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KETCHIKAN MINING DISTRICT, SOUTHEAST ALASKA—illustrated.
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VOL. XIV.

JANUARY, 1907.

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MINING RECORD

ESTABLISHED 1895

VOL. XIV.

JANUARY, 1907.

No. 1

BRITISH COLUMBIA MINING RECORD

E. JACOBS,.....Managing Editor

Devoted to the Mining Interests of the Pacific Northwest.

PUBLISHED MONTHLY BY
THE BRITISH COLUMBIA RECORD, LIMITED

VICTORIA, B. C.

Office—Province Building. Telephone 243. P. O. Drawer 645.

ADVERTISING AGENCIES:

London, England: E. Henderson & Co., Billiter Square Buildings,
Denver, Colorado: National Advertising Co., 423-424 Quincy Building,
San Francisco, California: E. C. Dake's Advertising Agency, 1001 Masonic Avenue.

SUBSCRIPTIONS PAYABLE IN ADVANCE:

Canada and the United States, per year - - \$2.00
Great Britain and Foreign, per year - - - \$2.50

Advertising copy should reach Victoria office by 5th of each month
Rates on application.

Correspondence to be addressed to the Managing Editor.

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NOTES AND COMMENTS.

The average price of lead in New York for 1906 was 5.347 cents per lb., as compared with 4.707 cents for 1905.

Construction of the new furnace buildings of steel, at the Granby Company's smelter, Boundary district, is nearly completed.

The Calumet and Hecla on Rapid Creek, Poplar camp, Lardeau, has been bonded and its intended further development announced.

The writer of "What I See Round the City" in the London *Critic* advises purchase of Ymir Gold Mines shares, offering in London at five shillings.

Alaska's production of copper during three years was as follows: In 1904, 2,043,586 lb.; 1905, 4,703,600 lb.; 1906 (estimated), 6,250,000 lb.

The mineral production of Canada in twenty years increased by \$58,353,000. The production of 1886 was valued at \$10,221,000; that of 1905 at \$68,574,000.

For the number of men employed, says the Whitehorse *Star*, the Big Salmon has been one of the best gold-producing districts in the Yukon for the two years last past.

A recent mail brought an order, accompanied by a remittance for one year's subscription for the B. C. *MINING RECORD* to be mailed monthly to Tomsk, Siberia, Russia.

The total production of coal in the State of Washington, U. S. A., during the last quarter of 1906 was 880,412 tons. This was the highest tonnage of any quarter of the year.

It is stated that the substitution of electric power for steam will result in a considerable saving to the British Columbia Copper and Dominion Copper Companies, Boundary district.

The total tonnage of ore shipped during 1906 by the silver-gold-quartz mines of the Boundary district is shown by the *Anaconda News* to have been 2,210 tons as compared with 2,887 tons in 1905.

The membership of the American Institute of Mining Engineers on January 1, 1907, numbered 4,048. Included in this total were 11 honorary, 3,858 ordinary, and 179 associate members.

The *Nelson Daily News* states that a piece of ore sent to a local assayer for qualitative analysis was found to be cinnabar ore, the first of the kind known to have been discovered in the Nelson mining division.

The Department of the Interior, Ottawa, has published the "Interim Report of the Commissioner of the Yukon Territory," containing a review of mining operations and general conditions in the Yukon during the 1906 season.

From the *Kootenaiian* it is learned that a big tonnage of ore is accumulating at the Kootenay Ore Company's sampling works at Kaslo. It is coming from several mines near there, and is awaiting orders from the smelters for shipment.

The removal of 18,000 cu. yd. of rock, states the *Anaconda News*, will be necessary for the completion of the new spur being built by the Canadian Pacific Railway Company to the Dominion Copper Company's Rawhide mine at Phoenix, Boundary district.

Ketchikan and Prince of Wales Island, southeast Alaska, have lately been connected by cable with the outside world. The mining and smelting industries of those places will find the establishment of this means of speedy communication convenient and advantageous.

Included in the estimate of the *Iron Trade Review* of the iron production of the world for 1906 is that of Canada, placed at 575,000 tons. That of the United States is given as 25,300,000 tons. The grand total is 59,700,000 tons gross.

The Daly Reduction Company has been having levels taken and other work done in connection with its intended increase of power for its stamp mill at Hedley, Similkameen. Several schemes are under consideration and the data obtained will enable the management to decide which will be the most advantageous one to carry out.

Governor Hoggatt of Alaska estimates the population of Alaska at 33,000. He places the net increase last year at 3,500 and, in his first annual report, adds that there is a moving population of 6,000 who live in Alaska during the summer months finding employment in mining and various other industries.

Included in the preliminary statistics of production of gold and silver in the United States in 1906 were the following: Alaska, gold value, \$21,249,215; silver quantity, 191,706 fine oz. These figures show an increase in gold over 1905 production of \$6,323,615, and a decrease in silver of 44,872 oz.

A report from Moyie, East Kootenay, is to the effect that the Black-Mackay Mining Company while sinking a sand-pipe about 300 ft. out from the shore of Moyie Lake where the water is some 60 ft. in depth, after driving through 50 ft. of clay and 5 ft. of rock, encountered what is believed to be the extension under the lake of the St. Eugene north vein of silver-lead ore.

The "Summary Report of the Geological Survey Department of Canada for 1906" has been published. Its distribution thus early in the year immediately following that in which the work it records was done is a decided advantage, and we welcome this very desirable change from the delays of past years. We shall notice this report more fully in our next issue.

The second of the large blast furnaces recently erected at the British Columbia Copper Company's smelting works at Greenwood, Boundary district, was blown in on January 24. The treatment capacity of the two new furnaces is 600 to 650 tons each per day. It is hoped that ere long ore and coke supplies will be sufficient to keep all three of the new furnaces regularly in operation.

The article on the "Copper Deposits of Washington, U. S. A.," printed on pp. 28-32 of this number of the *Mining Record*, was submitted by the writer, Hon. A. W. McIntyre, to the American Mining Congress, at Denver, Colorado, last October. We acknowledge with thanks the courtesy of the secretary to the Congress in acceding to our request to be supplied with a copy of it for publication.

