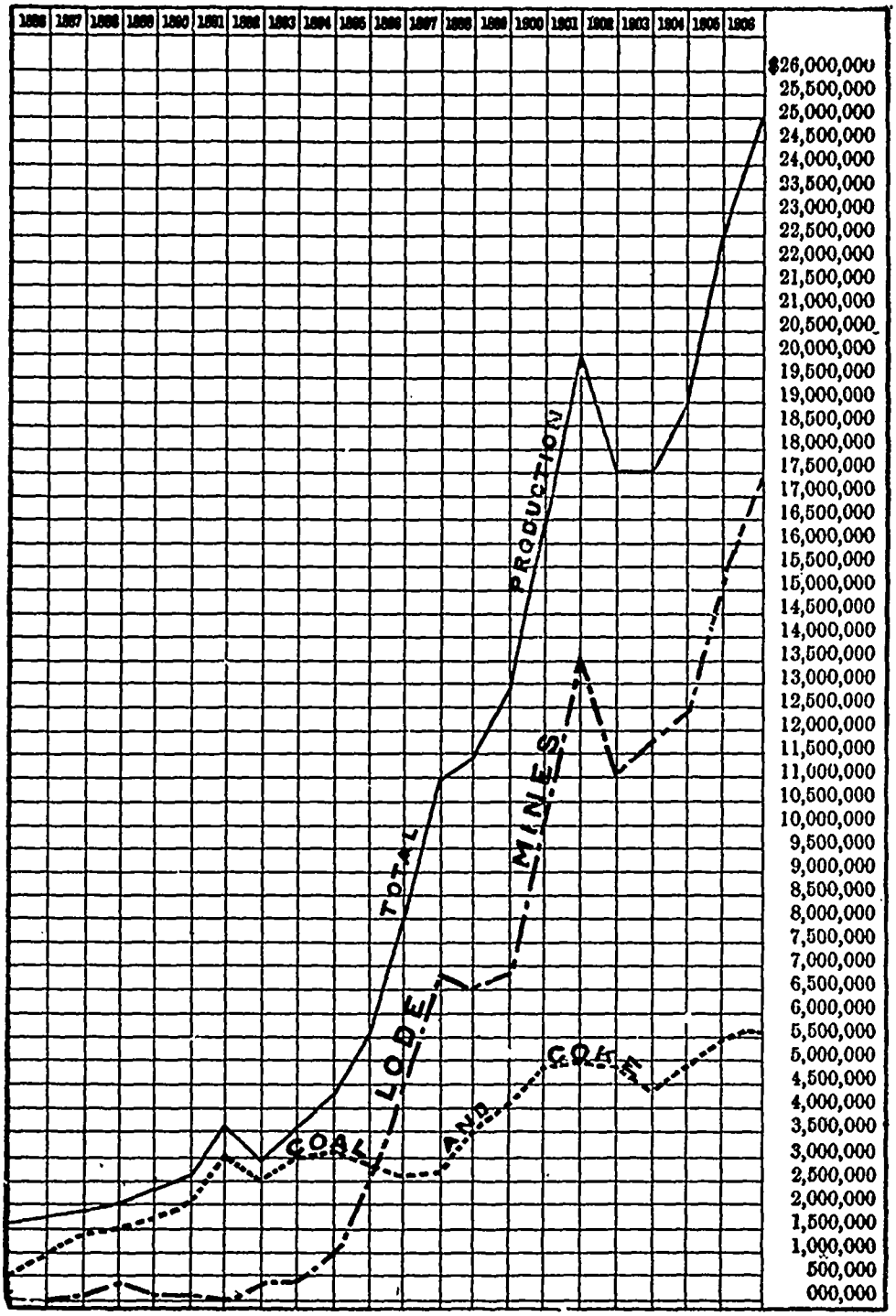


Table showing Progress of Mineral Production in British Columbia.

COAL AND COKE.

Coal mining appears to have been commenced in 1836, but production must have been small during 30 years to 1865, inclusive, official records showing a total value for the whole of that period of only $666,288. It was not until 1884 that the total for any single year reached $1,000,000; the recorded value for that year was $1,182,210. As already shown, the total value to the end of 1886 was $10,449,000. During the next period, 1887-1896, the production of $23,537,000 included $7,825 for coke, the manufacture of which was commenced at Union, Vancouver Island, in 1895. Of the total of $45,349,000 for coal and coke during the period 1897-1906, the production of the latter was $6,512,000,

chiefly from the collieries of the Crow's Nest Pass Coal Company, in southeast Kootenay, at which coke-making was begun in 1898.

BUILDING MATERIALS, ETC.

Building stone and brick, fire-brick, lime, cement, and such earthenware as pipes and tiles, constitute practically all the non-metalliferous minerals included under this head. The output from Coast quarries of granite and sandstone for building purposes has considerably increased during the last two years. The production of brick and lime is also on the increase. Portland cement has been manufactured on Vancouver Island since 1904; the output for 1906 was of a value of between $200,000 and $300,000, while for the current year the outlook is favourable to a substantial increase. Oil and oil shales are still undeveloped so as yet are not of commercial importance in the Province.

PRODUCTION OF 1906.

Turning now to the mineral production of 1906, which was a record year in the history of mining in British Columbia, it is noteworthy that the total of nearly $25,000,000 is rather better than 11 per cent. higher than that of 1905, while it shows an increase of nearly 32 per cent. as compared with that of 1904, and nearly 43 per cent. over 1903. As regards tonnage of ore mined, which is of course exclusive of coal, the quantity was about 1,964,000 tons, an increase of 15 per cent. over that of 1905. The number of mines from which shipments were made was 154, but of these only one-half shipped more than 100 tons each, and but 41 in excess of 1,000 tons each. The number of men employed at the metalliferous was not quite 4,000, and at the coal mines a higher total, together giving an aggregate of between 8,000 and 9,000.

While the higher prices of silver, lead, and copper contributed in large measure to the considerable increase in value of the year's production over that of any other year, there was also an enlarged output of copper, coal, and building materials. Copper especially made a substantial gain in quantity—about 5,300,000 lb. more than was produced in 1905. Coal also showed an appreciably large increase over the production of 1905, and the year's output of 1,517,000 tons was the biggest tonnage ever reached in the Province in any single year.

The causes of decreased production of several of the minerals in 1906 as compared with 1905 were temporary and the reasonable expectation is that they will not similarly affect production in 1907.

As exhibiting the importance of mining in comparison with other staple industries of British Columbia, the following estimate of production in 1906, made at the close of that year, is submitted:

Lumbering	$ 9,500,000
Agriculture	8,000,000
Fisheries	8,000,000
Together	$25,500,000
Minerals	26,000,000
Manufactures	11,000,000
Total	$62,500,000

It will be seen that the estimated total value of the mineral production was about $1,000,000 in excess of the actual amount shown in the revised figures based on the official returns, nevertheless the mineral industry came a long way first with a value of the year's production only about $520,000 short of that estimated as the total of the products of lumbering, agriculture and fisheries combined. While this is a decidedly creditable showing for the mining industry of the Province to have made, the immediate outlook is that when the time shall come for a corresponding comparison for 1907 to be made, the mineral production for that year will be found to have reached a still more favourable relative position.

In recent numbers of the MINING RECORD mention was made, first of the appointment of Dr. R. A. Daly to a professorship in the Massachusetts Institute of Technology, and next of Professor Jaggar and party having proceeded to the Aleutian Islands for purposes of scientific study. The April-May number of *Economic Geology* contains the following information relative to those scientists and their work: Dr. Reginald Aldworth Daly has been appointed professor of physical geology at the Massachusetts Institute of Technology, the appointment to take effect October 1, 1907. Professor Daly has completed six seasons of field work as geologist of Boundary surveys at Ottawa. He has only the office work to finish. In Boston he will teach dynamical and physiographical geology to classes of mining and civil engineering students. He will also offer research courses in the physical geology of the igneous rocks and in oceanography. Dr. Daly's coming to Boston is part of a movement at the Massachusetts Institute to establish a research laboratory of physical geology, directed by T. A. Jaggar, Jr. Funds for the purchase, installation and maintenance of seismographic apparatus have been subscribed. The laboratory will deal primarily with the direct measurement and record of earth movements and processes. Professor Jaggar will inaugurate the research work of the laboratory by an expedition to explore the Aleutian Islands. The exploration is financed by Boston men. The scientific party includes Professor Jaggar as geologist, Prof. H. V. Gummere of the Drexel Institute as astronomer, a physician, a mining engineer, and two student assistants. The main object of the scientific work is the study of Aleutian volcanoes, and some attention will be given to magnetism. Travel will be by schooner from Unalaska to Attu and return. The volcano on Akutan was reported active about March 15, and a new extension of Bogoslof rose from the sea in 1906, according to authentic reports.

The *Mining and Scientific Press* states that 'statistics indicate a big increase in the consumption of sheet mica during the past year, in the United States. The imported mica comes from Canada and India, this country taking about one-half of the output of the Canadian mines. Ground mica, of Canadian origin, is not imported on account of the tariff."

DEVELOPMENTS OF THE YEAR.

MINING DEVELOPMENT in the Province in 1906, though in a large measure satisfactory, exhibited no very striking features. Coal mining has notice elsewhere. The official review of the year's metal mining follows:—

PLACER MINING.

In placer mining a departure has been made in Atlin, from the methods formerly in vogue, in the installation of the first properly equipped steam shovel, with apparently satisfactory results. In Cariboo, the long-preached axiom that the quantity of water available for hydraulicking is the measure of the output, has had the effect of starting extensive plans and works for rendering available considerably more water, the effect of which on the production will not be noticeable for a couple of years.

Dredging in Atlin has proved a failure, owing to the character of the gravel rather than the scarcity of gold. Dredging on the Fraser and its tributaries has not proved successful, for various reasons.

Individual placer mining is decreasing to such an extent as to be now relatively unimportant.

LODE MINING.

The enlarged production of the lode mines of the Province in 1906 was entirely due to the increase in the market price of metals, together with the effect this had in stimulating the output of copper ore in the Boundary and Coast districts.

The chief product of the East Kootenay district is silver-lead ore, of which practically all is obtained from two or three mines in the Fort Steele mining division. Here, although the amount of lead produced in 1906 was 3,761,317 lb. less than in 1905, the former year's production was more than double that of 1904. Despite the decreased production, the market price was so much higher as to make the value of this year's diminished product greater than was that of last year. The same is true of the silver product. The quantity of ore handled this year increased by about 10,000 tons. Fort Steele mining division produced about 85 per cent. of the total lead output of the Province. The North Star Company again began to ship a considerable quantity of ore from one of its properties.

In the Windermere mining division some six mines shipped during the year, but did not average 50 tons each.

In the Nelson mining division the tonnage of ore mined was about the same as in 1905, but, owing to the closing of the Ymir mine, the production of gold decreased, while the copper output more than doubled. Several of the smaller properties in the division were energetically and successfully operated.

In the Slocan district some 52 mines shipped ore—about the same number, as in 1905—but of these only 16 produced more than 100 tons each during the year. During the year the metallic content of the ore was only about half what it was in 1905, or one-quarter of 1904. This great decrease is partly attributable to the fact that in 1906 there was no market for zinc ore, which is a by-product in the mining of galena. Neither the Dominion Government bounty nor the high price of the metals seems to stimulate the lead industry in this district.

In the Rossland camp there was a decrease in the tonnage of ore mined of 15 per cent., with a somewhat greater decrease in gold and copper contents.

In the Boundary district, despite a shortage of coal and coke for about two months, there was an increase of some 22 per cent. in the tonnage of ore mined. The value of the gold product increased about 19 per cent.; of silver, about 18 per cent.; and of copper, 44 per cent. The value of the copper product in this district was nearly 75 per cent. of that of the whole Province.

In the Coast district, on Texada Island, the Marble Bay mine has maintained regular shipments, while the Copper Queen and Van Anda properties have again begun to ship, although in small quantities. The iron mines have not been operated.

In the New Westminster district the Britannia mine has been in operation, but on account of troubles with the aerial tramway, and difficulties encountered in the concentration of the ores, has not been so successful as it was hoped it would be. There were mined, however, during the year about 90,000 tons of ore, of which some 35,000 tons were shipped direct to the smelter and about 55,000 tons were concentrated, producing nearly 10,000 tons of concentrates. The metallic contents of the ore mined were, approximately, 2,800 oz. of gold, 4,500 oz. of silver, and 2,600,000 lb. of copper. The smelter operated by this company, situated at Crofton, has been in operation during the year on Britannia ore, supplemented by ores from Alaska and from the Portland Canal.

The Portland Canal district has at least partly fulfilled its promise of last year, and during the latter part of this year has been shipping to the smelter at Hadley, Alaska, from one mine, about 100 tons of copper ore a day.

In the Omineca mining division, on the headquarters of the Telkwa and Zymoetz Rivers, a number of prospects are being developed which have good surface showings, chiefly copper ore. These will, however, be too remote from transportation to be available until after the Grand Trunk Pacific railway shall be built.

On Vancouver Island, the Tyee mine shipped some 24,000 tons of ore, containing 1,800,000 lb. of copper, in addition to gold and silver values. The development of the lower levels of the mine has been continued regularly, but has so far failed to disclose any important ore bodies. From the Richard III. mine shipments of ore have again been made this year from a big shoot of ore that is a continuation of the Tyee ore body. A shipment of almost 100 tons of copper ore was made from the Southern Cross mine, on Alberni Canal. Active development has again been begun on the copper properties at Sidney Inlet on the West Coast of the Island.

METALLIFEROUS MINING ON WEST COAST OF VANCOUVER ISLAND.

Notes of Various Island Mining Properties.

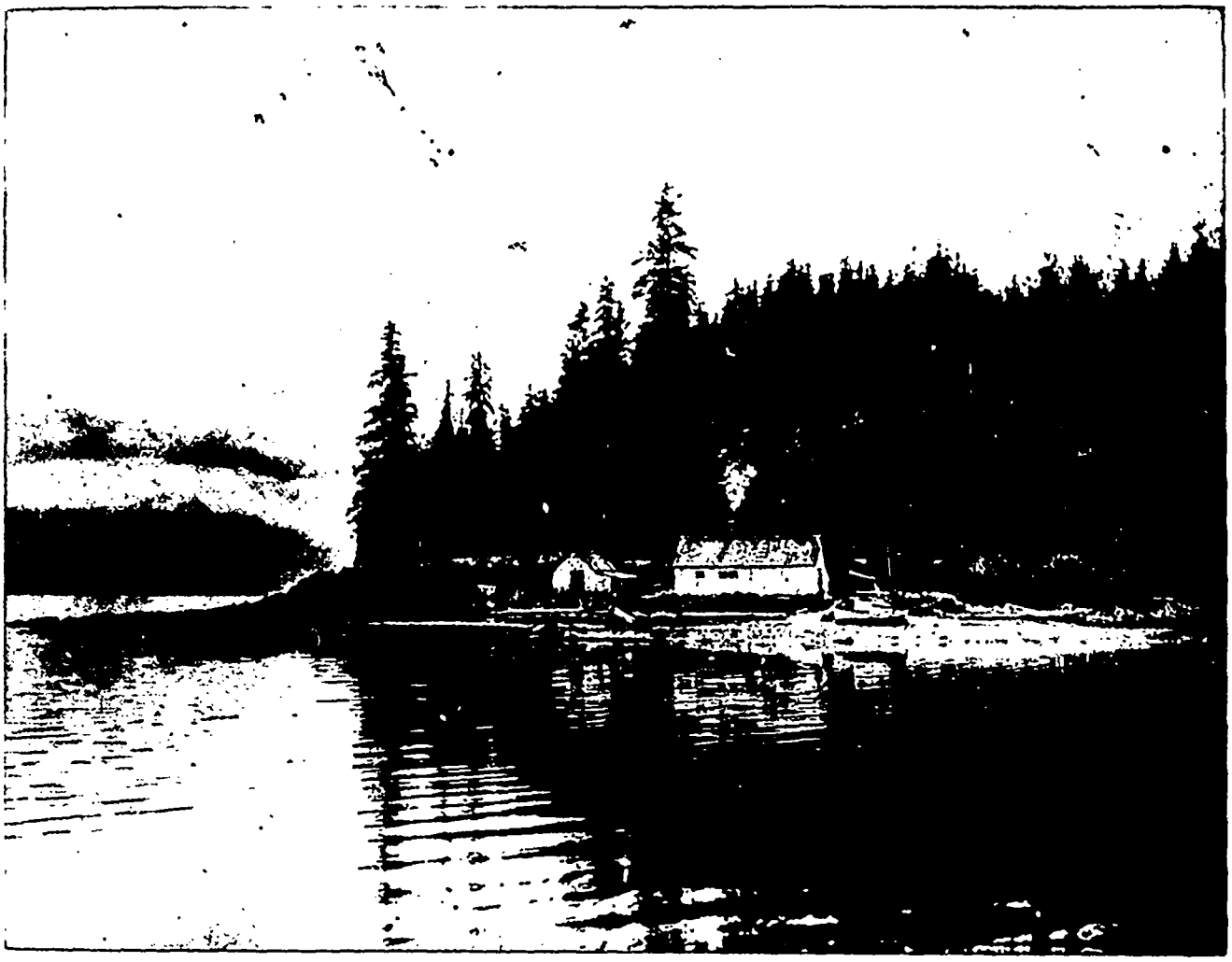
ON VANCOUVER ISLAND metalliferous mining has not yet been found profitable in an important degree except, perhaps, in the case of the Tyee mine at Mount Sicker. There are, however, numerous mineral claims in various parts of the island and among them some which develop ment, though generally not extensive, has shown to be so promising as to warrant a considerable outlay on further exploration of their mineral resources. Several of these latter are being worked, and it is probable they will ere long be steadily producing and shipping ore to one or other of the Coast smelters.

Not much reliable information of quite recent date relative to mining operations on the west coast of Vancouver Island is readily available, consequently, since it is not practicable for the MINING RECORD to obtain later particulars, except in a few instances, recourse has been had to the "Annual Report of the Minister of Mines" for 1906 for the information that follows. Most of the engraving blocks used in illustration have been courteously lent by the Bureau of Mines.

The west coast of Vancouver Island was visited last summer by the provincial assayer who reported as follows:

QUATSINO SOUND.