The following note is from the *London Mining Journal* of January 19: A sharp jump has been made by Ymir from 2s. to 4s. 6d. A circular from the company states that arrangements have been made whereby the company's indebtedness will be discharged and additional working capital provided by an issue of debentures, of which the subscription of £40,000 has been guaranteed.

James Cronin and others associated with him in this enterprise have acquired the Queen Victoria group of mineral claims situated seven miles west of Nelson, near Beasley siding. The *Mining Record* published a description of this property in July, 1902. There is on it a bluff of copper ore from which a large tonnage can be obtained. No work has been done here for years, but now some 25 men are employed.

Recent reports of a proposed amalgamation of the British Columbia Copper Company and the Dominion Copper Company, each owning and operating mines and a smelter in the Boundary district, appear to be without foundation in fact. No mention of such a proposition was made in the circular sent to stockholders notifying them of the intention to hold the annual meeting of the former company on February 13.

It is reported that the Le Roi Mining Company has bought a controlling interest in the Velvet mine, situated on Sophia Mountain, near Rossland, but official confirmation of the report has not been received. During 1904 the Velvet-Portland Mines, Ltd., owning the amalgamated Velvet and Portland properties, erected a small concentrator and shipped about 180 tons of concentrates to the smelter. Since then practically nothing has been done, neither at mines nor mill.

The British Columbia Bureau of Mines has issued two bulletins, both by Herbert Carmichael, provincial assayer. No. 1 is entitled "Mineral Claims on the West Coast and in the Vicinity of Great Central Lake, Vancouver Island," and No. 2 "Mineral Locations, Portland Canal District, in the Skeena Mining Division." The latter is reprinted in this number of the *Mining Record*. The illustrations are reproductions of photographs kindly placed at our disposal by Harold Nation who last summer was engaged in survey work in the locality.

S. S. Fowler, consulting engineer; B. A. Isaac, of the Nelson Iron Works, and R. S. Lennie, all residents in Nelson, have been appointed a local board or committee to in a general way conduct affairs at the Ymir mine. It is stated that financial arrangements have been made that provide for the resumption of development work in the mine and production on a scale that should result in operations proving profitable. The late manager, E. M. Hand, is being succeeded by Horace G. Nichols, an experienced mining engineer of good standing who was with the Ymir Company seven or eight years ago.

Speaking to the toast of "The Mining Industry" at Sandon recently, J. M. Harris said that while litigation had undoubtedly given the camp a heavy set-back he hoped the coming summer will see an end to this trouble. If everything goes right he intends putting 30 to 40 men at work at the Reco mine. When called upon to respond, Osear V. White of the Sloean Star, the owners of which are defendants in the litigation referred to, said that during the past five years Mr. Harris had kept him so busy chasing around "black fissures" that he had had no time to study the mining industry. This apt allusion to a prominent feature in the Star vs. White case caused much laughter, its bearing upon

the dispute between the parties named being understood by all present.

The London *Mining Journal* has given prominence to copper mining in the Boundary district of British Columbia by publishing an article, which is reprinted on another page of the *Mining Record*, on the mines and smelter of the Dominion Copper Company. In this connection the following excerpt from the Boston *News Bureau* is of interest: The shares of the Dominion Copper Company are about to be introduced on the London market, a block of 50,000 having been acquired by strong English interests, whose clientele are heavy holders of railway and other Canadian corporation securities. These shares were chiefly contributed by four or five of the largest stockholders of the Dominion Company. The result will be to give the securities of this company a wider and, therefore, a more stable market.

The article entitled "Friendly Messages from 'Uncle Sam' and 'Brother Jonathan'" appearing elsewhere in this number of the *Mining Record* has been in type for three months, but has been crowded out of each of several successive issues by matter requiring prompt publication. Though somewhat belated, it is published now for the reasons that it will still serve to indicate how cordial was the welcome given in London to the members of the American Institute of Mining Engineers when the guests of their British friends last summer, and how happy the versatile and genial secretary of the American Institute, Dr. R. W. Raymond, was in his address at the magnificent banquet given, in honour of the visitors, at the Guildhall, London, in the course of which address he delivered "Brother Jonathan's Message."

The total tonnage of Boundary district mines for the first month of 1907 was the smallest for many months. This, says the *Phoenix Pioneer*, was due to lack of coal for steaming purposes which prevented the railways from furnishing a sufficient supply of coke to district smelters. The production figures for January were:

	Tons.
Granby Company's mines.....	34,192
B. C. Copper Company's mines.....	12,230
Dominion Copper Company's mines.....	12,091
Snowshoe	3,830
Emma	759
Providence	150
Skylark	40
Total	63,292

According to the Los Angeles *Mining Review*, the New York stock exchange has taken a "tumble to itself." Only quite recently, as also in former times, its governing board decided that no mining stock could be, or would be, listed. Mining stocks were a bad lot, so wretchedly bad and irredeemable that

they could not be permitted to keep company with industrials and other high-toned stocks, such as were only dealt with on the New York stock exchange. But now its governing board is of a different way of thinking. Its members have reached the conclusion that a respectable mining stock is just as respectable as any other kind of a stock, so they have rescinded their interdiction; have decided to no longer taboo mining stocks, rather they will welcome them to their fold. The Grandby Consolidated of British Columbia has the honour of being the first to be enrolled on the exchange's list.

In the course of its comments on "British Columbia's Progress" the London *Critic* lately observed: One of the inevitable results of a more stable Government in British Columbia during the past few years has been the marked improvement in the credit of the Province, while, practically without exception, all the industries associated with the country have shown remarkable advances in the same period. The Province's mines, fisheries, forests, farms, and other industries produced commodities in 1906 to the value of \$60,000,000, and when it is recalled that the total number of inhabitants is just about 200,000, such an achievement can with perfect justice be described as remarkable. The output from the mines in 1906 was valued approximately at \$26,000,000, while the flourishing condition of other undertakings is reflected in the Province's revenue figures. In 1901 the income from all sources was only \$1,606,000; for the current year it will be, approximately, \$3,250,000. In 1901 the income from lands and forests was only \$200,000; for 1907 it will total at least \$1,000,000.