June Group.—The provincial assayer visited and reported on the properties in the vicinity of Quatsino in 1903, since which time 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 south-east arm of Quatsino Sound. As was then noted there was on this property a marked mineralized zone, occurring as a ridge, shown up for a length of 300 ft. This showing had then been prospected by a series of open cuts and gave promise of the probable finding of an orebody. Last year 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

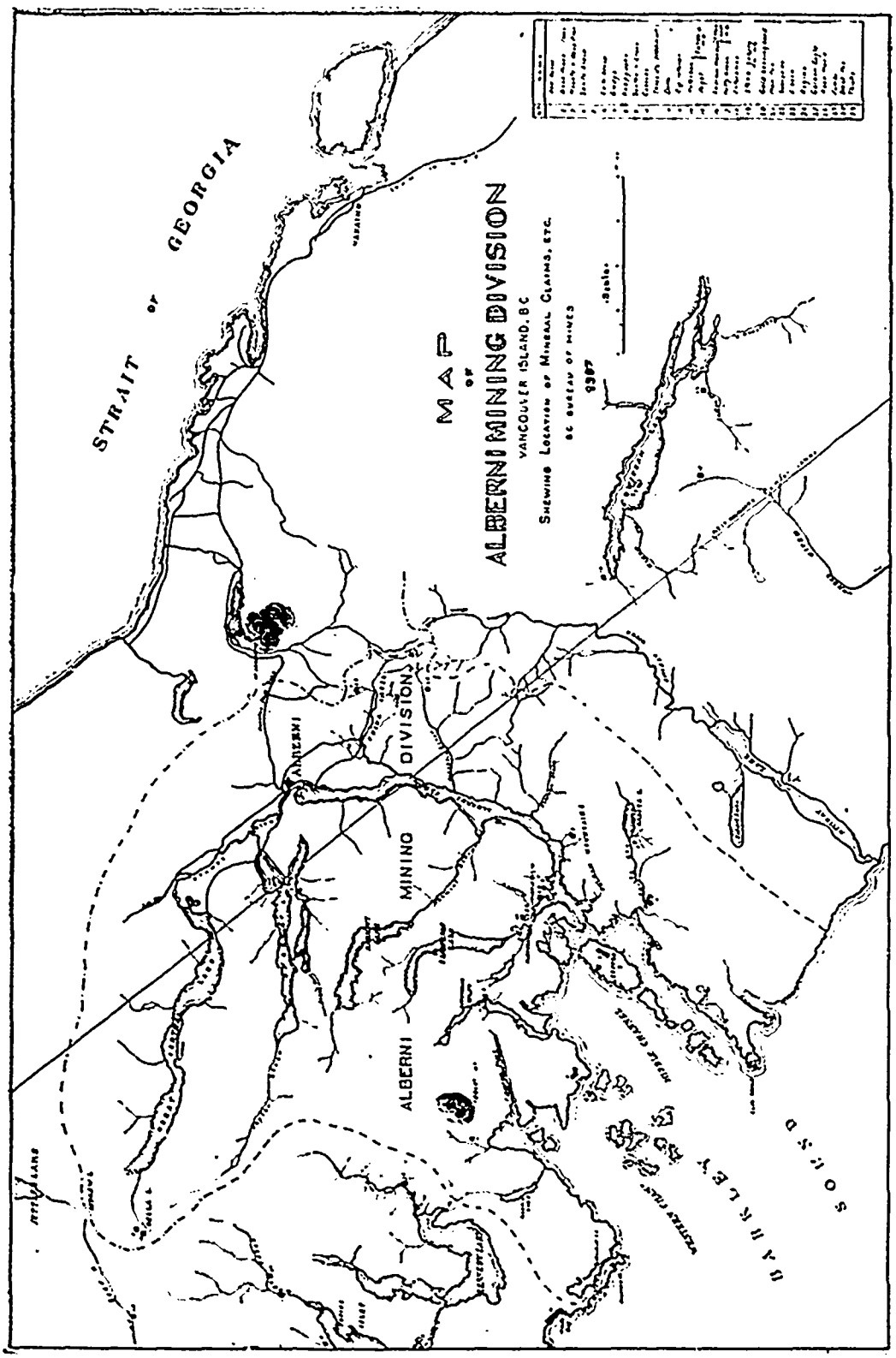


Coal Harbour, on West Arm of Quatsino Sound, Vancouver Island.

tunnel. This work has been done under the charge of Harold Grant, of Victoria.

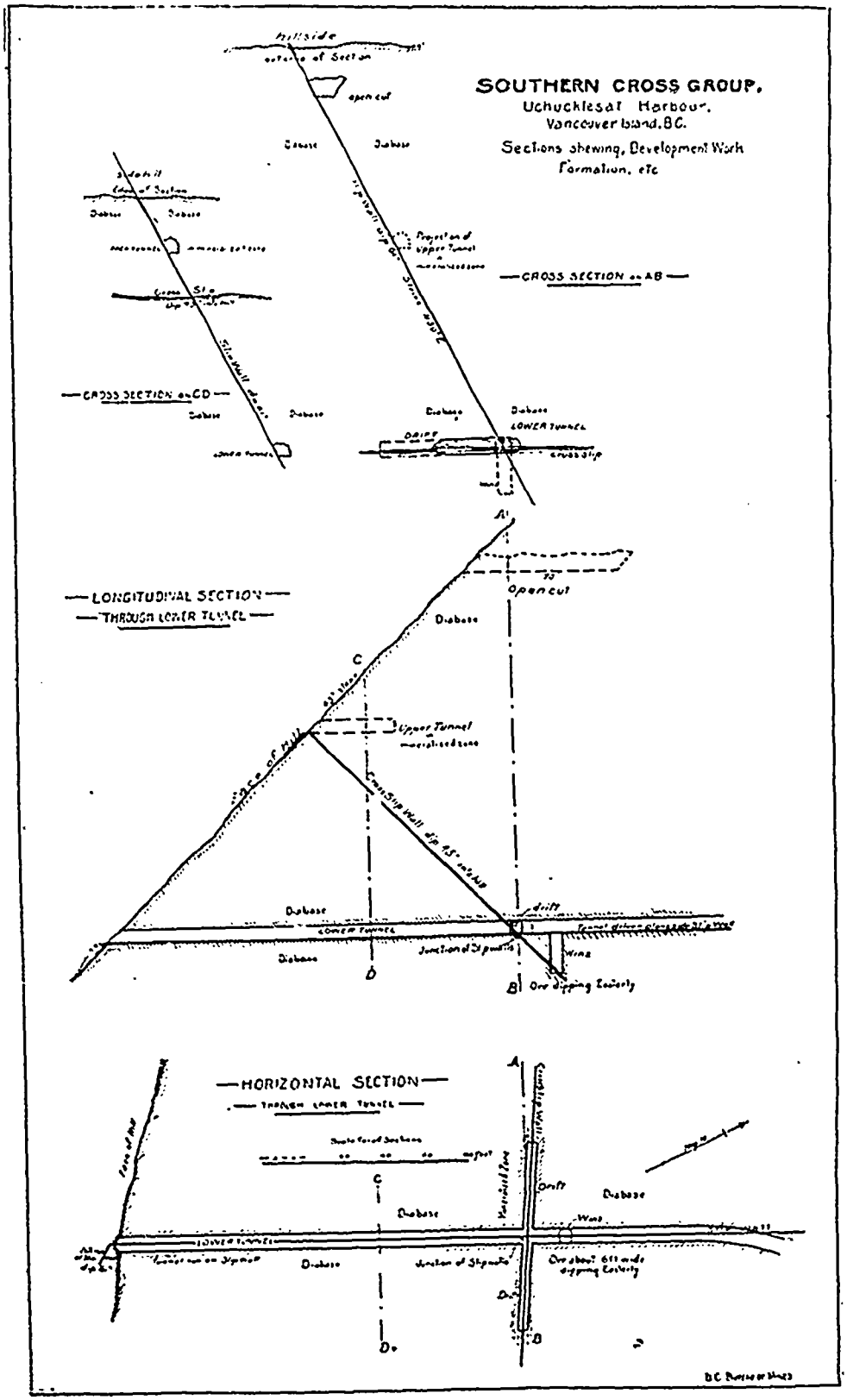
Yreka.—The Yreka mine, which was being worked in 1903, and was then fully reported on, has since that date lain idle and no further development has taken place.

Hematite Iron Ore.—The hematite iron ore deposit, noted in 1903 Report as situated on the west arm of Quatsino Sound, has been further prospected by small open cuts and test pits, with results that appear satisfactory to the owners. It is understood that the property has been under bond to a syndicate which contemplates the making of iron at Irondale, Washington, but, as far as can be learned, no or-



has been mined or shipped from the property.

On some of the other claims within the district tributary to the sound some little work has been done,



but it has been in each case limited to the amount of assessment necessary to hold the property.

KYUQUOT SOUND AND ESPERANZA INLET.

Kyuquot Sound and Esperanza Inlet are to the south of Quatsino Sound, on the west coast of the island. These inlets were prospected to a certain extent some three or four years ago, but no ore show-

ing warranting further prospecting was found.

NOOTKA SOUND.

Nootka Sound lies to the south of and adjacent to Esperanza Inlet.

Marble on Deserted Creek.—An attempt is being made on the shore of Deserted Creek—an arm of Nootka Sound—to develop a marble quarry, which is particularly interesting, as previous similar attempts on other parts of the Coast have shown the deposits worked to be so fissured by the proximity of igneous rocks, developed locally, as to be of no value commercially.

Deserted Creek is an arm some 2½ miles long by about half a mile wide, running in a northwesterly direction, and has a depth of 40 fathoms of water at its mouth, gradually shoaling off to 14 fathoms at its head. From the water's edge the mountains rise abruptly to a height of over 1,000 ft., leaving little or no land anywhere along the shore.

At the mouth of the creek or inlet the country rock is syenitic granite, but about a mile up the inlet this gives place to a highly crystalline limestone or marble, which has been traversed in places by diabase dykes, varying in width from a few inches to one that measured 45 ft. across. These dykes seem to be more silicious on the western side of the inlet than on the eastern.* On the east side this limestone formation extends for 1½ miles to the head of the inlet, rising to a height of several hundred feet and showing out strongly in great massive bluffs.

This entire mass of limestone has been rendered highly crystalline, probably by the great quantity of igneous rocks which surround and traverse it. While it has become crystalline, the crystallization varies greatly in character, and it would appear, from close examination, that along the contacts of the limestones with the dykes the crystallization is fine-grained, while farther away from the influence of the dykes the crystalline form is much coarser—in some places, very coarse. The original bedding of the limestone has been so completely obliterated by the metamorphism to which it has been subjected that no definite idea could be formed as to the strike of the beds, although this appeared to be N.E. and S.W., with an equally indefinite dip seemingly to the east.

The deposit on the east side of the inlet has been taken up by J. Hastie *et al.*, while that on the west side is held by J. Mortimer.

There is on either side of the inlet undoubtedly an extensive deposit of crystalline marble, of great purity and good quality, but as to whether this deposit will produce a commercial product—that is, solid, flawless slabs of commercial size—it is as yet impossible to say definitely, since no work has been done to open up quarries, and only a few shots have been blown out of the surface exposures to test them.

While, undoubtedly, in a number of places, the deposit has been considerably shaken and fissured yet there are indications leading to the belief that there are several spots which have not been so affected, and where quarries may probably be opened up and blocks of even large size obtained, free from flaws or shakes.

The colour of the marble on the east side is somewhat variable, but it is generally a blue-gray, becoming darker towards the northern end of the inlet.

On the west side of the inlet, while the extent of the deposit is not quite so great as on the east, the texture is finer and the colour is good, varying from a pure white to gray, while at several spots it presents a mottled face—white with gray streaks—from which it would seem from surface indications as if blocks of considerable size might be obtained.

If the properties prove upon subsequent development to be workable, as the present exposures indicate, they are admirably situated as regards transportation, being right on the shores of a deep navigable inlet, well sheltered from storms or rough water.

Stormont, Glengarry and Texas.—These mineral claims form a group owned by Stockham, Grant & Dawley of Victoria and Clayoquot, situated at the upper end of Head Bay, an arm of Nootka Sound, and distant half a mile from the water. At an altitude of 350 ft. above the sea some surface stripping has uncovered a body of magnetic iron ore, that appears to be of considerable size. The best exposure is a bluff more than 40 ft. high and uncovered for a width of 100 ft., in which exposed face the magnetite seems to be solid and unmixed with rock matter. At this point the ore has been partly stripped for a further distance of 200 to 300 ft., while it is said to have been traced through the three claims. The mineralization appears to occur along the contact of a felsitic, igneous rock with a limestone, but sufficient work has not been done for any definite ideas being formed of the dip or strike of the ore-body or of its general character. An analysis of an average sample gave the following result: Iron, 66.42 per cent.; sulphur, 0.26 per cent. The property is most favourably situated for cheap mining, and a railway two miles long, with easy grade, would give a means of conveyance for the ore to a sheltered bay with navigable water.

HESQUIAT HARBOUR.

Hesquiat Harbour is the next inlet to the south of Nootka Sound, and was visited by the provincial assayer in 1902, since which time no new developments have been made further than assessment work performed on the Brown Jug group, owned by Norris & Smith, of Alberni, and situated on the east side of Hesquiat Lake. The ore is reported to be zinc blende, carrying 20 to 25 oz. of silver to the ton.

*The following is the report of Dr. J. A. Dresser, of Montreal, on a microscopic examination of this dyke rock, taken from western side of the inlet:—

"No. 4,004.—Dyke Rock, Deserted Cove.—This is a yellowish green rock of fine, even texture. In the thin section is found to consist essentially of feldspar, augite, quartz and hornblende, with accessory amounts of some iron ore and shreds of leucoxene. The feldspar is plagioclase, well crystallized; augite, which in amount is nearly equal to feldspar, is of the later crystallization than many parts of that mineral; at least several interstitial spaces are filled with quartz; hornblende occurs in rather small brown crystals, somewhat chloritized. The rock is a quartz diabase."

SIDNEY INLET.

Sidney Inlet is about 10 miles southeast from Hesquiat Harbour, and 12 miles north of the Indian village of Ahousat. This camp was visited in 1899 by the writer; since that time considerable development has taken place on both the Indian Chief and Prince groups of claims, and some ore has been shipped.

Neither of these claims was being actually operated, and there was no one on the ground to serve as a guide, nor could one be obtained. However, an attempt was made to find the various workings by following up the old trails; but as trails in this part of the country become rapidly obscured by the rank underbrush and moss, the result was not satisfactory, as only three of the numerous openings could be found. This is to be regretted, as from reliable authority it is known that a number of new exposures of ore have been uncovered, which the owners consider very promising.

Indian Chief.—This group, consisting of nine claims—Firefly, Leschhi, Brutus, Mephistopheles, Scotlet, Victor Fract., Victor, Dewdrop Fract., and Tinnicanum—is owned by Hon. Edgar Dewdney, of Victoria. The property extends from the shore of Sidney Inlet back some 6,000 ft., in which distance the hills rise to a height of more than 2,000 ft. The mine camp is at an elevation of 1,200 ft.; the principal workings are farther up the mountain, and are reached by short trails from the main trail from the beach, which is one mile long. Over this about 100 tons of ore have been packed down to the beach and shipped thence to the Crofton smelter, yielding returns of 17 per cent. copper. The camp buildings consist of a cabin and stable on the beach and a good bunk-house up the hill.

Prince Group.—The Prince group, consisting of eight claims—Prince Nos. 1 to 8—is situated to the north of and adjacent to the Indian Chief group.

Upper Tunnel at Southern Cross Mine, Alberni Canal, Vancouver Island.

The occurrence and character of the ore are similar. This is a group which was obtained and developed for a Scotch syndicate by Dr. T. R. Marshall, now of London, but since his departure from the Province, in 1904, the claims have remained idle.

The Prince and Indian Chief groups use the same trail from the beach for a distance of 2,200 ft., when the trail forks, the right-hand branch going to the Indian Chief and the left-hand to the Prince group, this latter being situated some 7,000 ft. from the landing wharf.

AHOUSAT.

Ahousat is an Indian village situated on a sheltered

bay, Matilda Creek, making in on the east side of Flores Island, and is a regular port of call for the coasting steamers. There is a store here owned by W. Dawley of Clayoquot, where the more ordinary supplies can be obtained.

Ormond.—The Ormond is a claim owned by G. Beck and Gardhouse, of Ahousat, and situated about a mile back from the west shore of Matilda Creek or arm. At an altitude of some 950 ft. some blasts have been fired, breaking a few feet into an exposure of magnetite iron ore, showing here for a width of 3 or 4 ft., and occurring in epidote and diabase.

A little farther to the west and at about the same altitude there is to be seen, in a zone of movement in the diabase country rock, mineralization by copper pyrites and pyrrhotite, on which a short tunnel had been driven in for some 8 ft. The mineralization in this tunnel was ill-defined and indistinct, consequently, a second tunnel was started some 30 ft. lower down the hill, to prospect the showing at that greater depth. This tunnel is now in 54 ft., and has been driven on a well-defined slip wall in the diabase country rock. This slip forms the left side of the tunnel, and on that side no mineralization was seen, but the right-hand wall is irregularly mineralized with iron pyrites and copper pyrites which in certain spots ran as high as 6 or 7 per cent. copper. Some 75 ft. vertically and 150 ft. horizontally back from the second tunnel several shots have been put in on a rock exposure showing mineralization with pyrrhotite and copper pyrites.

A little to the south of and at 400 ft. lower elevation than the Ormond there occurs in a basic eruptive rock a mineralized zone running in a north and south direction, and on this zone several claims have been located. Beginning at its northern end, the following claims were seen:—

Pete and Iron King.—The Pete and Iron King, adjoining claims, have been purchased by Capt. John Irving and Wm. Wilson, of Victoria. At an altitude of 575 ft. and half a mile west from the shore of Matilda Creek or arm, several open cuts have been made, the longest being 27 ft. These show the zone in the diabase to be strongly mineralized with pyrrhotite and a little copper pyrites. A few feet to the south of this cut a few shots have exposed the rock, which here appears to contain a greater percentage of copper pyrites.

Copper King Nos. 1, 2 and 3.—To the south of and adjoining the previously mentioned claims are the Copper King Nos. 1, 2 and 3 mineral claims, owned by A. Watson and Sullivan. Towards its

Lower Tunnel at Southern Cross Mine, Alberni Canal, Vancouver Island.

southern end the mineralized zone already referred to occupies a ridge, and into this a tunnel has been driven, which for the whole 30 ft. of its length is in solid pyrrhotite. To the east and on the other side of the ridge the rock is soft and very much crushed, and in this very little mineralization could be seen. One or two inclines have been run into the hillside, and these are said to carry ore, but as they were full of water, such statement could not be confirmed by personal observation.

At Happy John Mine, Alberni Mining Division.

Ormond No. 2.—The Ormond No. 2 mineral claim has been located by Beck and Gardhouse on the east shore of Matilda Creek, and prospected by several open cuts and a few shots on surface. In one of these exposures, on a contact between diorite and diabase, there was seen from 3 to 4 ft. of solid magnetite, while from some of the other showings a small quantity of fair copper ore has been taken out, but no extensive mineralization has been proved by the work so far done.

CLAYOQUOT SOUND.

Clayoquot Sound is the first important inlet to the south of Sidney Inlet, and it has many branches, affording a splendid landlocked waterway. This district was visited by the provincial assayer in 1899, when a number of claims were reported on in full. Since then many of the claims have lain dormant, and on a few only has even the requisite assessment work been done.

Good Hope.—The Good Hope claim, owned by the Helga Mining Company, of Seattle, Washington, showed in 1899 a well-defined quartz vein from 4 to 7 ft. wide; since then the owners started a tunnel 126 ft. below the outcrop, to cross-cut the vein at depth. In and from this tunnel some 800 ft. of drifting and cross-cutting has been done, without locating any body of pay ore. Still undiscouraged, the owners are preparing to do at least a small amount of further work, which, it is hoped, will meet with better reward, since such energetic development is rare on the west coast.

Killapa.—The Killapa claim is situated on the shore of Disappointment Inlet. An attempt was made to find this claim, which was, however, not successful, as the trails were not traceable, being so grown over with underbrush. It was learned later that only the annual assessment work had been done on the property for some years. The following notes are from the report of an engineer who visited the property:

"The most important development work has been done at an altitude of some 600 ft. where a tunnel has been driven 150 ft. in ore. The vein-matter consists of quartz with iron pyrites and copper pyrites, carrying gold and silver, and is about 3 ft. wide."

American Wonder.—The American Wonder claim, situated on Tranquil Creek and owned by General Aston, of Tacoma, was visited in 1899, when a good body of copper ore was exposed. Since then the claim has been Crown-granted and allowed to remain idle, no further work having been done, so the conditions remain as before.

Hetty Green.—The Hetty Green claim is situated on Deer Creek and is owned by Ward and Thompson, of Alberni. Considerable work has been done on the property, and in 1905 some 215 tons of good copper ore were shipped out over a wagon road built with the assistance of the Provincial Government.

BARKLEY SOUND.

Barkley Sound is the most important inlet on the west coast of Vancouver Island, with many arms, extending for 35 miles in a northeast direction into the island, about two-thirds of the distance across, and at the head of the most important arm, Alberni Canal, is the town of Alberni. There are a large

Prospect Shaft at Cascade Mine, Alberni Mining Division.

number of claims situated in the district tributary to the various arms of this sound, and of which many were visited this summer.

Red Rover.—The Red Rover claim, owned by Jay, Graham and Poole, is situated about 2½ miles to the north from the shores of Toquat Harbour (with which it is connected by trail) and at an elevation of 375 ft. above tide water. A small creek flowing through the property has exposed a quartz vein from 2½ to 3 ft. wide, with a strike N. 30 deg. W. and a dip of 65 deg. E. at this point. Below this

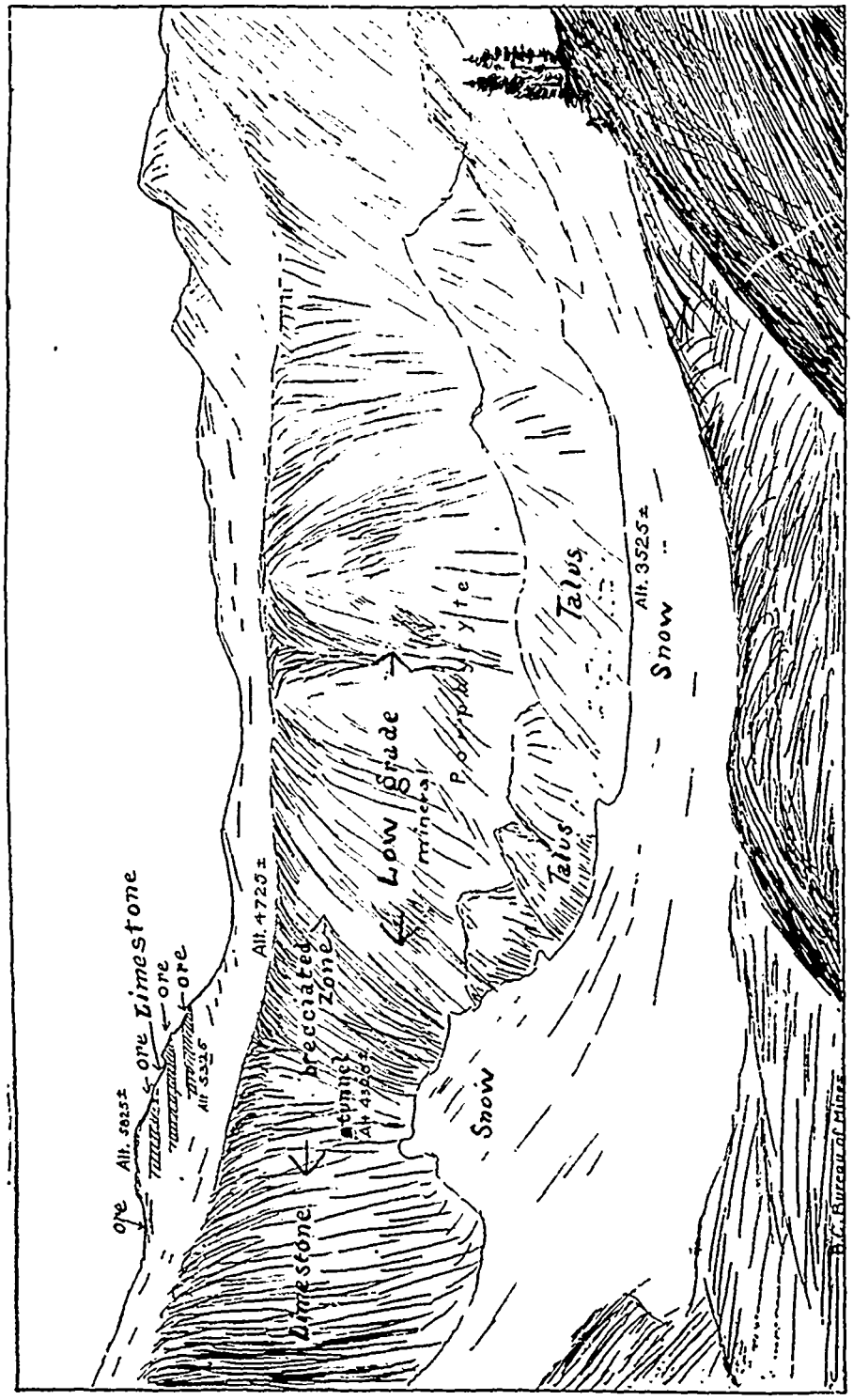
exposure, some 20 ft., an open cut 30 ft. long was run, from which some quartz was taken out, carrying $5 in gold per ton. From the exposure in the open cut it was seen that the vein was flatter than indicated by the outcrop, consequently, a tunnel was started at the end of the cut and under the vein as exposed. This tunnel gradually turns to the right, so as to cross-cut the course of the vein, but in the tunnel the vein does not appear to be clearly defined. The vein is in a diabase country rock, with fairly tight walls, although in the open cut the hanging wall is well defined. The vein-matter is somewhat brecciated in structure, containing enclosed fragments of the country rock. The owners claim to have obtained good gold values from the vein and that the wall rock also carries values, but such were

Basin and Mineralized Cliffs, Big Interior Group, Alberni Mining Division.

In his report on this property the provincial assayer says: "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."

not apparent in the samples taken by the writer for assay.

Enterprise.—This claim is situated on Prideaux Island, on Seehart Channel, Barkley Sound, and is visited. The lead is 22 ft. wide on the surface between well defined slickensided walls; strike, N. 75 deg. E. The vein-matter is brecciated and shows considerable movement. The mineralization on the



Sketch of Basin and Mineralized Cliffs, Big Interior Group, Alberni Mining Division.

owned by J. Crawford Anderson. On the south-east side of the island a quartz outcrop on the beach has been opened by a cut and some surface work; a shaft has also been sunk on the lead to a depth of 10 ft. This latter was, however, full of water when

surface and of the dump consists of a little copper and iron sulphides, with slight indications of cinnabar. The owner of the property claims to have obtained high values in gold and an appreciable percentage of mercury from the vein, but the samples

taken and assayed by the writer only gave a trace of gold and no mercury. The ore on the dump did not show high values, but as it is much decomposed it is possible the values have been lost. The vein appears to occur on a lime diabase contact and is seen on Nettle Island, farther to the S. E., and it is reported to have been traced on to other islands for one mile and a half.

Building Stone.—On the east side of Effingham Inlet, about 5 miles up, there is a high bluff of reddish brown rock, having a close, fine-grained texture and showing no cleavage or bedding planes.* Associated with this rock mass are intrusions of a greenish eruptive, having a more or less amygdaloidal structure. The deposit has been taken up as a quarry by J. C. Anderson, of Sechart, and it is possible the rock may have some value as a building stone.

Sarita Group.—This group consists of the Black Bear, Eureka, United, Southern Cross, Midday, British Pacific, and also a leased strip of the Indian reserve fronting on the Sarita River. The property is owned by Wm. Wilson and Capt. J. Irving, of Victoria. The claims are reached by following up the Sarita River from Barkley Sound about one mile from deep water, where an outcrop of ore is seen in the river. Some 10 ft. above the river a tunnel has been driven under an outcrop of ore showing on the bluff above. This tunnel has been run in a nearly straight line S. 17 deg. E. for 180 feet. At 117 ft. in two drifts have been run at nearly right angles, the one to the right for 54 ft. and the other to the left for 40 ft. Some years ago a winze was sunk at 47 ft. in on the tunnel to a depth of 50 ft., and a drift run back towards the river of 50 ft. This winze and drift are now full of water. There has been a considerable amount of surface stripping done on different parts of the claim.

The entire surface is heavily timbered and covered with underbrush, but, from a general examination of the property, there would seem to be contact of a felsitic rock with limestone, and along this contact later diabase dykes** have intruded, carrying with them a little mineralization, consisting principally of pyrrhotite with a little chalcopyrite and arsenical iron. The mineralization is not evenly distributed through the dyke matter, some parts carrying copper and others none. At present no body has been developed large enough to pay the cost of extraction.

The tunnel cross-cuts a diabase dyke 40 ft. wide, while the drift to the left, where the work is now

Great Central Lake, Alberni District, Vancouver Island.

*The following is the report of Dr. J. A. Dresser, of Montreal, on a microscopic examination of this rock:—

"No. 4,002—Anderson's Red Rock, Effingham Inlet, B C—This rock consists of angular grains of quartz, which are cemented together by fine aggregate of granular material, which is almost wholly hematite. The rock is a jaspilite or impure jasper."

**The following is the report by Dr. J. A. Dresser, of Montreal, on a microscopic examination of this mineralized dyke matter:—

"No. 4,007.—This is a dark green or greyish green rock, consists of lath-shaped crystals of plagioclase feldspar arranged about crystals and the irregular masses of pyroxene. Smaller interstices amongst these minerals are filled with quartz. Grains of magnetite are enclosed in the various other minerals. The structure of the rock is that known as ophitic, and the rock is therefore a quartz diabase."

being done, starts on the dyke, but at 40 ft. turns, cutting through the dyke and at the face is about 2 ft. in the felsitic country rock, the strike of the dyke at this point being N. 6 deg. E. with a dip of 66 deg. N. A systematic tracing of these dykes on the surface would much facilitate the working of the claims and would save a considerable amount of work underground.

The assay values from samples taken were as follows: Straight pyrrhotite: Gold, 0.16 oz., and silver, 1.12 oz. per ton; copper, none. Ore from outcrop: Gold, trace; silver, 0.2 oz. per ton; copper, 6.2 per cent.

Cascade Mine.—The Cascade mine is situated on the north shore of Uchucklesat Harbour. Near the head of the harbour the mountains on this side rise abruptly to a height of 3,000 ft. The general country rock is limestone traversed by diabase dykes. At an elevation of 275 ft. above sea level some surface work has been done and an incline sunk on a diabase dyke, which is impregnated with bunches of iron and copper pyrites. Some 25 ft. lower down, a tunnel has been run into the mountain side, on the dyke, for 54 ft. in a general N. 30 deg. E. direction, but turning a little more to the north towards its inner end. At 20 ft. in, the tunnel ran through a shoot of ore, a few feet wide, which is cut off by a slip-wall in the dyke. The mineralization is iron and copper pyrites. Selected samples gave the following assay: Gold, 0.06 oz. per ton; silver, 0.12 oz. per ton; copper, 5.5 per cent. That there has been much movement is proved by the slickensided slip-walls which are seen. The evidence would point to the mineralization having taken place during a second period of movement. The end of the tunnel is in the diabase dyke matter, but a little mineral is seen on a slip-wall near the floor. A considerable amount of ore has been shipped from this mine, taken principally from the open cut above and from the drift to the left of the tunnel. A gravity tramway has been erected to convey the ore to sea level, where it was shipped.

Southern Cross Group.—This group is situated on the north side of Uchucklesat Harbour, near the mouth, and consists of five claims—Southern Cross, Ballarat, Little Dipper Fraction, Constance Fraction and North Star. The work has all been done on the Southern Cross. The mountain rises at an angle of about 45 deg. and at an elevation of about 150 ft., on a contact of limestone with an intrusive rock, a well marked slip-wall is seen, having a strike N. 30 deg. E. into the hill, with a dip of 60 deg. towards the southeast.* This same intrusive rock also appears in the two after-mentioned claims, the Happy

Della Lake, Alberni District, Vancouver Island.

*The following is the report of Dr. J. A. Dresser, of Montreal, on a microscopic examination of this rock:—

"No. 4,013.—A fine-textured grey rock, showing a few grains of some yellow sulphide. A few rusty patches also appear in the hand specimen. They are evidently due to the oxidation of an iron-bearing mineral. The rock consists essentially of feldspar, which is principally orthoclase and much chlorized hornblende, with a considerable development of epidote. The rock is essentially similar to the last (No. 4,007), but contains little, if any, quartz. It is a syenite porphyry."

John and Monitor. Towards the south this slip-wall is cut off, nearly at right angles, by another slip having a strike of S. 55 deg. E. and a dip of 45 deg. into the hill. The northeasterly slip-wall, first mentioned, has been followed along by a tunnel 40 ft. long, all in a body of low-grade ore, occurring in a mineralized zone in the diabase, following along the slip-wall.*

About 100 ft. lower down the hill and slightly to the east, a tunnel has been driven to reach the point where the northeasterly slip and the cross slip, before referred to, intersect. This tunnel is now in 300 ft., and for 200 ft. runs through diabase, at which distance it cuts the cross slip-wall, here found to have the same strike and dip as noted on the upper level. The northeasterly slip-wall was also struck, with an unchanged dip and strike, showing a well-developed ore body on the right hand side, some 6 ft. in thickness. This is seen in a short cross-cut of 46 ft., which runs into the limestone to the right. The tunnel has been continued along the slip-wall 60 ft., with the ore on the right side, when the tunnel swings slightly to the right, and is being run for the limestone contact, which should soon be reached. Where the ore showed strongest a winze was being sunk from the tunnel and was down 20 ft., good ore having been taken out as the winze was being sunk. The winze is now passing out of ore, as the body dips away from it on the main slip-wall. When a greater depth is reached cross-cuts will be run to the ore shoot.

The cross slip-wall before noted has been followed from the main tunnel by a drift running to the left, which is now in a distance of 45 ft. This is fairly well mineralized and may develop a good body of ore. This cross slip is traceable on the surface and has been proved by an open-cut to the left, in which direction the cross-cut is now being driven.

At 175 ft. above the main shaft an open-cut has been run for 75 ft. along a mineralized zone in diabase on a limestone contact. In the open-cut this zone shows for 17 ft., and is mineralized with iron pyrites and a little copper pyrites.

There has been no stoping done in this mine, and any ore taken out has been in the course of development. The management is pushing the development with three shifts and is making a strong endeavour to block out a good body of ore. The mine is equipped with two bunkers and ore chutes on the two working levels, and there is a good wharf on deep water for shipment. The bunkers were partially filled with a very good grade of ore, the values being principally in copper pyrites. A small shipment was made this year (1906).

A sample taken of the best-looking ore in the bin gave, upon assay: Gold, trace; silver, 0.56 oz. to the ton; copper, 18 per cent.

Happy John Group.—The Happy John group is situated on the west side of Alberni Canal, near its mouth, and consists of the Happy John, Happy John No. 1, No. 2 and No. 3 Fraction, which have been surveyed and contain 125 acres. The Happy John and Happy John No. 1 have been Crown-granted, while the others will be this year. The property is owned by Frank Brothers and A. J. Engvik. There are minor showings all over the claims, but the principal work has been done at an altitude of about 300 ft., where an open cut has been run on a diabase dyke near a contact of limestone with a felsitic rock. This cut is 40 ft. long and for the first 12 ft. follows a slip-wall in the diabase. On this slip-wall is a body of solid copper pyrites about 2 ft. 6 in. wide at the widest part, but wedge-shaped, with the apex upwards, which assays about 12 per cent. copper, with 0.06 oz. gold and 1.7 oz. silver per ton.

To the east of this outcrop and some 40 ft. lower down, a tunnel has been driven into a diabase dyke on a slip-wall. Ore shows in the bottom of the tunnel about 2 ft. wide for 15 ft. This is not as strong a showing as that previously mentioned, although it is well mineralized and it does not appear to be the same orebody nor on the same dyke.

At a height of 50 ft. above this lower tunnel, and farther to the east, another tunnel was run into the hillside, on a diabase dyke, and at 21 ft. in cross-cuts diagonally a slip which showed ore, but this slip was not followed. This tunnel is being driven to the contact with the limestone and is now in 55 ft. At 40 ft. in a detached horse of limestone was struck and a drift to the left was here started, which is now being run with the hope of reaching the contact of the solid limestone.

In the vicinity of this work there is considerable evidence of mineralization, as shown by small surface stripping. The tunnels are situated in ground rising nearly vertically, for 80 ft. or so, from the creek below. The means of ascent and descent is by ladders.

On the No. 2 claim, higher up the mountain, a shaft was sunk 12 ft. deep on a slip-wall in a diabase with 2 ft. of ore. A tunnel, now in 40 ft., is being run at a level 300 ft. lower to reach this ore.

Surface strippings show a number of parallel dykes more or less mineralized. Near the mouth of the creek a few shots have disclosed a mineralized dyke carrying arsenical iron, with traces of copper Samples gave the following assay: Gold, 0.05 oz.

*The following is the report of Dr. J. A. Dresser, of Montreal, on a microscopic examination of two samples taken from this mineralized zone:—

"No. 0.—The Southern Cross Ore.—The rock of this ore, which is an altered porphyrite, is penetrated by narrow seams of ore which maintain a generally parallel direction. In the microscopic section these lines are found to be small fractures in the rock, into which the ore has been infiltrated after the rock has been solidified and fractured. In one case a large feldspar has been broken across and ore has been subsequently deposited in the crevice thus formed. The ore has thus been the latest part of the rock to form, while if it were due to magnetic segregation, it would have been one of the earliest constituents to solidify.

"No. 4,018.—Gangue Material from the Southern Cross Mine.—This consists of radiating tufts of hornblende, chiefly actinolite and masses of some light-coloured zeolite, which is often partially decomposed. This specimen does not seem to throw any satisfactory light on the relations of the ore to the enclosing rock."

to the ton and silver, 0.05 oz. to the ton, and copper, 0.1 per cent. These claims show considerable copper mineralization and there is reason to hope that a good body of ore may yet be blocked out.

Monitor.—A description of this property was given in the 1901 report, since when the company has ceased to ship ore, but has done some prospecting on its claims, which has been confined to surface stripping. At an altitude of 300 ft. a number of small surface strippings show what is apparently a diabase dyke running through or on a contact with limestone, which dyke appears to be fairly-well mineralized, in one place solid copper pyrites being seen. This ore gave the following assay: Gold, trace; silver, trace; copper, 16.2 per cent. While no defined body of ore has been disclosed, there is evidence which would warrant further prospecting by the company.

Nahmint.—This mine is situated on the west side of the Alberni Canal, 14 miles from Alberni. The Nahmint Mining Company, Limited, was organized in 1898, with a capital of $100,000, and in 1899 had done 2,100 ft. of underground development work, which disclosed a considerable amount of copper ore. In 1900 an aerial tramway was installed and ore shipped. The ore shoot, however, gave out and a long tunnel has been driven to prospect for a new body, with, so far, negative results. The mine equipment is all in good order and in charge of a caretaker, but no work is being done on the property.

Gladys.—This claim is situated on the east side of Alberni Canal, near the mouth. The work on it has been done at an altitude of 400 ft. and several hundred feet back from salt water, where a few shots have been put in on a horse of limestone appearing in the diabase dyke, mineralized with copper and iron pyrites and a little arsenical iron. A shaft has been sunk on the dyke, 25 ft. lower, from which a considerable amount of ore has been shipped. This shaft was full of water when visited, and the ore at present remaining on the dump is only second-class, the dump having been hand-picked and the first-class ore shipped. According to a miner who had worked in the mine, there was still good ore in the bottom of the shaft, but financial difficulties necessitated the temporary closing down of the property. The assay of some selected samples taken give the following results: Gold, 0.2 oz. per ton; silver, 2.32 oz.; copper, 16.43 per cent.

Edith Group.—This group, consisting of the

Della and Glacier Mineral Claims, Alberni Mining Division.

Edith, Black Bear and Bruin, owned by E. A. Waterhouse, of Alberni, is situated on the east side of Alberni Canal, a short distance from its mouth, and is reached by a trail from the beach about a mile long, although the distance to salt water would be less in a direct line. The workings are at an altitude of 475 ft., where a tunnel has been run in a S. 65 deg. E. direction for 30 ft. This tunnel was started on a lime-diabase contact, but was diverted, continuing entirely in diabase, following a strong slip-wall along which no ore was visible, although some ore seen on the dump was presumably taken out of the tunnel. A few hundred yards to the east a number of open cuts have been made and shots blasted in diabase, which show more or less mineralization with copper pyrites, iron pyrites and pyrrhotite, the last, however, predominating while in one of the open cuts solid pyrrhotite was noted.

Arrastra, Della and Glacier Mineral Claims, Alberni Mining Division.

GREAT CENTRAL LAKE.