Concerning the recent decision of the Chicago holders of a controlling interest in the Providence Mining Company, Ltd., owning the Providence silver-gold quartz mine at Greenwood, Boundary district, to increase the capital of the company, the *Greenwood Ledge* observes: "With the exception of the *Ledge* all the papers in Boundary district have commended the action of the directors of the Providence Mining Company in increasing the capital from \$250,000 to \$2,000,000. Had the company acquired or attempted to acquire more property, or increased their plant, there would possibly have been some excuse for the increased capitalization, but as they have not done so, their object must be an attempt at stock jobbing. The Providence in the past two years has paid a dividend of 10 per cent., or 5 per cent. per annum. This would mean $\frac{5}{8}$ of 1 per cent. per annum on the increased capitalization—not a very high interest paying investment. But this is not the worst phase of the promotion. If a large amount of Providence stock is sold in eastern cities and no dividends paid on it, the investing public will become suspicious of other and legitimate promotions in the district, and thus a great injury will be done those who are endeavouring to develop their properties on business principles."

The state mineralogist of California, U. S. A., is actively interesting himself in the prosecution of a man against whom the grand jury has found an indictment for obtaining money by false pretences. The accused is under arrest in Chicago and will be taken back to California to answer a charge of having by misrepresentation induced a woman to buy 500 shares of mining stock at \$1 per share. Mr. Aubury, the state mineralogist evidently does not intend to rest content with having secured the enactment of a State law against fraud in company promotion, but will press for its being brought into active operation. Idaho is considering the desirability of passing a law with a similar object in view. If British Columbia would follow suit there would quickly be an end to such questionable promotions as the *MINING RECORD* has from time to time been prompt to expose and condemn. Accommodating "mining engineers" (?), of which unprincipled class there are, fortunately, but few in this Province, would also be restrained from supplying so-called reports to order and thus prostituting what an uninformed public trustingly accepts as their qualifications for expressing an opinion that may be relied on. It may not be brought about at once, but eventually the pressure of public opinion will compel legislation in this country that will make the trickery of such parasites on the mining industry a criminal offence and will provide accordingly for their punishment.

The "Fourth Annual Holiday Number" of the *Pioneer*, published at Phoenix, Boundary district, is the best and most useful publication dealing with the important mining and smelting industries of the district from which has been obtained during several recent years the greater part of the copper produced in Canada, that has come under our notice. Freely illustrated descriptions of mining camps, individual mines, smelters, electric power systems, railways, etc., together with valuable and instructive statistics relating to the mineral production of the Boundary, fill most of the pages of this special number which contains between 60 and 70 pages. There are nearly 100 half-tones of mine, smelter and other views, representative men, and including line cuts of modern maps of the district and of different sections of it, prepared specially for the *Pioneer*, consequently up to date and giving the leading features of this big mining district. The outlying camps—Franklin, up the north fork of Kettle River; Beaverdell and Carmi, up the west fork of the same stream; and Camp McKinney, all have attention. Prominence is given, as well, to what are known as the "high-grade" mines of the Boundary, these including a number of silver-gold quartz properties in Greenwood, Phoenix and Beaverdell-Carmi camps. A brief historical account of the district, some information concerning its chief "parliamentary friends," and particulars of several of its towns and

their institutions are also given. Altogether the "Annual" is a publication that is distinctly a credit to its enterprising publisher, W. B. Willeox, while the wide distribution of the 6,000 copies printed cannot fail to be of much benefit to the district, especially since much care has been taken to make the information reliable. For all interested, or likely to be, in the mining district producing the larger part of the ore mined in British Columbia, this number will be found worth far more than the 25 cents price at which it is published.

A few weeks ago the *Vernon News* published some notes concerning the British Empire mine (the manager and financier of which is the notorious "Windy" Young) the opening sentence of which was as follows: "Professor Van Debroch, a New York mining engineer of continental reputation, has been spending a few days in the district, the object of his visit being to inspect the British Empire mine, opposite Okanagan Landing, in the interest of eastern stockholders." This announcement was reprinted in the *Victoria Week*, the present editor of which several years ago was engaged by "Windy" Young to report on alleged coal lands in the Similkameen for that fake company promoter's use in the furtherance of his schemes, which ended in loss to most of those who retained their stock holdings in the company he then floated. Doubting that any "mining engineer of continental reputation" would be sent to examine mining property that "Windy" Young was in charge of, the editor of the *Mining Record* made enquiries, first from a well-known member of the United States Geological Survey whose professional duties necessitate his travelling much in the most important mining regions from Mexico to British Columbia, and next from the editor of one of the leading mining journals of the United States, with this result: Neither of the gentlemen mentioned remembered ever having previously heard or seen the name of "Professor Van Denbroch," who, by the way, is not a member of either the American Institute of Mining Engineers or the Institution of Mining and Metallurgy. Now the *Mining Record* is not asserting that there is no such person as Professor Van Denbroch or that if he exist he is not a mining engineer of good repute and ability. It is, though, endeavouring to show that no engineer of that name is of "continental reputation," and that in so describing him the *Vernon News* and the *Victoria Week* published a statement that is false and consequently misleading. After the *Vernon News* shall have become fully informed as to the crooked ways of "Windy" Young in his earlier mining company promotions it will not be so easily deceived by him as it appears to have been in the past. The British Empire mine may be a good property—the *Mining Record* has not suggested the contrary—but the association with it of the name of "Windy" Young in any responsible capacity is enough to make those who wish to see mining freed from fraud suspicious of it during the period of his connection with it.

DOMINION COPPER COMPANY.*

ATENTION has recently been directed in influential quarters to the prospects of the Dominion Copper Company—a concern which, as its name implies, is working under the British flag in a colony remarkable for its great mineral wealth—and inquiries having been made as to the position and character of the undertaking, the following details, based on official statements, will doubtless be of interest to our readers.

The kernel of the position of the company, which is registered under the laws of British Columbia, is its possession of properties containing large deposits of low grade copper ore that are being worked at an ample margin of profit, and furthermore, the strength of its financial position, the \$750,000 remaining in the coffers of the company enabling the necessary provision to be made for the progressive increase and improvement of the plant which is essential to cope with an expanding scale of operations, without trenching upon profits available for dividends.