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 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 & 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 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 Alberni Canal, to the northeast down Buttle Lake and Campbell River, and to the west by Bear River into Clayoquot Sound.

Summarizing the conditions, 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, and as illustrated in the accompanying sketch, 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 that zone. While this talus may to a certain extent have been affected by weathering, it still may be considered a very approximate sample of the inaccessible cliff. Samples were taken from this talus, from which it is judged that approximately the central portion of the mineralized zone will assay from 0.5 to 1 per cent. copper, with from 1.5 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, which is consequently so low grade as to be of value only if found amenable to some form of concentration, and of which there seems to be a fair probability.

On the top of the mountain, in the knob shown to the left of the centre in the sketch herewith, 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 not possible 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

*The following is a report of Dr. J. A. Dresser, of Monteal, of a microscopic examination made on two samples, the light and the dark-coloured varieties, of this rock:—

"No. 4,069.—Light variety.—This is a holocrystalline, a fine-textured rock having a light grey colour, and is flecked with small needles of green hornblende. In the slide it is found to consist of feldspar, hornblende and quartz. The feldspar is principally orthoclase, although small amount of plagioclase is also present. The hornblende is much altered, chiefly to chlorite. Quartz is present, both in large crystals and also filling smaller interstitial spaces. This rock is a granite porphyry.

"No. 4,070.—Dark variety.—This is a porphyritic rock The larger crystals or phenocrysts consist of hornblende and feldspar; the former is green and occasionally somewhat chloritized. Feldspar crystals are well formed and belong to the lime soda series. One crystal showed symmetrical extinction parallel to its line of twinning, which was according to the albite law, at an angle of thirty degrees on either side, thus indicating that its composition is that of an acid labradorite. The groundmass is a finely crystalline aggregate of feldspar and biotite. Angular grains of magnetite are scattered somewhat sparingly through the rock. It is a porphyrite."

ice covered 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 Big Interior Basin, and are owned by Drinkwater & 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., and 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 arrastra, which has been erected and is being driven by a small water-wheel constructed on the ground. The arrastra had just been completed at the time of my visit.

FORMATION OF ORE BODIES ON WEST COAST.

An examination of the different properties on the west coast of Vancouver Island, especially those on which extensive development work has been done, would point to the following theory as to the mode of ore deposition:—

The properties, with the exception of those in Quatsino Sound and Great Central Lake, present nearly identical conditions. The mineralization occurs in or close to diabase dykes. Sometimes there is sufficient quartz in the fissure to make a quartz vein, but more often an entire absence of quartz, the vein-matter being the crushed material of the dyke. There appear to have been two periods of movement—the first in which the dykes were formed, when no mineralization took place; the second in which these dykes were shattered and twisted, when probably secondary dykes of a similar composition to the first series were injected into the fissures found by the movement. A careful examination of these deposits would lead to the conclusion that mineralization took place at this time, not as a secondary enrichment, but as a direct deposit by ore-bearing solutions from below. The solid mineral is seen to penetrate what were originally cavities, and to follow along old slip-walls, inside of which, as a rule, no mineral whatever is seen, as would be the case if segregation had occurred. The deposits are often of brecciated structure, the ore enclosing fragments of the original dyke-rock and only occasionally is it seen forming a part of the dyke, and then it would be accounted for as forming part of the second upheaval when the later dykes were formed. Mineralization is found along fractured zones in these dykes, and where these fractures contained cavities for the entrance of mineral-bearing solutions there are now ore bodies, but where the ground is tight or shows only slight movement, little or no ore is found.

Chalcopyrite forms the principal mineral of value, while pyrrhotite is a common mineral, occurring both massive and mixed with pyrite and chalcopyrite, but carrying little or no value in itself. Arsenopyrite occurs in many of the properties and, as a rule, carries gold values.

While no geological map or extensive examination of this region has been made, the general country rock outside of the mineralized zones appears to be syenite, occurring often as mountains of great size and connected with a series of felspathic dykes which penetrate the older rocks.

MINING IN NANAIMO DISTRICT.

Gold Commissioner's Report for 1906.

NANAIMO MINING DIVISION includes part of Vancouver Island, a considerable area of the mainland lying between New Westminster and Bella Coola mining divisions, and nearly all the islands between Vancouver Island and the mainland coast. The gold commissioner for the district reported for 1906:—

"The mineral resources of this division are being steadily developed, and the results generally have been highly satisfactory, many important discoveries having been made during the past year. There were 496 mineral claims in good standing on December 31, 1906, and more mineral claims were recorded than in the year 1905.

"The returns for the year's work from the Tyee Copper Company's smelter at Ladysmith, although not as large as the year 1905, made a good showing for the number of days that the smelter was in blast. Tons of ore smelter in 1906: 29,110; value, $477,300. With the exception of 4,744 tons, the above was all from British Columbia coast mines.

"TEXADA ISLAND.

"The Marble Bay group of claims, belonging to the Tacoma Steel Company, under the management of A. Grant, mined and smelted during the year 1906, 10,560 tons (dry weight) of ore. The development work done on the property consists of deepening the shaft 100 ft., 250 ft. of drifting and 110 ft. of winze sinking; the total depth of the shaft is now 760 ft. below the surface, or 718 ft. below sea level. A new shaft house, 40 ft. x 40 ft. and 90 ft. high, has been erected, in which has been installed a new 10-ft. diameter sheave for the hoisting cable to run over.

"One H Sullivan diamond drill, capable of boring a hole 2,000 ft. deep, has been added to the plant. The average number of white men employed in and about the mine for the year was 50, and 15 Chinese. The copper and gold values show a steady increase with depth.

"The Cornell Operating Company, working the Cornell mine, under the management of J. A. Johnson, mined and shipped about 1,000 tons of ore since July 1, 1906. The development work consists of 100 ft. of drifting and an upraise of 45 ft. A lot of timbering was done to conform with the order of the inspector of mines. The company is contemplating installing a new air compressor, hoist and cage, and boiler.

"W. Thos. Newman, who has charge of the exploitation of the Commodore group of claims on Texada Island, has kindly furnished me with the following particulars of the development work done

on Commodore mine during the year 1906:—A plant, consisting of a 40-h.p. wood-burning, locomotive-type boiler; 16-h.p. double-cylinder hoisting engine; Cameron sinking pump; duplex Morris station pump; with full complement of blacksmith shop and essential machine tools, was installed, and has been constantly worked throughout the year. A bunk-house and cook-house to accommodate about 40 men, with boiler- and engine-house (the former containing bath-room and drying room), was also built, and a substantial gallows frame, and tramways therefrom, complete the surface plant.

"With the above mentioned outfit 180 ft. of sinking has been done during the year. The main shaft is a two-compartment incline, 5x8 ft. in the clear. From the bottom of this shaft a level has been run north and south for 725 ft., and 128 ft. of crosscutting has been done. On an average 12 men have been employed during the year, in two shifts. The Commodore mine has three veins capable of being operated from the same set of openings. The main or contact vein is to be the first explored and tested, and is situate directly in the main contact crossing Texada Island between several miles of limestone on the southeastern side, and about the same extent of eruptives on the northwestern side. These operations have demonstrated the vein to be a true fissure, as three dykes have been encountered coming in from the lime-wall side, and the vein has gone straight on without being faulted, even the strong clay parting on this wall being unbroken. The only effect of these dykes has been increased mineralization on the vein in their proximity. The shaft was sunk between two large exposures a distance of 1,140 ft. apart, the drift being pushed either way. To the north the values on the surface are in silver, lead, zinc and copper, in the order named, while the exposures on the south consist of gold and copper. To the south, at a depth of 180 ft., the ore carries a satisfactory amount of gold, and the gangue is mainly quartz. When driven 1,500 ft. this level is expected to intercept both the lateral veins which run into the limestone a known distance of over 2,000 ft. in the Commodore ground.

"The Loyal Lease Company, working the Loyal group of claims, has not shipped any ore during the year 1906, but has installed a 50-h.p. boiler, and employed 10 men. The development work consisted in sinking the shaft 100 ft. deeper; the shaft is now 300 ft. deep, with 700 ft. of drifts.

"The Puget Sound Iron Company has not been working the iron mines during the year 1906; but proposes starting up again in the near future.

"The Forest Queen is getting ready to ship ore again, after having been shut down for the past year.

"There are many other properties on Texada Island on which the owners have done development work enough during the year to keep the claims in good standing.

"VALDES ISLAND.

"The Copper Cliff Mining Company, operating the Copper Cliff group of claims, situate at Copper Cliff, Valdes Island, under the management of Wm. Simison, has just begun to open up what promises to be a very valuable property, and shipped 120 tons to the Tyee smelter late in the fall of 1906. It has drifted into the mountain 45 ft., close to the sea beach. Only three men were working, but it is the intention to provide accommodation for 20 next year. The ledge is well defined and of unknown width, but on the foot-wall there is said to be 11 ft. of chalcopyrite of shipping grade. An ore bunker to hold 150 tons has been built.

"The Islands Copper Company, owning the True Blue group of claims on Valdes and Gowlland Islands, at Gowlland Harbour, has done considerable development work, sinking 50 ft., and has opened up a large body of copper ore in the diorite several feet in thickness. The percentage of copper shown by the smelter returns on a trial shipment of 22 tons of ore to the Tyee smelter was 2.84 and 6.2 on low and high-grade ores, respectively. A small trial shipment to the Tacoma smelter gave 4.30 per cent. in copper, gold, 0.02 oz. per ton, and silver, 1.3 oz. The cost of transportation to the Tyee smelter, together with the smelter charges, will not be more than $3.50 a ton; this would leave a handsome profit on even the low-grade ore, and if the orebody holds good with depth, this property should be the making of a mine. There are other properties on Valdes Island that have made good showings for the amount of work done on them.

"Considerable work has been done during the past year on Phillips and Frederick Arms, Thurlow and Cracroft Islands. Most of the peninsula between Hardy Bay and Beaver Harbour, at Fort Rupert, has been located, and some fine showings of copper ore have been found there.

"DUNSMUIR DISTRICT.

"The Nanaimo Jubilee Mining Company has not done much development work on its two groups of mineral claims, situate some distance up the south fork of the Nanaimo River.

"OYSTER DISTRICT.

"Considerable work has been done on many claims in this district during the past year, resulting in very favourable showings."

The following statement relative to dredging in Victoria, Australia, was made in a recent letter of a correspondent in that State of the London *Mining Journal*: An improved dredge at Bright is making low grade ground payable, fast-travelling buckets and a separate engine for water supply being employed. The usual quantity of material treated by dredges running buckets at the ordinary pace—viz.: 12 buckets per minute, with main pump and buckets driven by the same engine—amounts to about 5,000 to 6,000 yd. per week. The new plant, during five weeks, turned over 3 acres of ground, at a depth ranging from 10 to 14 ft., or an average of 12 ft., being at the rate of 11,616 yd. per week. The yield of gold from the 3 acres amounted to 301 oz., approximately 100 oz. to the acre, and as the total cubical contents of 3 acres amounts to 58,080 yd., the value of the ground is only a shade over 4 1-2d. (9 cents) per yd.

MINING IN VARIOUS PARTS OF BRITISH COLUMBIA.

Excerpts from the "Annual Report of the Minister of Mines" for 1906.

OFFICIAL REPORTS on several mining divisions of the Province were published in last month's number of the MINING RECORD. Additional extracts from the 'Annual Report of the Minister of Mines" for 1906 follow:

NORTHEAST KOOTENAY DISTRICT.

Golden Mining Division.—The gold commissioner at Golden reported:

"Mining is practically at a standstill as regards the shipment of ore, and will probably remain so until there are better transportation facilities in the Upper Columbia valley. A large percentage of the ore must be treated on the ground.

"The Monarch, which is situated close to the Canadian Pacific Railway track near Field, is likely to have another trial. Bunk-houses have been commenced and a wire cable to convey the ore down to the track is on the ground. A lease of the Golden smelter has been secured, where the installation of new machinery is contemplated for the treatment of this particular ore, which has hitherto always been done at a loss. Whether this proposed new treatment will be successful or not remains to be seen.

"Work on a small scale has been prosecuted continuously on the Shining Beauty group of claims, the property of the Labourers' Co-operative Company, and the only one at present worked by them. The development work consists of one tunnel 400 ft. and another 200 ft.

"Work was discontinued on the Giant during the summer, but will be resumed again shortly.

"All other work in this division consisted practically of assessment work only."

Windermere Mining Division.—The mining recorder for this division, in which are the head waters of both the Columbia and Kootenay Rivers, the former running north and the latter south, reported:

"Railway communication, which is not far off, construction being actually under way, will change conditions tremendously, although, as a matter of fact, the different properties can ship at a profit under the present inadequate transportation conditions.

"The following properties made shipments before the close of navigation on the Columbia:—Tecumseh, Nettie M., Black Diamond, B. C. and Tilbury, Ptarmigan and Paradise, which, with the exception of the last named two, were worked by local owners and one lessee. The Tecumseh, Paradise and Ptarmigan will continue work throughout the winter.

"Lead Queen Group, on B. D. S. Creek, a tributary of No. 3 Creek, continues to improve with development work, which, as heretofore, is being done on the sole resources of the three original locators. It is expected that this property will become one of the large shippers in East Kootenay. The owners will continue work throughout the winter.

"A new strike was made this season, on September 17, on a tributary of the north fork of Toby Creek, and is known as the Comstock group. The pay-streak averages about 3 ft. in width, and is said to assay $86.39 to the ton in silver and lead. The owners have established a winter camp and are taking out several carloads of ore for shipment in the spring. This property is considered one of the most promising locations made in East Kootenay. It is understood that development work on an extensive scale will be commenced in the spring.

'Nothing more than the usual assessment work has been done on the majority of the properties, in anticipation of the advent of new capital."

SOUTHEAST KOOTENAY DISTRICT.

The gold commissioner reported of Fort Steele mining division as follows:

"The following table shows approximately the number of mineral claims held during each year since 1899:

	Held under Crown Grants.	Certificates of Work.	New Locations.
1899	37	718	729
1900	71	704	470
1901	104	642	455
1902	117	451	253
1903	142	335	200
1904	167	260	169
1905	189	193	181
1906	241	235	160

"The assessment work done on mineral claims shows a slight increase, but the number of new locations is smaller than in the previous year.

"The shipping mines have been the St. Eugene group at Moyie and the Sullivan and North Star groups at Kimberley. The North Star group has shipped only 2,900 tons of ore, but has been energetically pushing development work throughout the year. Work has been continued on the Stemwinder, a neighbouring claim to the North Star, with good results, and this claim will undoubtedly be added to the list of shipping mines in this division within the next twelve months.

"The syndicate which secured rights during the year 1905 to prospect under the waters of Moyie Lake, between the St. Eugene and Aurora groups, has been boring on the eastern shore and in the lake, and expects to reach the vein shortly.

"Development work on a large scale would be justified on many properties with the present means of transportation, but capital seems to be waiting for cheaper transport.

"The silver-lead ore from this mining division has this year contributed largely to the total mineral production of the Province.

"Placer Mining.—The usual output from Wild Horse Creek by Chinamen has been made. An hydraulic plant has been completed by a company of

white men, who washed for six weeks during the early part of the fall.

"One hydraulic company has been operating with a large staff of men on Perry Creek during the whole summer. The steam shovel previously installed on this creek was not operated this year.

"The company operating on Bull River resumed work late in the fall, but I have no details of the work done.

'Coal and Coke.—The Crow's Nest Pass Coal Company continues shipping coal and manufacturing coke in large quantities. In consequence of its mines having been closed for some months by a strike, it has not been able to supply the constantly increasing demand. The provincial mineralogist will report more fully on its operations than I can. The installation of improved machinery during the year will result in increasing the daily output.

"The Imperial Coal and Coke Company, having uncovered coal on the different groups of coal licences held by it on Fording River, has applied for and obtained leases over 89 lots, covering 53,851 acres of land. The preliminary survey of a railway route to these properties has been completed.

"The Elk Valley Coal Company, holding 14 licences and leases on the upper Elk River, has discovered coal on several of its claims, and is continuing the exploration of the others.

"Coal has also been discovered and leases have been granted on 41 lots lying immediately north of Lot 4,588, on the upper Elk River, and leases have been granted covering 26,240 acres.

"Coal licences covering 13,440 acres on the north fork of Michel Creek are in force.

"A syndicate holds 16 coal leases, covering 10,240 acres, at the northern end of Lot 4,593. I have not in my office any record of the number of coal licences and leases in force in the other parts of this lot."

TROUT LAKE MINING DIVISION.

The mining recorder reported, in part, on the progress of mining in the Trout Lake Division for the year 1906 as follows: "There has been no marked activity in mining in this division during the year. The most notable event has been the acquisition by the Ohio Mines Development Company, Ltd., of the Broadview and other properties situated on Great Northern Mountain. These claims, which are within easy reach of transportation, are credited with having large bodies of medium grade ore.

"Poplar Creek camp, which was said to contain many good gold properties and of which much was expected, remains still practically undeveloped.

"On the Silver Cup only development work was proceeded with from January 1 to March 21, at which latter date the mine was closed temporarily, owing to possible danger from snow-slides. Operations were resumed in April, since which time the mine has been working steadily. The chief aim of the management throughout the year has been development; this has been confined to the ground lying to each side of the raise connecting the lower level with the old workings above. Three levels have been run between these points, and the ore showings throughout are very satisfactory. Drifts and crosscuts 2,065 ft., and 95 ft. of raises, were run, making a total of 2,160 ft. No new machinery was installed, but a pipe-line has been laid, thus permitting of the driving of the compressor by water-power during the summer months. An average of about 35 men was employed during the year. About 700 tons of first grade ore, galena with grey copper carrying a high percentage of silver, were shipped. It is the policy of the management to maintain ore shipments averaging about 100 tons a month. This property is owned by the Ferguson Mines, Ltd., and is situated on the south fork of Lardo Creek, about 7 miles from Ferguson.

"Ground-sluicing has been carried on to a considerable extent on the Yuill group, which lies immediately below the Silver Cup property, exposing a lead from 4 to 5 ft. wide and carrying about 4 in. of galena. This is on the strike of the Silver Cup vein and is believed to be a continuation of that vein.

"The Reward Gold and Silver Mining Company, Ltd., is driving a long tunnel near Six-Mile, on the south fork of Lardo Creek, to cut at great depth the porphyry dyke in which the Silver Cup and Nettie L. mines lie, and ran 500 ft. during the year, thus making the tunnel 1,050 ft. long.

"On the Winslow, situated about one and a half miles west of the Silver Cup, a cross-cut tunnel has been driven 140 ft. cutting a quartz vein about 8 ft. wide, which carries good gold values. Considerable work, of a prospecting nature, has been done on the Star group, situated near the last-mentioned property.

"The Broadview, situated on Great Northern Mountain, was operated from January to April by a local syndicate, with a force of about 14 men. During this period 230 tons of ore were mined and shipped, and considerable development work done. On September 1 the property was acquired by the Ohio Mines Development Company, Ltd., which has since driven 470 ft. of drifts, cross-cuts and raises. The work so far undertaken by this company has been purely development. The lead, where cut, is said to contain 26 ft. of milling ore. Sixteen men have been employed during this period. The Blue Bell, St. Elmo and True Fissure, adjoining properties, are under bond to the same company.

"Considerable development work was done on the Lucky Boy, which is situated on Trout Creek and owned by the Chestnut Hill Mining Company, Ltd., seven men being employed for about three months during the summer. Thirty tons of ore were shipped from this property.

"On the Calumet and Hecla, situated on Rapid Creek, a number of open cuts were made and the vein stripped for a considerable distance. This property possesses an excellent surface showing and carries good gold values."

LARDEAU MINING DIVISION.

The mining recorder for the Lardeau mining division reported for 1906:

"There has been little change in the mining situation here since the report of last year. The location of mineral claims has slightly increased, whilst the assessment work recorded has slightly declined. This, however, indicates that locations without merit are allowed to lapse. The same companies actively engaged in mining during last year are one and all showing their faith in the district by pushing development and by enlarging their mining plant and adding machinery which will increase their output.