The present and prospective growth of the company's operations forms the most striking feature of the concern. Until recently the plant had a capacity of 650 tons per day, and the net earnings for the month of November last were \$30,000 upon this basis. As a result of arrangements made for increasing the output, the blowing-in of an additional furnace early in the present month will increase the capacity to 1,500 tons a day. Taking, however, an average of 1,200 tons of ore treated *per diem*, thus making a liberal allowance for the minor accidents which are certain to occur in the conduct of a big industrial enterprise, the company will produce between 750,000 and 800,000 lb. of copper per month, at a cost carefully calculated at 8 cents per lb. Upon this scale of increased production, and assuming that no further diminution of reduction costs occurs, the net earnings will rise from \$30,000 per month on an average to \$75,000 or \$80,000, sufficient to pay 14 per cent. upon the par value of the stock, and a substantially higher percentage upon the present price of the shares. With copper reckoned at its present price the return would be still higher. Speaking of the recently-added furnace, M. M. Johnson, the company's consulting engineer, said: "This new furnace will give us an additional capacity of from 700 to 900 tons per day, or a total capacity, with the furnaces now running of from 1,300 to 1,500 tons daily. The new furnace will be mechanically fed, eliminating hand labour almost entirely. As soon as practicable, the mechanical feed will be applied to the furnaces now in use also." The operations of the company, however, are projected upon a far broader scale than this, and plans are being prepared and estimates being made for the increase of the plant to a capacity of 3,500 tons a day. With a capacity of 3,000 tons of ore daily the Dominion Copper Company would be in a position to produce 25,000,000 lb. of copper per annum. On 18-cent copper this production would

*From *The Mining Journal*, London, England.

give the company net earnings of \$2,500,000, or 50 per cent. on the par value of the stock—\$5 per share. These are big figures, and point to the expansion of the concern upon lines of great magnitude; but it is pointed out that they are carefully calculated from data composed of the present product of the company combined with the known ore content of the mines and the designed capacity of the additional plant. Already the smelter and mines are equipped with the most modern plant, driven by hydro-electrical power, which has resulted in reduced costs.

The properties of the company are situated in British Columbia, Canada, and cover an area of 360 acres. They adjoin the property of the Granby mines, whose ore values are the same as those of the Dominion Copper Company, and who have a smelter capacity at the present time of 2,700 tons per day, while their net earnings were over \$1,850,000.

The company's chief mines are the Brooklyn, the Idaho, and the Rawhide. The Brooklyn has been the principal producer to date, averaging 500 tons of ore per day. There are calculated to be 450,000 tons of ore in sight above the 400-ft. level. The average values in this mine are returned at: Copper, 1.43 per cent.; gold, \$1.32; silver, 25 cents. The Idaho mine is a most important asset, and is confidently expected shortly to produce a large tonnage daily. Cross-cuts show ore bodies similar to those in the Granby's mines, which adjoin this property, and from which 2,000 tons per day are being mined. The Idaho claim is 1,500 ft. square.

Describing the situation at the chief mines, Mr. Johnson recently said: "The Rawhide mine is looking well. We have pushed development work on this property during the past few months, and the surface work is very satisfactory. We are getting a splendid tonnage of ore there, and the four tunnels are opened up all in solid ore. We expect to take about 400 tons a day from the Rawhide when the new furnace is blown in. We are getting the most of our ore at present from the Brooklyn. The Idaho and Stemwinder claims are being rapidly developed. We are taking about 50 tons a day from the Idaho, and the shipments from this property will be gradually increased.

"Important developments have taken place at the Sunset group, which includes the Sunset, C. O. D., Florence Fraction, and Crown Silver claims. The ores from this group run heavy in iron, and have been used only as a flux, but during the past 60 days the copper content in these ores has increased, and it is now running between 1.14 and 1.25 per cent. copper. There are good indications that these ores will show increased copper values at depth. At the Athelstan mine the shaft is being unwatered. This shaft is down to a depth of 250 ft. We will start cross-cutting at the 200-ft. level in order to develop some good backs of ore."

With the present figures of production and profit dividends are considered to be well within sight, and while the management of the concern is officially silent on the subject, a well-known Boston paper re-

produces a statement to the effect that the directors have decided, barring accidents, to pay dividends commencing with the second quarter of the current year, at the rate of 10 per cent. on the par value of the stock.

PROSPECTIVE EARNINGS OF GRANBY CONSOLIDATED M., S. AND P. CO.

GEORGE L. WALKER, in his weekly copper letter to the *Boston Commercial*, says, concerning the Granby Consolidated Mining, Smelting and Power Company:

Granby Consolidated's operations have been curtailed very seriously during the past two months, chiefly because of inability to get a sufficient supply of coke and coal. The miners' strike at the Crow's Nest Pass Coal Company's mines has been settled; but the heavy fall of snow and extremely cold weather in the Northwest have tied up railroad traffic so completely that coal and coke shipped weeks ago have not yet arrived at the mine and smelter.

The Granby Company is now equipped to produce better than 2,500,000 lb. of copper monthly. Its recent output, however, has been only a little more than half this amount, and whereas its net earnings should be approximately \$400,000 monthly with copper selling at 25 cents, they are now running slightly above \$200,000 monthly.

Assuming that the railway freight tangle is cleared between now and February 1, Granby Consolidated should make 30,000,000 lb. of copper this year at a cost of about 8 cents per lb. This will give the company net earnings of \$4,800,000 or \$35 per share on its stock—new capitalization basis—provided the average market price of copper is 24 cents. This is at the rate of more than 25 per cent on the current quotation for its stock, whether it be the new stock, now selling around \$135, or the old, now selling about \$13.50.

Granby stock is cheap at its present price. I do not recall another copper stock at the present moment which has behind it probable earnings during 1907 of 25 per cent on its current selling price. If there are any others, the companies they represent are not making their copper at as low a cost as 8 cents per lb., or have not as great demonstrated value and such future prospects as the Granby. There is every reason for the belief that Granby stock will prove an excellent investment at any price up to \$150 or \$160 per share.

Granby's 35,000 shares have been listed on the New York stock exchange.

During the present winter season Byron N. White will ship in all about 1,000 tons of ore as bulk smelter tests of the value of the ore in shipping quantities. Both the Britannia and Tyee smelters, on Vancouver Island, will receive a proportionate part of this ore, the remainder of which is to be sent to the Tacoma smelter.

"THE RICHEST COPPER DISTRICT IN
THE WORLD."

A Company Promoter's Misrepresentations Exposed.

WORTH \$10,000,000 is a block of copper shown (on paper) as existing in a British Columbia mineral claim; at least so says the crafty promoter of "The British-American Copper Mines and Smelter Company," the financial agents of which are J. C. Kernohan Company of Cleveland, Ohio, and Thos. Davies & Company of Chicago, Illinois, according to a half-page advertisement of a prospectus printed in the *New York World*, the *Winnipeg Free Press*, and other newspapers that do not seem to be particular whether or not their advertising columns are used for the purpose of obtaining money under false pretences, since they sell space for large display advertisements designed to deceive those to whom such appeals are made, usually with the object of obtaining money from them. Well, if people will put money into such wild schemes as that under notice, there is no ordinary means of preventing them, but they are sure to lose it. Yet, though, as Governor Pardee of California said when speaking before the American Mining Congress on the subject of the prevention of mining frauds, "it is quite true that we cannot protect all the fools all the time, but we can protect some of them some of the time," the *MINING RECORD* offers some observations on the above-mentioned "British-American Copper Mines and Smelter Company," for the benefit of "some of the fools," also others who are not fools but are uninformed as to the facts of the case.

First we will give a little advice to those who contemplate buying stock in this company. It is simply this—don't, unless you shall be prepared to wait a long time for any returns, and even then you must expect to be disappointed eventually, for if you give your money to men who deliberately deceive you to get it, it is not to be expected that they will have any compunction in applying it to purposes other than those you are led to believe it is intended for.

Now, space limitations will not admit of the mis-statements made in the prospectus being dealt with *seriatim* so only several that are notoriously misleading will here be noticed, as under

"The richest copper district in the world."

The total value of the copper output of the whole of the adjoining mining divisions of Golden and Windermere for five years, 1901-5, is shown in the "Annual Reports of the Minister of Mines for British Columbia" to have been, at New York yearly average market prices, \$4,179. Of this amount \$1,654 was for 1905. The returns for 1906 have not yet been received by the Bureau of Mines, but they are not expected by the officials to show any increase worth noting. This district is therefore not yet regarded by the provincial department of mines as rich in copper.

"This mine will begin shipping ore at once."

* * * * "All that we need to do to bring

"this mine into the producing class is to finish the construction of three miles of a ten-mile wagon road." * * * * "This will give us a splendid outlet to the Kootenay Central Railway."

The Kootenay Central Railway is not yet in existence, save only that some ten miles of grading have been done, but not within 50 miles of the mineral claims in question. Nor is there any reasonable probability of construction being shortly proceeded with. No operating railway passes within say 100 miles of these claims by a road or river transportation route.

"The Granby Company, a neighbour of ours, is paying 24 per cent. yearly on a capitalization of \$15,000,000."

The mines of the Granby Company are situated nearly 200 miles away in an air line. By ordinary transportation routes it would take about three days' travel by train and lake steamer to reach the Granby mines from this part of Golden district. Last year they paid 12 per cent. for the first time in their history, being comparatively new mines.

"Managing Director and Engineer in Charge, E. August Bradley, E. M., Revelstoke, B. C., mining engineer of international reputation."

There is a man named E. A. Bradley resident at Revelstoke, British Columbia, but this is the first time we have heard it imputed to him that he is of "international reputation," although he may be eventually in a discreditable way should "The British-American Copper Mines and Smelter Company" succeed in obtaining an international share subscription list. Mr. Bradley's name is not on the last published list of either the American Institute of Mining Engineers or the Canadian Mining Institute. His professional card is not advertised in any influential mining journal of either the United States or Canada. He may be a good mining engineer for aught we know to the contrary; if so it is particularly unfortunate that he should be associated with J. C. Kernohan, of Cleveland, Ohio, whose name is printed at the foot of the advertisement here noticed and which we believe to contain gross mis-statements, calculated to induce uninformed people to apply for stock which there does not appear any good reason to suppose will bring them any other result than total loss of whatever money they put into this scheme.

Now a little information as to the mineral claims themselves. We have read the separate reports on them by two professional men whom we have reason to regard as fully qualified and reliable mining engineers. It may be noted that J. C. Kernohan, whose name and reproduced photograph appear prominently in the advertised prospectus, does not make more than passing mention of qualified engineers and their reports, but generalizes in a way common to promoters who do not desire to give explicit information. We summarize briefly, as follows: The claims are situated in a very rough country on mountains, in parts 8,000 to 9,000 ft. above sea level; outcrops of ore are large and indicate a strong and well mineral-

ized ore body; much of the ore could be hand-picked for shipment to smelters, but remainder of ore about two-thirds would require concentration; present cost of freight to the landing on Columbia River is estimated at about \$12 per ton; the construction of a new road 10 or 11 miles in length is essential; one engineer says "it is impossible to state anything definitely, owing to little development work done, but from all appearance and considering how the ledge occurs in the formation surrounding, I should think there is every indication of permanency of ledge, both in size and value, at depth."

Just a word of caution in conclusion. Mr. Kernohan says in his published prospectus "I have always been particularly impressed with the possibilities of British Columbia and her great copper mines, *because of the protection afforded investors by the Canadian Government.*" Note the words we have italicised and then bear in mind that the British-American Copper Mines and Smelter Company is *not incorporated under the laws of British Columbia*, nor is it registered as an "extra-provincial" company as is usual in the case of *bona fide* companies doing business in the Province. Further, even if it were so incorporated or registered there is no special protection for the victims of mining sharks who either in Canada or any other country sell shares in mining companies, excepting the ordinary laws against obtaining money by false pretences. The British-American Copper Mines and Smelter Company as now promoted might prove a money-maker for its brazen-faced promoters, but for ordinary purchasers of stock it would appear to give promise of proving an irreparable loss.

A DEPARTMENT OF MINES.

VICTOR G. ALDERSON, president of the Colorado School of mines, at the Trans-Mississippi Congress, in session at Kansas City on November 22, spoke on the need of a department of mines and mining, with a cabinet officer at the head of it. Mr. Alderson said in part:

The mining industry is basal. A department would crystallize and bring into harmony all the various influences to upbuild and dignify the industry. Today the miner gets the title to his claim from the land office, more or less untrustworthy. His maps are too late for his use; his information is too old. Prompt advice, assistance, cooperation, is not for him. A department could remedy this state of affairs. In the second place it would revise our mining laws and eliminate much of the legal stupidity in laws made by men who know nothing of the industry. There should be a recognition of mining commensurate with its importance. In the third place it could conduct its researches such as are carried on for the benefit of the agricultural industry. Today there is no place where we may turn for information or advice. Such research would open new avenues of prosperity, reveal fresh opportunities for the investment of capital, and provide work for tens of thou-

sands more men. Such a department would secure the enactment of new laws. It is not a work for mere politicians, nor any particular State, but from the standpoint of national development. The duty of the Government is to foster research and to give dignity and standing to the industry.