Beatrice.—The management of this valuable property has passed from the original owners into the hands of heavy shareholders, whose intention it is to prove, and that as quickly as possible, that the Beatrice is a rich silver-lead property. Ore has been encountered in the intermediate tunnel, which was being driven for last year. Now attention is being directed to strike the ore-body in the lower tunnel.

Eva.—This mine is Camborne's mainstay in free gold. The company has slowly, but surely, demonstrated that it has free gold in paying quantities, and has raised the property to the self-supporting (and hopes during the coming year to the dividend-paying) stage. This company, in the past, has been supplying its 10-stamp mill with something like 1,000 tons a month, by hand-drilling, but before this reaches the press, a Rand air compressor, which is now being installed, will be supplying air to seven or eight air drills. With the addition of 10 other stamps, it will not be difficult to treat practically double the above tonnage, with the same monthly expenditure.

Gold Finch.—This company resumed operations in the spring, and has by systematic development proved that free-milling ore still exists on its property. Reconstruction of the aerial tram, which was burnt out two years ago, is looked for in the spring of 1907, and the stamp-mill will then be again started.

Mammoth.—The Edward Baillie Syndicate, operating this property, is working under great disadvantage, developing it during winter by using the proceeds of the very rich ore which is extracted from the surface in the summer. In the event of the lead being struck in the present workings ore can be taken out the year round.

Oyster Criterion.—This property is still lying idle. The confidence displayed by the shareholders at the outset has never been shaken by lack of merit in their holdings at Camborne.

Silver Dollar.—This company has installed a saw-mill, aerial tramway and air compressor, and has a stamp-mill, with crusher and Chilian mill, *en route* to the property. Owing to the mountainous trail to the mill, some five miles above Camborne, and the nature of the machinery to be taken up for installation, there will, of necessity, be a period of heavy expenditure. The management by this time should know the value of their ore, also the available quantity, and should be in a position to inform the shareholders, should they require the information, the net proceeds from the ore—I say net advisedly. Milling can only extract a percentage of the ore, and at present any values remaining in concentrates could not be reckoned on to yield full values, on account of cost of transportation of same to the smelter.

Del Ray.—This property adjoins the Silver Dollar. Considerable work has been done on this during the past year, but the owners being away nothing authentic can be stated. The contractors, however, report good bodies of ore everywhere, and the values are supposed to be eminently satisfactory.

One location made during the past year is worthy of note, viz., the Berneire. A specimen from this property is on exhibition, apparently a piece of white quartz weighing about 100 lb., and covered with visible gold. This location adjoins the Nelson group, a free-milling gold proposition, and being directly in line with the Eva and Gold Finch properties, it would tend to show the continuity of the gold belt through this section.

LILLOOET MINING DIVISION.

No changes of importance took place during 1906. The gold commissioner reported:—

"The Lorne mineral claim, at Cadwallader Creek, was worked as usual with an arrastra, which crushed 215 tons of ore, yielding $5,441.82, which was a good result from such a primitive mode of treating the ore.

"The purchase of the Wayside mineral claim at Bridge River by Osmond Ferguson, is worthy of note. The surface indications are good, but the property has not yet been proved at depth.

"The Anderson Lake Mining and Milling Company's mineral claims at Anderson Lake are bonded to J. Burley Smith, of Montreal, who informed me he had undertaken to form a company in London, England, with a large capital to operate the same.

"Babb, Ferguson, Walker & Swanson have done considerable development work on their placer leases at Alexander Creek. They employed an average of 15 men and took in a large hydraulic plant over a trail for the greater part of the way. They intend working two monitors, having a good water supply, and the ditch, which is 1½ miles in length, is nearly completed. They dammed the outlet of No-fish Lake, for the purpose of storing water. The lake is about two miles long by one-half mile wide.

"The Jesperson leases at Cayoosh Creek were not worked to the same extent as last year. High water, at various times, prevented the re-building of the dam, so only four men were employed in prospecting and development work.

"The yield of placer gold ascertained amounts to only $14,000, which is $10,000 less than last year, owing chiefly to the cessation of work by the dredge by reason of liquidation of the company that operated it, and the departure of nearly all itinerant Chinese miners to Bullion, where they obtained employment at high wages.

CLINTON MINING DIVISION.

"Mining in all its branches," the gold commissioner reported, "has been practically at a standstill, and no improvement in value over that of 1905.

The total yield of gold, so far as ascertained, was under $1,000.

"A certain amount of prospecting has been done on the mineral claims (copper) on Bonaparte River.

"On a few of the recorded claims sufficient work has been done to hold them for another year.

"The holders of the dredging leases on the Fraser River, in this division, have seen their way clear to install a Keystone drill to test the value of the gravels in the bed of the river, a method which I have advocated for years. It is an expensive way of prospecting, but in the end far better than building an expensive dredge and launching it on what may be a worthless part of the river. The work done by an imperfect dredge on Horsebeef Bar, below Lillooet, has convinced me of the far-seeing ideas of the late Dr. Dawson. In a conversation with him several years ago, he said: 'The mineral values in the Fraser River were enormous, but they were at depth, and science and mechanical skill would, some time in the future, find ways and means to reach them.' The Keystone drill was installed late in the season, and only three or four bore-holes put down a distance of 50 to 60 ft. each, when extreme cold weather set in and all work was stopped until next April, at the earliest, when prospecting will be renewed and continued with vigour until the lessees feel justified in setting about the construction of a modern dredge powerful enough to deal with the gravels in that very turbulent river.

"Placer mining has been confined to a few itinerant Chinese and Indians."

OSOYOOS MINING DIVISION.

The following information relative to mining operations in the Osoyoos mining division is from the report of the gold commissioner for the district:—

"Camp Fairview.—Very little mining work has been done this year outside of assessments, excepting on the Stemwinder. The company operating this mine has, during the past year, undergone re-construction, and is now known as the Stemwinder Gold and Coal Mining Company, Limited. A new flume, more than a mile long, has been constructed from Reed Creek to the head of the pipe-line, which doubles the water supply available for power and treatment purposes, and will, for a portion of the year, enable steam costs to be entirely dispensed with. A large belt-driven, cross-compound, Rand air compressor has been installed in the mill near the Corliss engine, by which it can be driven; the compressor may also be driven by the water wheel. A supply of the new Murphy drills has been obtained, from which great things are expected. The shaft is being sunk to the 600-ft. level from the bottom of the present 300-ft. incline shaft, all new work being perpendicular. A raise is to be made from the present 300-ft. level, which will come out at the back of the mill and give an admirable site for new head-works, dump and crusher, and facilitate the delivery of ore to the mill. The ore has been found under the break which caused temporary suspension some time ago, and unless unlooked for difficulties arise, by cross-cutting this orebody each 100 ft. during the sinking operation, there will become available a large amount of pay ore that will demonstrate the value of this property.

"On Kruger Mountain but little work has been done on either the Dividend or Gold Dust group of claims.

"Camp Hedley.—On the Nickel Plate and other properties of the Yale Mining Company less development has been done than in any other year since the property was bonded in 1898; but it was a record year for extraction, and this was done with a view to obtaining the maximum value of which the existing plant and ore in sight was capable. Fortunately, the amount of development done before the present manager took charge was sufficiently extensive to permit of this course of 'picking the eyes out,' without any serious impairment of the value of the property. The development was confined to exploration work with the diamond drill, of which 3,600 ft. was done on various claims of the Nickel Plate group.

"The tonnage of ore mined and milled during the year was about 35,000 tons, principally from the Nickel Plate and Sunnyside claims. No addition of any importance was made to the plant, but a few necessary changes were effected. The postponement of extension of the works or improvement of the plant may be attributed to the failure of the railway company to complete construction within the time named. The mining company had already paid large sums of money for haulage of plant from Penticton, and when it was promised railway connection in the early autumn of 1906, it was perhaps justified in waiting for it before bringing in additional plant. The concentrates have been hauled by wagon to Penticton, a cheaper rate of inward haulage being obtained by giving the freighter a load of concentrates for back loading.

"On the Humming Bird group of claims, owned by J. J. Marks and others, there was done, in addition to considerable prospecting, 2,000 ft. of diamond drilling, from which satisfactory results were obtained.

"The Golden Zone group, owned also by J. J. Marks and associates, and consisting of the Golden Zone, Silver Bell, B. C. and Irish Boy, was improved to the extent of about $1,000 worth of work. Former shafts and tunnels were extended and a new find made which gives excellent assay values. The total development done to date is much more extensive than that done on the average claims held by private parties.

"The Florence group, in 20-Mile canyon, is owned by Thos. Bradshaw, who spent about $1,500 in development work during the year. The amount already expended on these claims, the Florence, Florence fractional and Zeerust fractional, amounts to more than $8,000, principally in tunnelling. The ore is arsenical pyrites carrying satisfactory gold values.

"On the Greenwood group, owned by Duncan Woods, three men worked the greater part of the summer on development work

"The Kingston group, consisting of the Kingston,

Metropolitan, War Horse and Grand View, is owned by the Kingston Gold and Copper Mining Company. Development work has been carried on steadily most of the year, the force employed being from four to seven men. Much more good copper ore was exposed, and additional buildings for the mine crew were provided.

"The Jumbo group, situated on Sixteen-Mile Creek, had a great deal of development work done. A shaft was sunk, under the direction of G. M. Gilbert, to a depth of 100 ft., and also a considerable amount of cross-cutting done.

'The Oregon group, consisting of the Oregon, Winchester, St. Barnard, and Savage, is situated on the north bank of 16-Mile Creek. About 30 ft. of tunelling was done, resulting in an excellent copper showing."

YALE DISTRICT.

Asheroft, Kamloops, Nicola, Similkameen, and Yale mining divisions are in Yale district. Extracts from the reports of mining recorders of three of these were printed last month. The report of Nicola mining division this month follows that of Kamloops. The district gold commissioner reported:—

'Placer Mining.—The yield of placer gold in the Asheroft, Kamloops, Similkameen and Yale divisions, which formerly showed good returns, has been of so little value as to be unworthy of mention. This is a matter of deep regret, as it apparently marks the termination of an industry which, in past years, provided a remunerative occupation for a hardy class of men, whose history is closely associated with the early days of the Province.

"The mining recorder at Yale, in his report for the year 1905, stated the yield in the Yale division to be only $2,000. That of the Asheroft division also showed a remarkable decrease in the usual output, whilst a similar amount to that of the Yale division was credited to the Similkameen district.

"Since the abandonment of the Fraser River by the whites, placer mining has been steadily prosecuted by Indians and Chinese, principally the latter. The same bars, and other localities favourable for the deposit of float gold, are mined with results varying every year, caused by the spring floods carrying away bars situated at a considerable distance higher up the river, and depositing the gold they contained at points lower down, where it remained until the following spring.

"The new dredge, constructed at Yale last fall by a New Zealand company, was operated several weeks, in charge of a crew of experienced men, but I have not been able to obtain the particulars of the results. It is the intention to remove it to Hill's Bar next season, where the amount of success obtained will determine the future of the lower Fraser River in regard to dredging operations.

"Mineral Claims.- To offset the exhaustion of the placer mines, the mineral claims of the districts are attracting attention. The approaching construction of the V. V. and E. railway through the Similkameen country will open up a promising mineral section, which, in consequence of lack of railway communication, has remained comparatively undeveloped.

"The development of the Nicola coal mines will not fail to stimulate mining interests by a supply of cheap coke necessary for smelting.

"At Highland valley, in Asheroft mining division, on the Transvaal group and other locations, work has been diligently performed on the mineral deposits they contain, with results that prove their valuable character."

KAMLOOPS MINING DIVISION.

The following notes concerning the mineral locations in this division refer only to those on which the most development work has been accomplished. There are many others on which mere assessment work has been performed, this being insufficient to give any idea of their permanence:—

"Iron Mask.—The Iron Mask, Capt. J. Argall, manager, was worked during the past year with a force of from 60 to 80 men, until the beginning of last October, when the number was reduced pending arrangements being made to increase the returns, by utilizing the large bodies of low-grade ore, which will yield profitable results with the introduction of a more economical mode of transportation and treatment. To effect this object, negotiations are in course of progress for the erection of a large smelter near the Canadian Pacific railway line, where a suitable site has been obtained for the purpose. The ore will be transported by an aerial or gravity tramway. These improvements will admit of operations being prosecuted on a larger scale. The quantity of ore shipped to the smelters in Kootenay, since my last report, I understand, is 3,720 tons.

"Wheal Tamar.—The Wheal Tamar is situated in the Jocko Lake section. It was steadily worked last summer with a small number of men, in charge of O. S. Batchelor. A 'common sense' whim was installed and housed in with a substantial frame building. Cross-cutting was performed at the bottom of the 50-ft. shaft. Forty feet of the vein was intersected and produced ore of similar class and value as the outcropping on the surface, which contains ore 60 ft. wide, that can be worked to advantage, and 200 ft. of low-grade ore that may be found profitable under more favourable conditions in regard to treatment. The vein has been cross-cut in different places for a considerable distance.

"Evening Star Group.—This group consists of three claims, viz., Evening Star, Golden Star and Bill Nye. It is situated about six miles southwest of Kamloops, immediately south of the Iron Mask mine. The vein runs northeast and southwest, and has been proved by open cross-cuts to extend the whole length of the three claims. The ledge is from 40 to 100 ft. in width on the surface. The principal work has been done on the Evening Star. A tunnel was run from a small lake to intersect the vein; at about 35 ft. from the entrance a lode of high-grade ore was encountered, 6 ft. wide. A shaft, 4x9 ft.

in the clear, with two compartments, well timbered all the way down, has been sunk a depth of 90 ft. At a depth of 40 ft. a body of clean ore 4 ft. wide was cut through, dipping to the northeast, and at 56 ft. had passed out of the shaft. A drift was started at this point 20 ft. long, in ore of the same grade, which yields $35 a ton, in all values. About 1½ carloads are now on the dump, which will pay to send to the smelter. Another shoot of similar grade, 6 ft. wide, exists at the bottom of the shaft. Between the two high-grade veins is a large body of low-grade ore which, with a smelter in the vicinity, would yield profitable returns in combination with the richer ore.

"Truth Group.—Considerable work was performed on the Dacotah last summer, which is one of the principal properties of the Truth group. The work consisted principally of wide open-cuts running with the trend of the vein matter in magnetic ore and carrying small values in gold, copper and silver. In one of the cuts a good showing of copper was exposed, which will be further developed next season. All of the ore mined was sold to the Iron Mask Company for fluxing purposes. The Truth group is one of the mineral properties on Coal Hill and contains some of the best ore deposits.

"Pot Hook.—Mr. Ashby, the former manager of the Pot Hook, informs me that instructions have been received from England to resume work on that mine, which has lain idle for several years.

"Cotton Belt Mines.—The Cotton Belt mines are situated on Grace Mountain, about 10 miles in a straight line northeast of Seymour Landing, at the head of Seymour Arm. The following work has been performed on the claims mentioned: Cottonwood, an open-cut and shaft 20 ft. deep; Joe, shaft 10 ft.; Boyne, shaft 12 ft.; Harrison, shaft 10 ft.; Victoria, open-cut, shaft 20 ft., and lode stripped for a considerable distance; Jessie, vein stripped; Wellington, cross-cuts; Shory, cross-cuts; Leemitford, cross-cutting on vein; Black Prince, two large open-cuts; Tartar, open-cut 30 ft. long; McLeod, shaft 12 ft.; Horseshoe, shaft 10 ft. The ore bodies show an increase in value as depth is obtained. I am informed that two new veins were discovered last summer. They exist in different formations, and are dissimilar in the character of the vein matter. One of them, 70 ft. wide, contains chalcopyrite; the other, 10 ft. wide, is composed of galena, grey copper and chalcopyrite. F. Daniels, manager of the Cotton Belt group, reports having found a vein of molybdenum of a promising character, which has returned high assays in that metal and 10 oz. in silver. The gravel in Cotton Creek contains both gold and platinum, but not in sufficient quantity to pay to work.

"The amount granted by the Government for the construction of a trail has been a great assistance to prospectors.

"Coal.—A local company of Kamloops business men, which acquired 2,500 acres of coal lands bordering the railway track and extending up the mountain side, commenced drilling operations last fall at a point about six miles west of Kamloops, designated by the late Dr. Dawson as being in line with the strike of the coal belt, and offering advantages for the prosecution of the necessary work. A Calyx drill, which cuts a core two inches in diameter, was purchased from the Canadian Rand Drill Company, of Sherbrooke, Quebec, and installed last fall, and has performed efficient work with a much smaller expenditure than if done by means of a diamond drill. The depth attained is 375 ft., represented by 200 ft. of rock, geologically termed as belonging to the Tranquille bed, 100 ft. of conglomerate, and 25 ft. of shale. The cold weather caused a suspension of operations during the winter, but preparations are now in course of progress to resume drilling. It is not expected that the coal seam will be encountered before reaching a depth of 500 ft."

NICOLA MINING DIVISION.

The mining recorder reported:—

"Aspen Grove Camp.—The largest number of mineral locations is in the Aspen Grove camp, of which several groups have been Crown granted. About nine years have elapsed since prospecting work was begun in this section, and up to date few claims have changed hands. Efforts are now confined chiefly to keeping up assessment work and Crown granting.

"The Golden Sovereign group, which makes a strong showing of native copper, was bonded last March. Development work was engaged in and a shaft was sunk to the depth of 100 ft.

"The Copper Standard group of claims, owned by Price Ellison and others, contains copper ore with appreciable values in gold and silver. Work was done on the Bighorn and adjoining claims, enhancing the value of the property.

"On the group of claims owned by Dad Allen, assessment work resulted in copper glance, chalcopyrite and bornite being exposed. Locations held by Roberts & Budd, on which prospecting has been done, afford excellent showings. Some good exposures are to be found on the Tom Cat group, where several strong showings of native copper are in sight.

"Bates Bros. & Armstrong, who were among the first prospectors in the camp, have several groups of properties, on some of which considerable development work has been done.

"Disclosures on the Wayside group, owned by Larsen & Murray, indicate a wide ledge with copper showings.

"Ten-Mile Camp.—The camp at 10-Mile Creek has attracted attention on account of the ore exposed by assessment work on some of the properties. Work done in this camp during the last two years has resulted in favourable disclosures, both as to permanence of veins and values of ore bodies. An open cut on the property of the Broomhead Syndicate exposed the lead, which is 15 ft. wide with two well-defined pay shoots of high-grade copper ore, with small gold and silver values. In an old tunnel a station was cut and winze sunk 15 ft. on the larger pay shoot, which is several feet wide.

"Work on the Cowboy claim, owned by the same

company, has disclosed a vein of ore of excellent indications.

"On the Coronado mineral claim a lead about 12 ft. wide, which seems well mineralized, has been discovered.

"A large body of medium grade copper ore is in evidence on the group of claims owned by Mr. Sissett and others.

"Locations held by J. W. Collis and associates were favourably mentioned in previous reports, and subsequent work strengthens the conviction. H. Stumbles & Co. have a large orebody in sight, containing copper pyrites, which give excellent assay values.

"The extension of the railway into Nicola brings the 10-Mile camp within 12 miles of shipping facilities, with a down-grade to the station.

"Mill Creek.—On Mill Creek, about three miles north of Nicola, Thomas Hunter has a group of several claims, gold and copper bearing. The ledge matter is white quartz and the formation granite. Frank Lambert has five claims, on which several years' assessment work has been done. Assay values from both properties are good.

"Coal Prospecting.—During the last three years a considerable amount of prospecting with diamond drills has been done. The Diamond Vale Coal and Iron Company has been operating extensively with the drill on its coal areas in the Quilchena basin, and recently on its Coldwater property. The disclosures on Quilchena were satisfactory, but too remote from a railway for present shipment of coal. This company secured a large area of the best coal lands in the Nicola and Coldwater basin, through which the Canadian Pacific railway branch line passes. After several drill tests, which resulted favourably, the company selected a colliery site, and things are now in preparation for the opening up of these properties. All the work is done substantially and with a view to permanency. Everything is now ready for shaft-sinking, and, as the depth of the first seam is comparatively small, the company hopes to have an output of coal at an early date.