A hydraulic mining device is thus described in the *Engineering and Mining Journal*, New York, by Charles G. Yale: Pierre Bouery, general manager of the La Grange hydraulic mine near Weaver-ville, Trinity county, California, has devised and put in operation a new style of deflector for handling the giants. It is electrically operated and so arranged that the stream may be accurately directed to any desired point without the pipe-man's being anywhere near the giant itself. The gravel banks at this mine are 200 or 300 ft. high and in order to insure safety to the pipe-man in case of caves, the giants have to be placed at some distance from the banks. In this position the full force of the water cannot be utilized as it feathers or breaks before striking the gravel, and the sprayed water is not as effective as a solid stream would be. With this device of Mr. Bouery's it is possible to set the giant as close as desired to the bank, and yet deflect the stream in any direction. In case of a cave the giant itself may be buried and subsequently dug out, but the man operating it is out of danger. The pipe-man is enabled to stand several hundred feet away from the bank, and by means of electric switches still maintain perfect control over the deflectors on the giant, directing the stream where he pleases. By this means, in utilizing the full force of the water under pressure, much more gravel may be washed with a given quantity of water, than where the stream is allowed to feather too much, and, what is more to the point, there is no danger to be feared by the pipe-man.

British Columbia's representation among the officers and members of the council of the Canadian Mining Institute for the ensuing year will consist of the following: Frederic Keffler, Greenwood, Boundary district, engineer in charge of the British Columbia Copper Company's mines, president; Wm. Fleet Robertson, provincial mineralogist, Victoria, one of the vice-presidents; W. H. Aldridge, managing director of the Consolidated Mining and Smelting Company of Canada, Trail; Thos. Kiddie, metallurgist, Victoria, and Jas. McEvoy, geologist and land commissioner of the Crow's Nest Pass Coal Company, Fernie, southeast Kootenay, members of council. As the secretary—H. Mortimer Lamb—and two members of council—R. W. Brock and J. C. Gwillim—have in past years been intimately associated with mining in British Columbia the Province also has in these gentlemen earnest well-wishers for an enlarged activity and increased prosperity in connection with its mining and smelting industries.

PORTLAND CANAL DISTRICT.

Report of H. Carmichael, Provincial Assayer.

PORTLAND CANAL is the most northerly inlet on the coast of British Columbia, and forms the boundary between that Province and Alaska. This International boundary, the position of which was definitely decided upon some few years ago, has now, in this portion of it at least, been laid out on the ground, and its position clearly marked by monuments or by a cutting through the forests where such occur. The settlement of this boundary has relieved claim owners of much uncertainty as to which country their claims lie in, and should stimu-

being a snow-clad pinnacle 7,000 ft. high. The valley of the river is about a mile wide, composed of gravel and sand dotted with cottonwood and alder trees. It extends easterly in a straight line, with a gradual rise, for 10 miles, until an elevation of 400 ft. is attained. From this point the river and creeks rise more rapidly, becoming mountain torrents. With very little work a good wagon road could be made up the valley for 10 miles or more. A bridge over the river, near its mouth, is needed, as, without it, it is nearly impossible to cross the river at high water, and all means of communication are cut off.

Communication up Portland Canal is maintained by the Union Steamship Company every ten days



View up Portland Canal from Blue Bell Group, Outsiders Camp (Brown Alaska Company's), Maple Bay, in foreground.

late development on both sides of the line. The canal, or fiord, communicates with the open sea at Dixon entrance, and from that point runs nearly due north a distance of 55 miles to its head. It possesses few and indifferent anchorages, since the shores on either side are precipitous mountains with, in places, peaks which rise almost perpendicularly to heights of 6,000 ft. About 35 miles from the head of the canal, on the east side, is Maple Bay (marked Maple Point on the chart), a small bay affording good shelter but with rather deep anchorage. The two rivers, the Bear and the Salmon, at the head of Portland Canal, are separated by a high bare ridge of mountain that forms the International boundary line, trending off to the west. On the east side of the valley of Bear River a mountain range extends in an east and west direction, the highest peak of the range, Mount Disraeli,

from Vancouver, and every week by a small steamer from Port Simpson. There is a very comfortable hotel at Stewart, at the head of the canal. Attention was first drawn to Portland Canal when, on May 4, 1898, a party of 64 persons from Seattle landed at the head to look for placer diggings at the source of the Nass River. Some 21 of the party went over the divide from Bear River and down the Nass River and struck "colours," but no pay placers. Some of the men still believe that if the "grub" had held out they would have found diggings worth staying with. Two or three of the party wintered on the canal and staked in the spring of 1899 what is now the Roosevelt claim, on Bitter Creek, while Stewart's claim, on American Creek, was staked in 1902, and the principal claims on Glacier Creek in 1905 and 1906.

The country round Glacier Creek is the only part

which so far has been visited and reported on. The locations there have been made on well-defined veins in a schist country rock, carrying values in silver, gold and lead, with a little copper. Farther up Bear River the country rock is said to change, becoming more granitoid, the change being noted on the Mother Lode claim, two and a half miles above Glacier Creek. There is still ample field for further prospecting, and the district is well worthy of attention.

On the west side of the canal the country rock is granite, which continues from the mouth to its head and forms the range referred to as between the Salmon and Bear Rivers.

On the east side a similar granite extends from the mouth nearly to Maple Bay, where the country rock changes to a schist intersected by dykes, which



Location of Eagle Group, Maple Bay, Portland Canal.

formation continues to a point about seven miles up Bear River valley, where granitoid rocks again appear.

MAPLE BAY CAMP.

The properties at Maple Bay are being worked by the Brown Alaska Company, with head office in Seattle and a smelter at Hadley, Prince of Wales Island, Alaska. The general superintendent at Maple Bay is Arthur A. Wakefield.