"The Nicola Valley Coal and Coke Company (locally known as the Garesche-Green), also located on the Coldwater, has a large coal seam to start on, an outcrop on the hillside of a good quality of coal, which can be worked by tunnelling. Under the efficient management of Alex. Faulds, M.E., this property is being prepared for coal shipment. The local demand has been fully supplied; also the Canadian Pacific railway engines on the Nicola branch are supplied with coal from the tunnel output. A car is being loaded for shipment to Vancouver. Counting the different seams known to exist on this property, there is fully 18 ft. thickness of coal accessible by tunnel. The work so far has been chiefly exploratory and preparatory; but as soon as proper shipping facilities shall be provided the company expects to have an output equal to the demand."

BRITISH COLUMBIA BUREAU OF MINES.

Review of Work of the Year 1906.

THE BUREAU OF MINES regularly and systematically performs important duties in connection with the mining industry of British Columbia. The following summary of its work during the year 1906 has been taken from the "Annual Report of the Minister of Mines," lately published:

The work of the Bureau of Mines increases, of necessity, year by year, and this growing activity is due to the following causes: The extension of the mining area of the Province, with the proportional increase in the number of mines; the increasing desire of the outside public for the free information which the bureau supplies with regard to the various mining districts and camps; and the appreciation by the prospector of the fact that he may obtain, gratis, a determination of any rock or mineral which he may send to the bureau.

The routine work of the office, and the preparation and publication of the "Annual Report" for the year just ended, followed by the examination in the field of as many of the mines and mining districts as the season would permit, together with the work of the laboratory and instruction of students, fully occupied the staff for the year. The staff of the bureau consists of the provincial mineralogist, the provincial assayer, and a junior assistant in the laboratory, with a clerk as temporary assistant during the publication of the Report.

Provincial Mineralogist.—After the publication of the "Annual Report" for the previous year and the finishing of office work, the provincial mineralogist, early in June, made a trip to the vicinity of Cowichan Lake, visiting there such mineral claims as had had any material amount of work performed on them, and making a report on the same. A report was also made as to the necessity for and the best route to be followed for a trail into certain claims situated on the Nanaimo River. The field-work to be undertaken during the summer months by the bureau was then planned and preparations for the main summer trip of the provincial mineralogist made.

On July 12 the provincial mineralogist, acting under instructions of the Hon. the Minister of Mines, started on a trip to the valley of the Peace River, east of the Rocky Mountains and west of the 120th meridian, the provincial boundary between the 54 deg. and 60 deg. north latitude. The reports of rich finds of gold, and also of coal, in this district, combined with its agricultural possibilities, on all of which the Government had no authentic information, and the fact that this was a proposed route of the Grand Trunk Pacific railway across the Province which seemed most likely to be followed, rendered an early report on this district very desirable.

The route chosen was to go up the Skeena River from Essington to Hazelton; thence by pack-train to Babine Lake, portaging to Stuart Lake, and thence

to Fort St. James, at the outlet of this lake. From here pack-horses were taken to Fort McLeod, on the Pack River, one of the tributaries of the Peace River, a distance of 85 miles. At McLeod Lake post canoes were obtained, with which, and later the use of a bateau, the tributaries of and the main Peace River were followed to Peace River Crossing, some 430 miles down stream, during which run three or four side trips were made into the adjacent country by pack-train or on foot.

From Peace River Crossing a wagon road was followed for 100 miles to Lesser Slave Lake, which discharges through Lesser Slave River into the Athabasca River; and these waterways were descended in a canoe, a distance of 200 miles, to Athabasca Landing, from which place to Edmonton the trip of 100 miles was made in a wagon. From Edmonton to Victoria the trip was made by the Canadian Pacific railway.

The total distance travelled on this trip was a little more than 3,000 miles, of which 910 miles was by steamer, 840 miles by railroad, 700 by canoe, 470 on horseback or on foot, and 200 by freight wagon. The total time occupied, including all stops and delays, was 88 days. From Hazelton to Edmonton, with included side trips, occupied 76 days, during which time camp was moved 56 times.

In November the provincial mineralogist made a trip to Texada Island, accompanying an officer of the United States Geological Survey.

In May, and again in December, examinations for assayers were held in the Government laboratory, Victoria, by the board of examiners appointed under the act, on which board the provincial mineralogist and provincial assayer sat.

In December two bulletins—one on the West Coast of Vancouver Island and the other on the Portland Canal district—were prepared, and published in January.

The remainder of the time was spent in the preparation for publication of the notes taken in the field, the collection and preparation of statistics and the routine work of the office, which included, in connection with the various inquiries for information and the collection of statistics, the sending out of, approximately, 1,500 letters, with a similar number received.

Provincial Assayer.—In addition to the work in the assay office, which is noted in a separate report herewith, the provincial assayer made a trip up the west coast of Vancouver Island and another to the district at the head of Portland Canal, with a short run into the Kemano River, on Gardner Canal, visiting the mineral claims under development in these sections. He also undertook an investigation of the clay deposits of the Coast that are now being commercially worked; this investigation is not yet completed.

The photographs, from which cuts accompanying the "Annual Report" for 1906 were made, were almost all developed in the laboratory. Attention is drawn to the very skilful manner in which the provincial assayer has made one photograph out of, in some cases, as many as six separate negatives (4x5 Kodak), which have been so successfully joined that in most cases it is quite impossible to detect the fact that the photograph is not from one negative. As good results have never been attained by any professional photographer in the Province.

PROVINCIAL ASSAY OFFICE.

The following is a summary of the work of the assay office of the bureau for the year 1906, as reported by the provincial assayer, Herbert Carmichael:—

During the year 1906 there were made by the staff in the Government assay office 1,005 assays or quantitative determinations, which is a decrease from the number made during the previous year. Of these, a number were for the Bureau of Mines, or for the department, for which no fees were received. The fees collected by the office were as follows:—

Fees from assays	$ 393 00
Fees from melting and assaying gold dust and bullion	249 00
Fees from assayers' examinations	467 00
Total cash receipts	$1,109 00
Determinations and examinations made for other Government departments for which no fees were collected	$ 400 00
Value of assaying done, etc.	$1,509 00

The value of gold melted during the year was $85,000, in 117 lots, as against $99,631, in 142 lots in 1905

Free Determinations.—In addition to the above quantitative work, a large number of qualitative determinations, or tests, were made in connection with the identification and classification of rocks or minerals sent to the bureau for a report. Of these no count was kept, nor were fees charged therefor, as it is the established custom of the bureau to examine and test qualitatively without charge samples of mineral sent in from any part of the Province, and to give a report on the same. This has been done for the purpose of encouraging the search for new or rare minerals and ores, and to assist prospectors and others in the discovering of new mining districts, by enabling them to have determined, free of cost, the nature and probable value of any rock they may find. In making these free determinations, the bureau asks that the locality from which the sample was obtained be given by the sender, so that the distribution of mineral over the Province may be put on record.

In addition to the ordinary work of the office, a large number of water analyses were made for New Westminster city and Phoenix.

A considerable number of samples of black sand were assayed and platinum was found in the samples from Omineca and Cassiar districts.

An examination is being made of the clay and clay industry of the Province, and when the work is further advanced a complete report will be made.

EXAMINATIONS FOR ASSAYERS.

Report of the Secretary of Board of Examiners.—I have the honour, as secretary, to submit the Annual Report of the Board of Examiners for Certificates of Competency and Licence to Practice Assaying in British Columbia, as established under the "Bureau of Mines Act Amendment Act, 1899."

The act requires that at least two examinations shall be held each year, and such have duly taken place. Both were held in the Government laboratory at Victoria, each occupying a week; the first examination was begun on April 23, and the second on December 3, 1906.

At the first examination the board consisted of the provincial mineralogist, the provincial assayer and Thomas Kiddie, and at this examination five candidates came up, of whom four passed, only one failing. At the December examination, the board consisted of the provincial mineralogist, provincial assayer and D. E. Whitaker, at which 12 candidates stood for examination and seven successfully passed.

The question of holding the autumn examination at Nelson was thought of, providing a sufficient number of candidates from the upper country entered for examination. Advertisements were inserted in the Kootenay newspapers, giving notice of such intention and calling for entries, but no sufficient number applied to justify the considerable additional expense entailed by holding an examination away from Victoria.

In addition to the 12 candidates mentioned above, who successfully passed the examinations, the board recommended during the the year the granting of two certificates by exemption, under sub-section (2) of section 2 of the Act. In accordance with these recommendations, all these 14 certificates have been duly issued by the minister of mines.

EXAMINATIONS FOR COAL MINE OFFICIALS.

During the year 1904, under the "Coal Mines Regulation Act Further Amendment Act, 1904," the regulations regarding the qualifications and examinations of officials employed in coal mines have been completely revised and at the same time made much more stringent and thorough.

The 'Coal Mines Regulation Act," as now amended, provides that all the officers of a coal mining company having any direct charge of work underground, shall hold Government certificates of competency, which are to be obtained only after passing an examination before a duly qualified board, appointed for the purpose of holding such examinations, and known as the Managers' Board. The certificates granted on the recommendation of such board, and the requirements for same, are as follows:—

First Class (or Manager's) Certificate.—Such a certificate must be held by every manager or "chief officer having the control and daily supervision of any coal mine" in British Columbia. The statutory requirements for this certificate, in addition to such examination and qualifications as may be imposed by the board of examiners are, that the candidate for examination shall be at least 25 years of age, a British subject, and have had at least five years' experience in or about the practical working of a coal mine.

Second Class (or Overman's) Certificate.—Such certificate must be held by any person "who has the daily charge of the underground workings of a coal mine under the control and daily supervision of the manager, and next in charge under such manager."

Aside from the requirements of the Board of Examiners, a candidate for such certificate must have had "at least five years' experience in or about the practical working of a coal mine."

Third Class Certificate.—This certificate must be held by every shiftboss, fireboss, or shotlighter in a coal mine in British Columbia, and besides the examination by the board, calls for three years' practical experience.

Experience in a coal mine outside the Province may be accepted by the board. Any certificate is considered to include that of any lower class.

In addition to the examinations and certificates already specified as coming under the Managers' Board, the act further provides that every coal miner shall be the holder of a certificate of competency as such. By "miner" is meant "a person employed underground in any coal mine to cut, sheer, break or loosen coal from the solid, whether by hand or machinery."

Examinations for a miner's certificate are held each month at each colliery by a Board of Examiners, known as the Miners' Board, and consisting of an official appointed by the owners, an examiner elected by the miners of that colliery, and an examiner appointed by the Government.

Report of Secretary of Board of Examiners.

I beg to submit the annual report, covering the transactions of the above board, appointed under the "Coal Mines Regulation Act."

The period intervening between the holding of the last examination and the previous one was longer than usual, and the number of applicants was in consequence greater. The board possesses no definite means of ascertaining when these examinations should be held, in order to enable intending candidates to present themselves for examination without unnecessary delay, and the board has hitherto been governed in this matter by the response to the previous examination.

While it is the desire of the board to hold examinations sufficiently often to fully meet the requirements of the "Coal Mines Regulation Act," it should be stated that the necessary arrangements and preparations required to hold such examinations simultaneously over so large an area, embracing as it does, coal mining centres 800 miles apart, necessitates work of some magnitude, and the fixing of dates for holding these examinations should, and does, receive the careful consideration of the board.

In order that intending candidates may have ample time in which to prepare for examination, the board now publishes notices of examination intended to be held fully three months previous to the date set for such examination. The last examination was held simultaneously at Nanaimo, Fernie and Cum-

berland, on October 23, 24, and 25.

The examiners were as follows:—

Nanaimo—Charles Graham, Elijah Priest and F. H. Shepherd.

Fernie—John John and R. G. Drinnan.

Cumberland—A. Dick, John Matthews and Tully Boyce.

The following candidates, having earned the necessary percentages, were recommended to receive first, second or third class certificates accordingly:—

First Class—Thos. H. Williams, Thos. France and John K. Millar.

Second Class—Bernard Canfield, John Newton, James Derbyshire, Edward Budge, William Lockhart, Thomas M. McGuchie, John Gillespie, David McKinnel, Joseph D. Thomas and John C. Brown.

Third Class—D. B. Douglas, William Merrifield, Samuel K. Mottishaw, William Stockwell, George Merrifield, James M. Stewart, Edward Devlin, George Moore, William Lancaster, Samuel Richards, William Watson and John White.

Regarding the nature of the examinations, the board regrets that it was unable to procure suitable apparatus in time to submit the "sight test" suggested in previous report, but acknowledges with thanks the valuable information received upon the subject from James Ashworth, The Cassels, Old Colwin, England, who describes, with drawings, a very efficient apparatus for testing mine officials in the detection of small percentages of gas by safety lamps; also from J. T. Beard, principal of the Scranton School of Mines (Coal Min. Div.), for valuable suggestions upon the same subject, accompanied by his valuable pamphlet upon the "Detection of Small Percentages of Gas by the Safety Lamp." Also suggestions kindly sent by E. Gilpin, inspector of mines, Works and Mines Department, Halifax, Nova Scotia.

The board will endeavour, at its next examination, to install the requisite apparatus and submit to each candidate this very important and necessary test.

The by-laws of the board prohibit the use of textbooks and of written or printed formulae at the examinations, and this question has been brought to the attention of the board by a pertinent circular letter issued by J. T. Beard, and addressed to 'State Examining Boards for Mine Foremen, Firebosses and Engineers," a copy of which was forwarded by the author to this board.

The question has from time to time received the consideration of the board, and it is probable that the matter will be taken up at its next general meeting. Giving as an example a long, complicated numerical calculation, Mr. Beard comments as follows:—

"If this question came up in the office, or was worked out by the candidate at home, he would naturally refer to his handbooks and find the formula that he required to make the calculation, and in a few minutes he would arrive at the correct answer.

"No one expects a practical man to remember rules, formulae, etc., that are required in such numerical calculations, and, except when a candidate is preparing for these examinations, he does not attempt to memorize such formulae, because he knows where he can find them when required.

"I think you will agree with me that the purposes of any examination should be: first, to show the candidate's practical knowledge and acquaintance with mine-work of every description, and the laws, conditions and requirements in any way affecting the work; and, second, to show his capability for making necessary calculations.

"A man may understand how to solve the hardest theoretical questions, and yet, without practical experience, he would be incapable of holding any position of responsibility in mining operations."

Mr. Beard has given this question much consideration, and in this connection I may say that the recent efforts of the board have been to render the British Columbia examinations more practical, and to eliminate the ultra-academic feature, tending towards furnishing coal mine officials of greater practical experience, and thus making for greater safety to life and property.

The Board of Appointment of Examiners consists of: Andrew Bryden, Ladysmith, chairman; Tully Boyce, Nanaimo, vice-chairman; T. R. Stockett, George Williams and A. Dick, Nanaimo; R. G. Drinnan and John John, Fernie; F. H. Shepherd, Nanaimo, secretary. The office of the board is in the Provincial court house building, at Nanaimo.

Cobalt silver miners are on strike for higher wages and shorter hours.

In six years the use of portland cement in Canada has increased between three- and four-fold. In 1901 the estimated consumption was 872,966 bbl.; in 1906 it was 2,814,267 bbl.

The Rand gold companies of South Africa paid dividends during the year 1906 to the amount of $27,086,838. This constitutes a record. The total dividends paid since the South African war, says *Reuter*, amount to $97,855,432.

The mining tax bill recently passed by the Ontario Legislature provides for a tax of three per cent. on all profits of mines in excess of $10,000 a year, and an average tax of two cents per acre on all mineral lands in unorganized districts. The lands in organized municipalities were already liable to assessment for municipal taxation. Another measure affecting mineral lands was introduced, this dealing with a large class of holdings in the settled districts in which the surface rights only have been sold, reserving the mineral. The latter, when undeveloped, has escaped taxation, all taxes having been levied on the owner of the surface. An amendment to the law was introduced making the mineral rights assessable. This was regarded as too sweeping, and likely to discourage investment; it was subsequently modified so as to make it applicable only to "petroleum rights" instead of 'mineral rights" generally, in which form

COMPANY MEETINGS AND REPORTS

YMIR GOLD MINES, LIMITED.

The first annual general meeting of the Ymir Gold Mines, Limited, was held in London, England, on July 2, Mr. Oliver Wethered (chairman of the company) presiding.

The secretary having read the notice convening the meeting and the auditors' report,

The chairman said: "Gentlemen,—I need hardly tell you that the period covered by the report has been an extremely trying one, after a time of great prosperity, because in the early days the Ymir Company, as the older shareholders know, was very prosperous. The company met with a series of misfortunes which taxed the patience of the shareholders and the abilities of the directors to a very great extent, and at one time reconstruction or liquidation was imminent. Happily, however, this was averted, and thanks to our getting into communication with Mr. Morland Hughes, he, through his Canadian connexion, was able to get accurate and satisfactory information about the Ymir mine, and we were able to raise, on very satisfactory terms, £40,000 worth of debentures. As the result of obtaining these funds, we were able to at once take in hand important development work and certain alterations in connection with the machinery which were recommended by Mr. Gilman Brown in a report which was sent to the shareholders. These recommendations have been carried out as rapidly as possible, and I am glad to say so far with extremely satisfactory results. Dealing first with the machinery, I may say that one of Mr. Brown's recommendations was that our large compressor should be moved to a site which would render us practically free from fuel bills in the future. It involves a considerable time and some cost, but I have no doubt the saving effected will amply cover the amount involved in such expenditure, and, moreover, in future not only shall we save the actual cost of fuel, but we shall deal with a problem that was getting a very difficult one. At a mine like the Ymir, each year the forests are denuded and the supplies of timber are more difficult to obtain, also they naturally cost more because of the longer distance to bring them. And in a climate like that of British Columbia there is comparatively a short period in the year during which timber can be transported from the forests to the mine. So difficult had this become that we were making tests of coal, which was obtained from 300 miles away from the Crow's Nest Pass collieries, and although there would have been a little saving there, the railways of Canada are so taxed by the wonderful demand on their rolling stock that on several occasions we were seriously delayed by the non-delivery of coal; therefore, in now making ourselves independent of fuel, we have accomplished a great deal. The developments carried on have been satisfactory, and we have gone through ore of a much higher grade than we had encountered for many months—I might say years—and when the mill is running I think the returns cannot fail to show very handsome profits. The first work to be undertaken was to give a second line of communication between the 700-ft. and the 1,000-ft. levels, because hitherto there was only the one means of communication, and it was difficult to keep apart the good and bad ore, or country rock. Some of the very disappointing results in the past were not, in Mr. Brown's opinion, because we had not good ore to crush, but because, unfortunately, it was impossible to keep the good ore from the bad, and therefore the net result obtained was such as to render the profits very small, if anything.