Outsiders Group. The group consists of 14 claims, including fractions, and lies to the north-east of Maple Bay. A quartz vein has been traced through seven claims running diagonally up the hillside at an angle of 30 to 40 deg. The principal work has been done at the junction of the Regina and Copper King claims. At an elevation of 1,100 ft., and 6,000 ft. back from the bay, a main tunnel has been run in 300 ft. on a well-defined quartz vein, which follows the strike and dip of the schistose country rock, the dip being about 60 deg. to the East. The vein, while clearly defined, swells and contracts in places, varying from 5 to 14 ft. wide, and is well mineralized with copper pyrites, fairly well disseminated, the mass averaging 3 per cent. in copper.

A second tunnel, called the intermediate, has been

run at an elevation of 75 ft. above the first, and is in on the vein 100 ft.

About 20 ft. still higher up a third, or upper, tunnel, has been run on the vein 40 ft. No stopping has been done, but the different levels have been connected preparatory to stopping, when the ore will be taken out by the lower or main tunnel.

On the surface, above the upper tunnel, the vein has been stripped and shows up strongly, crossing over a shoulder of the mountain. Two or three small diabase dykes were cross-cut in the tunnels, and also show up on the surface; these dykes cross the vein from wall to wall, but do not run into the country rock.

On a level with the upper tunnel, but some 550 ft. to the north, in a small gulch, a cross-cut has been driven through the schist country rock, cutting the vein at 150 ft. in. At this point the vein was found to be about 3 ft. wide and not as heavily mineralized as in the main workings. From the inner end of this cross-cut tunnel a drift has been run to the north, on the vein, for 150 ft., while a drift to the south, towards the main workings, has been run for 220 ft. In this south drift, at 140 ft. from the tunnel, the vein has been replaced by a diabase dyke, but towards the inner end of the drift the vein comes in again with a width of 8 ft., throughout which width it is well mineralized with copper pyrites. The vein has been traced for a considerable distance, both above and below the main workings, and gives promise of carrying a large body of good ore.

Just below the main tunnel is the upper terminal of an aerial tramway which runs 6,000 ft. to the ore bankers at Maple Bay, where there are good loading facilities. A 6-drill Rand air compressor has been



Scenic view of Maple Bay, Portland Canal, B. C., looking North. (Photograph taken two hours after midnight, June, 1906.)

installed at the beach and a pipe line run to the mine.

A sample of the ore taken as it was being mined gave, upon assay, copper, 3.4 per cent; silver, 0.4 oz. per ton, and gold, 0.05 oz. per ton.

Blue Bell Group. The Blue Bell group, consisting of eight claims, is situated to the south-east of Maple Bay, the principal work having been done on the Blue Bell. Some 4,500 ft. back from the bay

and at an altitude of 1,500 ft. a tunnel has been run in 50 ft. on a quartz vein from 18 in. to 5 ft. wide, carrying copper pyrites. Some 150 ft. below this tunnel a cross-cut is being run to strike the vein, that is now in 185 ft. and is expected to cut the vein at 200 ft. A sample taken of the ore as it could be sorted for shipment gave, upon assay: Copper, 11.3 per cent.; silver, 5.2 oz., and gold, 0.02 oz. per ton.

Eagle Group.--The Eagle group of five claims is situated above and to the north-east of Outsiders group. On the Eagle claim surface work has exposed a quartz vein 7 to 12 ft. wide. It has been traced for 1,500 ft., and is well mineralized with copper pyrites. It is intended to develop this vein

erly into the hill. The hanging-wall is schist and the foot-wall porphyritic dyke. The vein shows marked brecciation, the quartz enclosing and cementing large and small pieces of the schist country rock. The vein is well mineralized throughout, the mineralization, however, varying in places, the prevailing ore being galena with occasional native silver, while at certain points in the vein lead carbonate replaces the galena. A streak of solid, fine-grained pyrites, from 2 to 14 in. wide, occurs with great persistence through the lead. This carries about 0.25 oz. of gold per ton. An assay of a fair sample of the ore gave: Gold, 0.1 oz.; silver, 32 oz. per ton; copper, trace; lead, 27.5 per cent.; zinc, 6.3 per cent. The



Brown Alaska Company's Camp and Lower Terminal of Aerial Tramway, viewed from across Maple Bay.

by a tunnel and to ship the ore by tramway to the bunkers at Maple Bay, 3,000 ft. below and horizontally 3,000 ft. distant.

BEAR RIVER CAMP.

Lucky Seven and Little Joe.--These claims are owned by John Griffin and Jos. McGrath. They are reached by following up the main Bear River trail, 2 1/2 miles from the hotel, where a trail strikes up the south-east slope of Glacier Creek, and rising rapidly until the claims are reached at an altitude of 2,450 ft. and about 1 1/2 miles from the Bear River trail. A short distance above the mine cabin a small creek has exposed a quartz vein; this has been developed on the Little Joe by a short tunnel 20 ft. long and a series of shots and open cuts extending through both that claim and the Lucky Seven. The development, while not extensive, shows a well-defined quartz vein averaging about 8 ft. wide, striking N. W. and S. E. and dipping about 20 deg. south-

owners state that average ore assays: Gold, \$4; silver, 25 to 30 oz. per ton; lead, 4 to 6 per cent. The vein shows great permanence, having been clearly traced through the Lucky Seven and Little Joe, while extensions have been located at either end of these claims. Another small vein has been located on the claim, but no work has yet been done on it.

Gipsy.--This claim, owned by Beaton and Diddale, adjoins the Lucky Seven and Little Joe, farther down the hill, but was not visited, as the shaft was reported partly filled with water. The owners state that they have sunk a shaft 40 ft. on a quartz vein from 2 to 5 ft. wide, in schist, mineralized with galena and pyrites, the values running \$30 to \$40 in gold, 20 oz. per ton in silver, and 20 per cent. lead. The owners intend to sink farther in the spring.

Cook and Dobson's Claim.--This claim is located at the headwaters of the south fork of Glacier Creek.

three miles from Bear River. An open cut into the hillside has cut a mineralized zone in the schist, in which stringers of quartz run into and impregnate the country rock. This may be a continuation of the Little Joe vein, or it may be a parallel vein, though it is not so strong nor well-defined, and is not so well mineralized. The width of the mineralization is uncertain, but may be taken as about 8 ft.