"It is a great disappointment to me not to be able to tell you today that the mill is actually running, but there have been some unfortunat. difficulties. We now have the authority of the manager in a cable received today to say that it will be running not later than July 15. With regard to the nature of the ore we are going to crush, it is a little difficult, and, in fact, perhaps it would be dangerous to attempt to tell you what that grade of ore will be, or what quantity we shall supply to the mill in the early days, but, speaking generally, it is a much higher grade than we have crushed for a long time past, and I think we may safely reckon on keeping from 15 to 20 stamps running, gradually getting up to our capacity of 40 stamps, and I trust ultimately running 80 stamps as we did in the old days. If we could run 80 stamps on ore from the old Ymir mine I have no doubt the results would be as satisfactory as in the old days; but we have a second string to our bow, which is a very important factor when dealing with large quantities, and this is the new vein. The ground of our faith in ultimately finding this new vein is the fact that there was, over a large area, rich float discovered. It was a mass of rich rock evidently shed from a vein in the neighbourhood, because it was not weather worn, nor did it bear any indication of having travelled any considerable distance. Again, it was more or less parallel with the outcrop of the Ymir vein, and this to an expert like Mr. Gilman Brown, and to myself, who have seen a good many mines, indicated that it was much more likely to be ore matter from a permanent vein, inasmuch as it was across the line of fracture of the stratification of the country. Before Mr. Nichols, our manager, went to British Columbia Mr. Gilman Brown very thoroughly explained to him various reasons on which he based his opinion that this new vein would ultimately be found, and, working on this information, and supplementing it by his own observation, two months ago Mr. Nichols cabled over that he was quite satisfied, or rather had very great confidence, that within the next two months he would locate that vein. These two months have hardly elapsed, but we have a cable this morning to say that in one of the exploratory drives he has quartz stringers coming in, and this, you may take it, is an indication that we are approaching—I only say an indication—that vein, and he adds that within the next 50 ft. he hopes to prove what he describes as his theory. Now, if he is not interrupted by anything unexpected, certainly within 14 days, and possibly within seven days, he should cut that lode; and if that lode is at all of the character which the outcrop indicates, we have, quite apart from the old Ymir vein, a second string of very great value. In conclusion, I may, perhaps, deal now with the resolution which will be submitted for your approval after this meeting is closed. It is to give effect to the arrangement made with the subscribers to the debenture issue and to create the shares which will enable them to exercise the option of converting their debentures into shares at par. With the shares standing in the market at 4s. or 4s. 6d., perhaps it does not seem to be a matter to consider very seriously, but it was part of the arrangement made, and those who subscribed to the debentures, remembering that these shares once stood at considerably over £2, regard the option as a valuable one, and naturally look to the company to give effect to the undertaking of the directors. With these remarks I formally move the adoption of the report."

Mr. C. M. C. Hughes seconded the motion, which was carried unanimously, and Mr. Oliver Wethered was re-elected a director.

Messrs. Monkhouse, Stoneham & Co., were re-appointed auditors.

At an extraordinary general meeting, afterwards held, a resolution was passed authorizing the directors to increase the capital of the company to £250,000 by the creation of 50,000 shares of £1 each.

NORTH STAR MINING COMPANY, LIMITED.

The following report of the directors of the North Star Mining Company, Limited, manager's report and statements of accounts for the year ended May 31, 1907, were submitted at the eighth annual meeting of the company held in Montreal, Quebec, on June 26, ulto:—

DIRECTORS' REPORT.

"The operations of the year have resulted in a net profit of about $27,000. This is due to the mining and shipment of about 1,600 tons of ore, and the high prices of lead and silver prevailing throughout the year.

"The contract for the extraction of the remnants of ore in the old workings having expired, the company is now doing this work.

"The exploration work originating from the Kellog shaft carried on during the year having proved unsuccessful, on the advice of the company's manager was stopped in February, 1907. The directors decided that further exploration could be done to better advantage by diamond drilling, which is now in progress. The directors were influenced in continuing this work by a report from Mr. Williams, the owner of an electrical device for the location of ore, which stated that a mineralized body, the value of which is as yet unknown, existed in this neighbourhood.

"The policy of the directors has been to carefully husband the finances of the company, and prevent any wasteful expenditure in exploration; this means going slower, but they believe that the results will be more beneficial to the company.

"In conclusion the directors ask your attention to the report of N. McL. Curran, the company's manager, on the exploration work of last year, and to the financial statements annexed hereto."

MANAGER'S REPORT.

"Prospecting has been carried on to the north and west of the Kellog shaft and amounts to 558 ft. in sinking, drifting, cross-cutting and raising.

"The results from the work done early in the year were so favourable as to warrant prospecting the above ground at depth. For this purpose the Kellog shaft was pumped out and the old west cross-cut at the 200-ft. level was extended 171 ft. to reach the desired ground, also a drift was run north for 85 ft.; but the work in this ground proved disappointing at this level although the rock was fairly well mineralized in places. It was decided that some further prospecting of this area should be done, chiefly to the north, by means of the diamond drill. Drilling for that purpose was begun on May 27. Judging from the work done in the main drift and the good surface showings, it is difficult to believe that ore does not exist somewhere in this locality.

"The buildings are in good repair; the steam plant is in good condition; the tramway is also in fairly good condition.

"In conclusion I beg to call your attention to the ore shipped during the year. The contractors decided to give up their contract, and giving the three months' notice required, ceased work in August. The company is again working the old mine, six men being employed, and meeting with good results.

"The net returns for ore shipments for the year amount to $33,000."

STATEMENTS OF ACCOUNTS.

Assets.

Mines, mineral claims and assets	$1,258,568 96	
Development and prospecting for year ending May 31, 1907	15,505 58	
		$1,274,074 54
Permanent equipment		40,166 86
Office furniture		393 02
Mine supplies and stores on hand		2,290 29
Accounts receivable		5,847 20
Cash on hand and in banks		63,122 74
		$1,385,894 65

Liabilities.

Capital Stock	$1,500,000 00	
Less in Treasury	200,000 00	
		$1,300,000 00
Profit and Loss		85,894 65
		$1,385,894 65

Working Account.

To Cost of mining and shipping	$ 6,534 39	
" Freight and treatment	13,297 90	
" Ore tax	633 15	
" General expense	2,876 18	
" Written off permanent equipment	4,455 04	
		$27,796 66
" Balance transferred to Profit and Loss		27,380 98
		$55,177 64
By Proceeds of ore sales		$49,841 60
" Ore in transit		3,000 00
" Miscellaneous receipts		2,336 04
		$55,177 64

Profit and Loss.

To balance May 31, 1907	$85,894 65
	$85,894 65
By balance at credit of Profit and Loss, May 31, 1906	$58,513 67
By balance from Working Account	27,380 98
	$85,894 65

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi.—June: Shipped from the mine to Northport during the past month 11,722 tons ore, containing 2,368 oz. gold, 4,450 oz. silver and 242,300 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, $2,000. Expenditure on development work during the month, $9,000.

Le Roi No. 2.—June: Report of Josie mine, Rossland: Shipped 1,740 tons. The net receipts are $24,236, being payment for 2,188 tons shipped, and $1,341, being payment for 98 tons concentrates shipped, in all $25,577. Report of Vancouver mine, Slocan: Shipped 83 tons. The net receipts are $8,542, being payment for 100 tons concentrates.

Slough Creek.—"Outflow 890 gal. per min.; pressure No. 5 borehole 88 lb. and No. 10 borehole 94 lb. per sq. in." (Office note—The slight increase in pressure is consequent upon the melting snow which is usual at this season of the year.)

Slough Creek.—"Outflow, 969 gal. of water per minute; pressure No. 5 borehole, 85 lb.; No. 10 borehole, 92 lb. per sq. in." (Office note—The above outflow shows increase of 79 gal. per min.; the pressure a decrease of 3 lb. and 2 lb. respectively, on previous advice.)

Tyee.—June: Smelter ran 22 days, treating 1,104 tons of Tyee ore; value, after deducting refining charges, $13,000; 3,967 tons of custom ore; total 5,071 tons, producing in all 387 tons of matte.

U. S. A.

Alaska Mexican—June: 120-stamp mill ran 30¾ days, crushed 22,397 tons ore. Estimated realizable value of bullion, $31,039. Saved 425 tons sulphurets, estimated realizable value of same $24,767. Working expenses for month, $25,313. Labour conditions much improved.

Alaska Treadwell—June: 240-stamp mill ran 30¼ days. 300-stamp mill ran 26 days, crushed 76,139 tons ore; estimated realizable value of bullion $81,696. Saved 1,446 tons sulphurets, estimated realizable value of same $78,475. Working expenses for month $81,614.

DIVIDENDS.

Alaska Mexican.—A dividend (No. 47) of 30 cents per share

has been declared by the Alaska Mexican Gold Mining Company, payable July 29; amount $54,000, making total of dividends to date, $1,626,381.

Alaska Treadwell.—A dividend (No. 77) of $1 per share has been declared by the Alaska Treadwell Gold Mining Company, payable July 29; amount $200,000, making total of dividends to date, $9,435,000.

British Columbia Copper.—A dividend (No. 1) of 25 cents per share and a bonus of 15 cents per share, together 40 cents, has been declared by the British Columbia Copper Company, Limited, payable September 4. It is intended to pay a similar dividend regularly each quarter and, in addition, such bonus as the directors shall deem desirable.

Consolidated Mining and Smelting.—A quarterly dividend (No. 6) of $2.50 per share has been declared by the Consolidated Mining and Smelting Company of Canada, Limited, payable August 1; amount, $120,845, making total of dividends to date, $714,945.

Crow's Nest Pass.—The dividend (No. 26) for the quarter ended June 30, ultimo, at the rate of ten per cent. per annum, paid in July by the Crow's Nest Pass Coal Company, Limited, amounting to $87,500, brought the aggregate of dividends paid by the company during six and a half years up to $2,018,648.16.

International.—A dividend (No. 3) of 1½ per cent. has been declared by the International Coal and Coke Company, Limited, payable August 1; amount, $42,000, making total of dividends to date, $98,000.

Le Roi No. 2.—An interim dividend of two shillings per share has been declared by the Le Roi No. 2, Limited. The aggregate of dividends paid by this company is now about $780,000.

Tyee.—A dividend of one shilling and sixpence per share, being at the rate of seven and one-half per cent. per annum on its authorized capital of £180,000, has been declared by the Tyee Copper Company, Limited; amount £13,500 ($67,500), making total of dividends to date, £58,500 ($292,500).

NOTES.

The Wormald Creek Mining Company is sinking a shaft on Wormald Creek near Beaver Pass House, Cariboo. W. J. Gilman is manager.

Notice has been gazetted, under date June 28, 1907, that the Slough Creek, Limited, an extra-provincial company, licensed under the "Companies Act, 1897," on March 15, 1904, has ceased to carry on business within the Province of British Columbia, under its licence. A new extra-provincial company of the same name has been licensed.

The Ashcroft *Journal* states that the Slocan Cariboo Mining and Development Company is having a hard time while sinking on Canadian Creek on account of the volume of water being encountered at a depth of 17 ft. Beside the sinking of the shaft and installation of steam pumps and hoist, this summer's work includes the excavation of 2,000 ft. of ditch.

A. G. Hanauer of Spokane, and B. A. Laselle and R. H. Hanauer of Barkerville, directors of the Bear Hydraulic Mining Company, of Cariboo, met at Ashcroft recently. The business included consideration of plans for the erection of a new dam in place of that which lately broke away.

The Maple Leaf Mining Company, incorporated at Spokane, Washington, U.S.A., is capitalized at $200,000. Its officers are: Alfred Coolidge, president; D. M. Drumhell, vice-president; Aaron Kuhn, treasurer; Charles P. Lund, secretary, and E. Dempsie, manager. Coal properties near Bellevue, Alberta, have been purchased by the company, which is stated to have $60,000 available for development work.

The Reward Gold and Silver Mining Company intends driving its tunnel further into the mountain on its property in Ferguson camp, Lardeau. When work was stopped last autumn a distance of about 1,300 ft. had been driven. An extension of 500 ft. was recently authorized, and the company's representative in British Columbia—F. C. Elliott of Trout Lake city—is arranging for the carrying out of this work.

The LaPlata Mines Company has had difficulty in obtaining teams to haul ore and concentrates to the mine shipping place a few miles up the west arm of Kootenay Lake from Nelson.

The Sullivan Group Company is shipping about 100 tons of ore daily to the smelter at Marysville. The ore is stated to carry about 10 oz. silver per ton, 25 per cent. lead, and 10 per cent. zinc. Some 50 men are employed at the mine and 100 at the smelter.

The Willow River Mining Company, which last season reached the deep channel of Willow River, is now reported as being on a producing basis and making a good recovery of gold.

COAL MINING NOTES.

It is stated that a 3-ft. seam of coal is being developed at Nanoose Bay, a few miles north of Nanaimo, Vancouver Island. Beside mining coal the owners intend making fire-bricks, there being two feet of good clay alongside the coal.

Another coal mining company has been formed—the Royal Collieries, Limited. The Barnes mine, situated five miles from Lethbridge, together with some 6,000 acres of coal lands, has been acquired. It is reported that a modern plant is to be installed and development work undertaken as soon as shall be practicable. It will be necessary to construct five miles of railway to connect with the Canadian Pacific Company's Crow's Nest line.

The Alberta Fuel Company of Spokane, Washington, is stated to be erecting in Spokane coal storage bunkers to have a holding capacity of 10,000 tons. This company has been organized to market southwest Alberta coal.

Lands in the Crow's Nest Pass and Lethbridge districts—some 2,500 acres in the former and 1,400 in the latter—have been acquired by Chicago men from the Colfax Coal and Coke Company of Spokane and Colfax, Washington, U.S.A. The new owners are expected to shortly proceed with development work.

The Maple Leaf Mining Company has been incorporated in Spokane, Washington, to operate a coal property of about 700 acres situated in the Frank district, southwest Alberta. Connection with the C.P.R. Company's Crow's Nest railway is to be made near Bellevue.

The Nicola Coal and Coke Company is opening up two coal mines in the Nicola district. The Kamloops *Standard* says: In two weeks the C.P.R. will have completed a spur line from Merritt station, on the Nicola branch, into the coal lands of the Nicola Valley Coal and Coke Company and the mines will then be in a position to deliver coal to the C.P.R. cars. The company has two seams of coal about a mile and a half from Merritt station, which is seven miles this side of Nicola. On the 15-ft. seam a slope 800 ft. long has been sunk and a tunnel is now being driven on two ends which will open this slope out on the spur now being built. The tipple will be alongside the spur. Only 150 ft. of work in the centre now remains to be done to open this tunnel. On a smaller seam a slope is being driven, and it will also be open with a tunnel through which the coal mined will be brought out to the spur tracks.

On the payday for the month of June at the Crow's Nest Pass Coal Company's collieries the amount distributed was one of the largest monthly totals in the history of the company. The mines are now producing a large tonnage, but it is difficult to obtain additional men for mines and coke ovens, otherwise both would be worked to their full present capacity.

During July the Lille mine of the West Canadian Collieries, Limited, was closed down temporarily, the men having ceased work in order to compel the company to do away with the back-hand system that had been in force at this mine for two years. The difficulty has been temporarily adjusted and the men have returned to work pending adjudication of the point in dispute by an arbitration committee of miners and operators appointed as provided in the general agreement

made on May 4, last, between the Western Coal Operators' Association and the United Mine Workers of America.

An 11-ft. seam of coal has been struck by the prospecting party working for the Crow's Nest Pass Coal Company at Morrissey. The new seam is located close to the tipple but much lower down than the old seam. A contract has been let for a two-track tunnel and about 20 men are engaged in driving it.

Further development of the Canadian-American Coal and Coke Company's mine at Frank is being energetically proceeded with and efforts are being made to obtain 50 to 75 more men with the object of increasing the daily output of coal to 800 tons. Cross-cutting east and west of the seam heretofore worked will shortly reach two other seams and make more coal available.

GOLD BULLION RECEIPTS AT UNITED STATES ASSAY OFFICE, SEATTLE, WASHINGTON.

A summary of an official statement of the gold bullion deposited at the United States Assay Office, Seattle, during the fiscal year ended June 30, 1907, gives the following figures: Gold, standard ounces 1,228,742.875, coining value $22,860,330.26; silver, standard ounces 196,858.70, coining value $229,071.94; or a total value of $23,089,402.20, as compared with a total of $18,139,058.41 for the immediately preceding fiscal year. The sources from which the more recent year's bullion receipts came were as follows:

Alaska	$15,791,434.37
Canadian Yukon	5,995,837.45
British Columbia	1,190,547.72
All other	117,582.66
Total	$23,089,402.20

MACHINERY AND CONSTRUCTION NOTES.

It is stated that the Dominion Copper Company is preparing to install a two-stand copper converting plant at its smelting works at Boundary Falls in the Boundary district.

The Nelson Iron Works has received an order for a complete tramway to be erected by the Consolidated Mining and Smelting Company of Canada at its Eureka-Richmond mine near Sandon, Slocan district.

The Grand Forks *Gazette* says that in five days the Machine and Structural Iron Works of that town made a receiver for the large blast furnace recently completed at the Dominion Copper Company's smelter at Boundary Falls.

The Bear Hydraulic Mining Company has cut 60,000 ft. of lumber for use in renewing its dam which recently broke away with the loss of the water intended for this season's hydraulicking.

The 450-h.p. electric motor previously used in running the War Eagle compressor, and latterly a portion of the Centre Star compressor plant at Rossland, has been shipped to Phoenix where it will drive the Snowshoe compressor plant. A motor of 600 h.p. has been ordered from the Canadian Westinghouse Company and it is expected it will reach the Centre Star mine in the course of a few weeks. In the meanwhile the Nickle Plate compressor will be used.

Grading of Great Northern railway one and a half-mile spur to Granby Company's new Victoria shaft terminal, at which ore bunkers have been so arranged as to admit of loading on to either Great Northern or Canadian Pacific trains, is finished and laying steel commenced. Construction of a trestle 300 ft. long and 50 ft. high is necessary to complete the new railway connection.

Connection between the Cariboo Gold Mining Company's old reservoirs and big hydraulic mine near Quesnel Forks having been restored, the construction of the Spanish Lake water system has been suspended. The manager, John B. Hobson, has left Bullion for New York. Meanwhile hydraulicking is in progress at the mine.

The Canada Metal Company of Nelson has placed an order for a 20-drill air compressor together with an impulse water wheel for operating same at the company's Blue Bell mine on Kootenay Lake. A 5-ft. standard, 40-mesh, Huntington mill, to run parallel with a tube mill, is also being obtained for the Blue Bell mill.

The Pacific Coal Co. of Bankhead, Alberta, has ordered a 20-ft. Walker "Indestructible" ventilating fan.

The Crow's Nest Pass Coal Company is adding to its plant and machinery two Walker compound condensing Corliss two-stage air compressing engines each having a capacity of 3,500 cu. ft. of free air per min.; also a 20-ft. Walker ventilating fan driven by a tandem compound engine.

The Le Roi No. 2, Ltd., of Rossland, has ordered two Hadfield's patent steel ore crushers, which are under construction.

TRADE NOTES AND CATALOGUES.

Hadfield's patent stone breakers and ore crushers are steadily growing in favour in Canada. Beside the one described in last month's MINING RECORD two for the Le Roi No. 2, Limited, of Rossland, B.C., and two for the Mond Nickel Company's Victoria mines in Ontario, are in course of construction at the East Heckla Works, Sheffield, England, of Hadfield's Steel Foundry Company, Limited. Peacock Brothers of Montreal, sole Canadian representatives of Hadfield's, have reason to expect that they will shortly secure other orders for this make of rock crushers.

Mussens Limited of Montreal is doing a steadily increasing business in the Canadian Northwest in the supply of mining, railway, contractors', and municipal supplies. J. W. Collis, of Rochussen and Collis who have charge of the company's Vancouver branch, is kept almost constantly moving about the large area of territory he has to cover, with increasingly good results in orders obtained. The company has lately published a very useful catalogue (No. 15) of 640 pages, size 8x5 in., bound in cloth, freely illustrated, and having a full index for convenience in referring to particular manufactures or supplies. It is as comprehensive as space limits have allowed, and conciseness and simplicity are its prominent features. Code words and figure numbers admit of reference being made clearly and with least possible chance of error, while an abridged code, in conjunction with the other code words, will prove of much assistance to those ordering by telegraph. The publication of this catalogue is in keeping with the company's up-to-date general methods in carrying on its extensive business.

The Canadian Westinghouse Company's circular No. 1084, "The Westinghouse Series-Alternating Arc Light System," has been received. This pamphlet shows the Westinghouse system to be distinctive in its features of design and construction, and superior in its operation, representing, in all points, years of experience, investigation and development in the field of manufacture of electrical apparatus. Illustrated descriptions are given of various arc lamps, and accessories.

Bulletin No. 30 of the Canada Foundry Company, Limited, Toronto, Ontario, deals chiefly with gate valves and hydrants, both of which are described and illustrated in variety. Tables of dimensions and other useful information are included.

The Westinghouse Electric works at East Pittsburg, Pennsylvania, have established a new record. During the month of May the company shipped 750 carloads of electrical machinery, or an average of nearly 30 carloads each working day, aggregating 10,000 tons and representing in value about $4,000,000. This exceeds by 110 cars any shipping record for one month ever previously made at these works. The high record heretofore was held by the month of August, 1906, when 640 carloads were shipped. The shipments at the Westinghouse Machine Company's shops during May also reached high-water mark, the company having sent out from its works 90 engines, aggregating 50,000 h.p. These engines included gas engines from 10 to 1,000 h.p. and steam turbines from 1,000 to 10,000 h.p.

PRODUCTION OF LEAD.

Official returns of the output of metallic lead in British Columbia for the fiscal year ended June 30, last, give a total of 23,754 tons. Of this quantity 18,494 tons were the product of ores and concentrates smelted in British Columbia, while 5,260 tons were contained in shipments to American and European plants. More than half of last year's lead product was from the Consolidated Mining and Smelting Company's St Eugene mine, the output of which was 14,719 tons. The Sullivan group mine, also in East Kootenay, produced a considerable portion of the remainder of the total output. The totals of four consecutive years were as under:

Fiscal Year.	Tons of Metallic Lead.
1903-4	12,163
1904-5	27,838
1905-6	26,111
1906-7	23,754

BOOKS, ETC., RECEIVED.

Brooks, E. W.—A report on the geology, mineralogy and metallurgy of the London-Arizona copper mine, with map and cross sections from the U. S. Geological Survey, showing its genetic relations to other great copper deposits of laccolitic origin.

Columbia University, New York City.—The "School of Mines Quarterly." Vol. XXVIII., No. 3.

Guarini, Professor—"The Water Powers of Peru—their Development and Possible Applications." Abstract from the *Engineering Magazine* of an article (by Mr. Guarini, professor of physical and electrical science at the "Escuela de Artes y Oficios" of Lima, Peru), the purpose of which is to describe the amounts and relative locations of the water-powers of southern Peru, the feasibility of their development, demand for power, possible application of electricity, etc.

California State Mining Bureau—An "Act Establishing a Uniform System of Mine Bell Signals." Lewis E. Aubury, state mineralogist, Ferry Building, San Francisco. Price, cardboard 5 cents, paper 2 cents, postage 2 cents.

Dundee Free Libraries, Scotland.—Report of the Free Library Committee to the Town Council of Dundee for the year 1906. Pages, 44; illustrated.

Cobalt Mining Information Bureau, Limited.—Morton's "Hand Book of the Cobalt District"; map of Bucke Township, including section of Lorrain Township; map of Coleman Township. All published by the Cobalt Mining Information Bureau, Limited, Toronto, Ontario.

Poole, H. S.—"Features of the Continental Shelf off Nova Scotia." By Dr. H. S. Poole, Halifax, N.S. From the "Transactions of the Royal Society of Canada," Second Series, 1906-1907.

Zentrale fur Bergwesen, Frankfurt am Main.—Report for 1906 of the Central Mining Institute, Frankfort-on-the-Main, Germany.

American Institute of Mining Engineers.—Bi-Monthly Bulletin of the A.I.M.E., for July, 1907. Contents: I. Institute Announcements: II. Technical Papers.

BOOKS REVIEWED.

Gold Dredging, by Capt. C. C. Longridge, mining and consulting engineer. 313 pages, 6x9¼ in., illustrated. Published by *The Mining Journal*, London, England. Second edition: cloth, £1 net.

This volume, "Gold Dredging and Mechanical Excavators," is a second and revised and greatly enlarged edition of Captain Longridge's previously published work on "Gold Dredging." Much additional matter has been incorporated in the new edition, and the arrangement of the work has been considerably altered. Its 34 chapters cover a wide field, and deal successively with the various kinds of dredges in use, horse-power required in dredging, separation of the material dredged, gold recovery appliances, quantity of water required for washing the gold-bearing gravel, disposal of tailings, working costs, capacity and costs of dredges, difficulties of dredging, selecting and prospecting dredging ground, dredging leases, power excavators, fields for gold dredging, and the author's conclusions regarding this increasingly important industry.

It is claimed for this book that it retains its character as a practical treatise and, while omitting theories and untried inventions, records as faithfully and impartially as possible known gold-dredging practice and well-tested methods. It shows that of late there has been general development in dredges and their fields of operation, with the result that the facts have been brought into greater prominence that ground of abnormally low gold value can now be profitably treated, and that an enormous area of such ground remains to be exploited. Further, failures have been fewer and wherever dredging has been undertaken with prudence and skill there has been success in greater degree. In dredge building there has been all-round improvement in details of hull and machinery; design and construction have been bettered, and strength and durability increased.

Among the known dredging fields noticed are those of British Columbia and Yukon Territory. Information relating to the former has been extracted from articles published in the MINING RECORD and other journals, and to the latter from the "Interim Report of the Commissioner of the Yukon Territory" made by Commissioner McInnes on December 15, 1906. While the general results of dredging in British Columbia since the publication of the articles quoted from have been disappointing, the experience in the Yukon has been encouraging enough to induce the bigger operators to considerably extend for gold on a much larger scale than heretofore seen in the Canadian Northwest.

Captain Longridge's efforts to bring his book up to date will be appreciated by many interested in gold dredging. The making conveniently accessible of so much information on this very important subject should have the effect of leading to a ready sale of this comprehensive work, which in addition to the large fund of information it contains, possesses the merit of having been well printed, excellently illustrated, neatly bound, and generally got up in an attractive style.

Examination Questions for Certificates of Competency in Mining, by the editors of *Mines and Minerals*, Scranton, Pennsylvania, U.S.A. 532 pages, 6x8¾ in., illustrated. Published by the International Textbook Company, Scranton, Pa. Cloth, $3.50.

This book contains examination questions for competency as mine inspector, mine manager, mine foreman, fire-boss, hoisting engineer, etc., as given by the state examining boards, together with answers prepared and edited by the editors of *Mines and Minerals*, a journal devoted to articles on the practical operation and principles involved in the operation of all kinds of mines and metallurgical plants.

The questions and answers are mainly those that have already appeared in the *Colliery Engineer and Metal Miner*, or in *Mines and Minerals:* the answers as originally given have been edited and rearranged so that there may be as little duplication as possible. Certain questions have been added from a file of unpublished examination questions. It is thought, therefore, that this compilation faithfully and fully represents the range of subjects covered at the present time by examinations for certificated mining positions in the United States and some of the provinces of Canada.

This book is intended mainly to assist those preparing themselves for examinations for certificated positions; not as a textbook, but merely as an aid in connection with textbooks on mining. In it none of the general principles or theories of mining are given other than those asked for by specific questions.

The matter contained in the book is divided into 28 chapters, and a table of contents shows the subdivisions under the various heads. In addition, an index of 16 pages greatly facilitates reference.

MINING MEN AND AFFAIRS.

A. N. C. Treadgold passed through British Columbia during July on his way from Ottawa to Dawson, Yukon.

Burton B. Nieding is manager of the Niblack mine on Prince of Wales Island, southeast Alaska.

A. C. Garde has taken his family from Nelson to the Argenta mine on Hamill Creek.

L. Alexander is now managing the Emily Edith silver mine, in the Silverton section of Slocan district.

John B. Hobson, manager of the big hydraulic gold mine at Bullion, Quesnel, has gone to New York.

J. W. Astley, of Victoria, has been at Georgetown, Colorado, U.S.A., examining mining property for English clients.

George H. Aylard of New Denver, manager of the Standard mine in the Slocan district, is visiting in Ohio, U.S.A.

John Hopp has gone to Cariboo to personally superintend hydraulicking operations on his several placer gold mines in the neighbourhood of Barkerville.

Anthony J. McMillan, managing director of the Le Roi Mining Company, is expected to arrive in Rossland from England during August.

Smith Curtis of Rossland has been looking over copper claims in the neighbourhood of Kamloops. He will probably shortly make Victoria his headquarters instead of Rossland.

Wallace Corbett has been examining the Maggie and Tamarac properties in Ashcroft district, for Butte, Montana, principals.

J. C. Haas has been examining copper claims in the Bella Coola mining division, coast district, for Spokane, Wash., principals.

W. H. Aldridge of Trail, managing director of the Consolidated Mining and Smelting Company of Canada, is in the East and will probably remain there for several weeks.

Chas. L. Tutt, of Denver, Colorado, U.S.A., a well known wealthy mine and smelter owner, has been cruising on the British Columbia coast in his yacht Anemone.

W. C. Freeburn is manager of the Mt. Andrews mine on Prince of Wales Island, southeast Alaska, which ships its ore to Vancouver Island for treatment.

Henry Croft has returned to Victoria from England where he had been engaged in disposing of the Lenora mine at Mt. Sicker, Vancouver Island.

Hon. Alex. Henderson, the new commissioner for Yukon Territory, arrived at Dawson on July 14. He was cordially received and presented with an address of welcome.

E. E. Andrews, formerly manager of the Pacific Coast Mining Company which worked 6 and 7 below, Bonanza Creek, Yukon, has gone to Arkansas, U.S.A.

Walter G. Perkins remains at Ely, Nevada, U.S.A. His resignation has not been accepted by the Steptoe Valley Smelting and Mining Company.

Lucien Eaton, superintendent of the Iron Belt & Shore Mines, Iron Belt, Wisconsin, U.S.A., was in Victoria with his bride at the end of June.

W. J. Sutton, geologist for the Dunsmuir interests who own coal mines on Vancouver Island, has been looking over coal lands in the Nicola district.

F. C. Laird, manager of the Willow River Mining Company, has returned to Barkerville, Cariboo, from a trip to the East.

R. H. Stewart, manager of the mines of the Consolidated Mining and Smelting Company of Canada, has left Rossland for Ottawa, Ontario, on a month's vacation.

Francis A. Thomson, formerly of Nevada, who some time since was temporarily appointed professor of mining and metallurgy at Washington State College, Pullman, Washington, U.S.A., lately had his appointment made permanent.

Etienne A. Ritter of Colorado Springs, Colorado, was a recent visitor to copper mines in the Boundary district, U.S.A., after having been to several mining properties in Similkameen district.

Hon. Richard McBride, minister of mines for British Columbia, has returned to the Province from a visit to England. During his absence the provincial secretary, Hon. H. E. Young, was acting minister of mines.

Charles Camsell of the geological branch of the Dominion department of mines, lately spent a few days on the coast, afterwards returning to the Similkameen, in which district he is engaged in geological survey work.

Col. J. H. Conrad has returned to southern Yukon from a business trip to England in connection with the obtainment of capital for some of the Windy Arm mining properties in which he is largely interested.

Fred. T. Congdon, formerly commissioner of Yukon Territory, is in Dawson from Ottawa to attend the exchequer court. He is counsel in several important cases. *En route* to Dawson he visited the Whitehorse copper mines.

F. H. Knight of Grand Forks is manager of the Bertha Consolidated Gold Mining Company, which is developing the Bertha, situated some 12 miles up the north fork of Kettle River from Grand Forks, in the Boundary district.

Milnor Roberts, for several years professor of mining at Washington university, Seattle, Washington, U.S.A., is directing development work at the Moonshine mine in Ketchikan district, southeast Alaska.

P. Davidson Ahier, formerly manager of the Idaho-Alamo silver-lead mines, in the Slocan district, has been appointed manager of the Cariboo-McKinney gold mine at Camp McKinney.

George L. Walker, editor of the Boston *Commercial*, after having spent a week visiting copper mines and smelters in the Boundary district, left Phoenix on July 19 for California and Nevada.

Wm. Fleet Robertson, provincial mineralogist, has been examining Highland Valley claims in the Ashcroft section of Yale district, going thence to Nicola valley, where several coal mines are being opened up.

Robert H. Anderson, for some time superintendent of the Le Roi mine at Rossland, and afterwards manager of the Sullivan Group Company's lead-silver mine in East Kootenay, died recently in Spokane, Washington, U.S.A.

J. E. McAllister of Greenwood, Boundary district, manager of the British Columbia Copper Company, was summoned to Toronto, Ontario, last month, owing to the death there of his father.

John W. Astley of Dawson, Yukon Territory, where he was chief engineer and general manager of the Klondike Mines railway, recently left Dawson for Ottawa, Ontario. Mr. Astley was a pioneer Dominion land surveyor in the Northwest.

Erland G. Hadow, formerly secretary to the company owning the Silver Cup and Nettie L. mines in Ferguson camp, Lardeau, has returned to Trout Lake after having been for some time at the British Columbia Copper Company's Napoleon mine at Boyds, Washington, U.S.A.

Donald G. Forbes, formerly of the Silver Cup mine in the Lardeau district, late in July went from Victoria to the Similkameen district where, as consulting engineer for the Similkameen Mining and Smelting Company, he directs operations on that company's gold-copper mine on Bear Creek.

A. J. Morrison has been given charge of development work on the Moreen mineral claim in Deadwood camp, Boundary district, which was recently visited by Mrs. I. M. Parsons, Minneapolis, Minnesota, U.S.A., secretary of the company prospecting this property.

F. W. Guernsey, of the Consolidated Mining and Smelting Company of Canada, Trail, and S. S. Fowler of Nelson, have

been examining the Mammoth group, owned by the Edward Baillie Syndicate, Limited, and situated on Goat Mountain, 10 miles from Camborne, Fish River camp.

Geo. W. Hughes recently accompanied two New York capitalists to his zinc mine, the Lucky Jim, in Slocan district.

Robert R. Hedley visited the Vancouver Island Copper Company's Indian Chief group of claims at Sidney Inlet, west coast of Vancouver Island, during the month, and afterwards went north to Atlin.

D. B. Dowling, geologist, has left the Geological Survey of Canada, after 13 years in the service of the Canadian government, and is now in charge of exploration operations of the German Development Company, of Montreal and Ottawa, prospecting for coal near Yellowhead pass through the Rocky Mountains from Alberta to British Columbia.

Rienzi W. MacFarlane who six or seven years ago was directing development work on several mining properties in the Boundary district, going thence to the Malay Peninsula, is in England on a vacation. He is now manager of the Cherokee (Mexican) Prop. Company, at Parral, Chihuahua, Mexico.

Three directors of the Crow's Nest Pass Coal Company—first vice-president Senator Robert Jaffrey, Lieut.-Col. James Mason, and C. C. Dalton—arranged to leave Toronto, Ontario, on July 18 on a visit of inspection of the coal mines and other property of the company in the Crow's Nest Pass district of British Columbia.

R. G. McConnell and F. H. Maclaren of the Dominion department of mines, who are engaged in making a geological survey of Whitehorse copper camp, after having spent five or six weeks in the vicinity of the Grafter and Arctic Chief mines are continuing their work northward near the Copper King.

Col. W. S. Thomas of Bar Harbour, Maine, U.S.A., after having spent several months in the Whitehorse district, Yukon, has gone east to confer with his principals concerning the development of a number of mineral claims in Whitehorse copper camp he has secured for them, either by purchase or under option. He is understood to be the representative of a syndicate of Pennsylvania capitalists.

It is stated that Byron N. White, well known as the head of the company which successfully operated the Slocan Star mine and concentrating mill near Sandon, Slocan district, until so hampered by litigation over extra-lateral rights that further progress was not practicable, intends making Vancouver his headquarters instead of Spokane, Washington. Mr. White is actively developing a copper mine in Whitehorse camp, Yukon Territory.

Thos. Mills, whose resignation as manager of two of the Western Fuel Company's coal mines at Nanaimo was mentioned in last month's MINING RECORD, has entered the service of the Wellington Colliery Company and taken charge of its new workings on Haslam Creek, Vancouver Island. Mr. Mills was lately the recipient of a handsome gift from the Western Fuel Company's employees.

Louis W. Hill, president of the Great Northern Railway, lately visited the Similkameen district. At Hedley he went through the Daly Reduction Company's 40-stamp mill and cyanide plant, and afterwards visited the Yale Mining Company's Nickel Plate mine. He intimated that the completion of the Great Northern railway's road into the district might be expected within a year.

Stanley A. Easton, known to earlier residents in the Boundary district, where he was manager of the Gold Drop mine at Phoenix, is now in charge of the Bunker Hill and Sullivan property in the Coeur d'Alene district of Idaho, U.S.A.

WANTED.

WANTED—A tunnel foreman for rock railway tunnel in the East. Must have a thorough knowledge of rock drills and air compressing plant and able to handle men. Apply, stating terms, experience and references to P. O. Box 645, Victoria, B.C.

Some 500 men are employed in this company's mines which are stated to be shipping ore averaging about 19 oz. silver per ton and 55 per cent. lead.

From the list of names of those elected as members or associates of the American Institute of Mining Engineers and who during May and June last accepted membership are the following, resident in the Northwest: Lionel H. Cole, Rossland, B.C.; Paul H. Hebb, Tacoma, Washington, U.S.A.; Beach A. Laselle, Barkerville, B.C.; Harold N. Laurie, Perdue, Oregon; Walter F. McNeill, Alberta; B. Leonard Thorne, Hosmer, B.C.; Neville E. Townsend, Rossland, B.C.; Russell G. Wayland, Treadwell, Alaska. The following names are included in the last-published list of candidates for membership: Lyndon K. Armstrong, Spokane, Washington; Glenville Arthur Collins, Seattle, Washington; Carolus D. Emmons, Eugene, Oregon; Wilson Walter Hughes, Ellamar, Alaska; Leon Ewart Savage, Northport, Washington; all in the northwestern part of the United States.

The Whitehorse *Star* says. "W. W. B. McInnes, ex-commissioner of Yukon, now retained by the Guggenheims at a princely salary as their attorney in the Dominion, was in Whitehorse lately on his way to Dawson on professional business" It is stated that Mr. McInnes is representing the Guggenheims at the court Judge Burbidge, of the Canadian federal exchequer court, is holding to deal with the suits brought by the Dominion government to oust the concessionaires from the Bronson and Ray concessions on Bonanza Creek, and the Anderson concession on Hunker Creek, all of which have been declared cancelled. These concessions, covering miles of ground on two of the richest creeks in the Klondike, had remained for years practically unworked, hence the action of the government. The Guggenheim interests are in possession of the Anderson concession and are preparing to install on it a big gold dredge.

NOTICES IN THE BRITISH COLUMBIA GAZETTE.

Percy J. Gleazer, of Ymir, to be mining recorder for the Nelson mining division, in place of C. D. Blackwood, resigned.

Constable John A. Fraser, of Ymir, to be a deputy mining recorder for the Nelson mining division, with sub-recording office at Ymir.

Sealed tenders will be received by E. E. Chipman, government agent, Kaslo, up to noon of August 14, proximo, for the purchase of the following named forfeited mineral claims: Arena Fraction, J.I.C., and Jenny Jones.

Certificates of efficiency, authorizing the holders to practise assaying in British Columbia, have been issued by the minister of mines to the following. George William Dunn and George Edwards Cole.

The appointment of Hon. Henry Esson Young as acting minister of mines has been rescinded.

Cory Menhenick, of Camborne, to be acting mining recorder for the Lardeau mining division from July 27, during the absence of Benjamin Ernest Drew.

Archibald Dunbar Taylor, of Vancouver, solicitor, has been appointed the new attorney for the Atlin Mining Company, Limited, in the place of Clarence M. Hamshaw, whose appointment has been revoked.

The State Legislature has appropriated for the Michigan College of Mines, at Houghton, Michigan, U.S.A., $43,000 for a new central heating and power plant, also $75,000 for a library and museum building.

According to statistics compiled by Aron Hirsch & Sohn, the great metal-buying firm, of Halberstadt, Germany, the copper production of all countries in 1906 totalled 736,711 metric tons.