Jumbo.—The Jumbo mineral claim, owned by Sam Gurley and R. B. Dodge, is situated at the headwaters of the south fork of Glacier Creek, at an elevation of 2,190 ft., and is distant about $3\frac{1}{2}$ miles from Bear River. On the face of an overhanging bluff 100 ft. high is a mineralized zone in the schist, which here has a strike east and west, with a dip of 22 deg. into the hill. This zone is a quartz impregnation of the schist, there being quite as much schist as quartz. The entire mass is, however, more or less mineralized with lead carbonate and galena, and also carries iron pyrites. Little development has been done beyond a few shots put into the vein, and it is impossible at this stage to say the average values in the ore-body, as it is much decomposed, and it is probable that the greater part of the values have been leached out; but, judging from the results obtained on other claims, there is every reason to expect that it may prove a valuable ore-body. A selected sample of the ore taken for assay gave: Lead, 69.2 per cent.; zinc, 1.5 per cent.; gold, 0.03 oz., and silver, 47.2 oz. to the ton.

Evening Sun.—The Evening Sun mineral claim, owned by Rush and Baggs, is reached by a zig-zag trail up the north side of the middle fork of Glacier Creek, and 400 ft. higher than the cabin, which is about three miles from Bear River and 1,950 ft. above sea-level. A vein outcrops on the hillside, in schist country rock, on which a tunnel has been driven 36 ft. The vein dips vertically, strikes N. and S., and is from 3 to 4 ft. wide, with well-defined walls. The vein-matter is largely calcite, fairly well mineralized with galena and a little iron pyrites. A sample of the ore gave, upon assay: Gold, 0.04 oz. per ton; silver, 62.2 oz. per ton; lead, 27.3 per cent.; with a considerable quantity of antimony.

Silver King.—The Silver King mineral claim, owned by A. Nelson, is directly above Rush and Baggs' cabin, the highest workings being at about 500 ft. greater elevation. Several open cuts have been made which show a quartz impregnation of the schist dipping vertically, and outcropping up and down the hill. This carries some blende with a little pyrites and galena. A selected sample of the mineral gave, upon assay: Gold, 0.02 oz.; silver, 43 oz. per ton; zinc, 19 per cent.

Lake View Group. The Lake View Nos. 1 and 2 mineral claims are owned by Bebeau and McKay. To reach these claims the main trail up the south side of Glacier Creek is followed for $1\frac{1}{2}$ miles, then Bebeau and McKay's trail turns off to the left and follows up a small creek, a distance of about three-quarters of a mile. The trail rises rapidly at first, but towards the top flattens out considerably. At

an altitude of 2,200 ft. above Bear River a quartz vein outcrops in a small creek. This has been prospected by trenches and open cuts for a distance of 200 ft. These cuts and trenches have been sunk to the vein through 2 ft. of peaty mould and 2 ft. of broken schist. The work has not been sufficient to determine with certainty the nature of the country rock or how the vein occurs, but it appears to be a quartz vein in schist, cutting diagonally across the country rock, and having an average width of about 4 ft. The lead is well mineralized, and carries a considerable quantity of high grade ore in banded formation, the mineralization being fine-grained galena and pyrites. An assay of the best ore gave the following result: Gold, 0.08 oz. per ton; silver, 44.00 oz. per ton; lead, 16 per cent.; zinc, 13.5 per cent.

Mother Lode.—The Mother Lode mineral claim, owned by Jas. McKay, is on a small creek flowing into Bear River from the East, five and a half miles from the north of Bear River. At a quarter of a mile up the side of the hill from Bear River, and 300 ft. above it, is a quartz impregnation in a granitoid rock with a strong quartz vein some 8 in. wide and a number of stringers parallel to it, in all about 4 ft. wide. This shows considerable mineralization, with iron pyrites and a little jamesonite in places. The vein outcrops across the hill N. 10 deg. W., and dips 60 deg. to the East. Assays of ore gave: Gold, 0.05 oz. per ton; silver, 4.2 oz. per ton.

American Girl Group.—The American Girl group, owned by G. Stewart, is situated on American Creek, some 15 or 20 miles from salt water, following up Bear River. This claim was not visited owing to high water in American Creek, making the crossing dangerous. According to general report, there is on these claims a very considerable showing of galena or jamesonite, carrying, in places, high values in silver.

In addition to the claims already mentioned, there are, in the district, a large number of claims which it was impossible, under the circumstances, to visit, on the most of which comparatively little development work has been done. The owners of a number of these claims supplied the writer with samples of ore from their respective claims, which samples were assayed at the Government Laboratory, Victoria, and the results are given as follows, in order to indicate further the class of ore so far encountered in the district, without assuming responsibility except for the assays:—

Black Knight.—The Black Knight mineral claim is situated on the east side of Portland Canal, comparatively near the water. The sample received appeared to be nearly solid galena and zinc blende, with little gangue matter, and contained: Lead, 43.0 per cent.; zinc, 28.0 per cent.; silver, 16.4 oz. per ton.

Silver Bow.—The Silver Bow claim, owned by G. Starke and M. K. Rodgers, is situated about three miles up Glacier Creek from its junction with Bear River, and at an altitude of over 3,000 ft. The

sample assayed consisted of mixed sulphides of lead, antimony and zinc, containing: Lead, 17.1 per cent.; zinc, 8.0 per cent.; antimony, about 20 per cent.; silver, 8.2 oz. per ton; gold, 0.94 oz. per ton.

Roosevelt.—The Roosevelt mineral claim is on Bitter Creek, a tributary of Bear River, about 14 miles from Portland Canal, and is owned by F. Rainey, of Stewart, British Columbia. The sample received assayed: Lead, 24.7 per cent.; copper, 1.5 per cent.; silver, 20.0 oz. per ton; gold, 0.02 oz. per ton.

Franklin No. 1.—The Franklin No. 1 mineral claim, also owned by F. Rainey, is located on the west side of Bear River. The samples received assayed: Copper, 6.2 per cent.; nickel, none; silver, 2.2 oz. per ton; gold, 0.02 oz. per ton.



Looking Southwest from May Queen. Mountains in Alaska in distance, across Portland Canal.

KEMANO RIVER.

The Kemano River flows into Gardner Canal on the north-east side, 30 miles from the mouth of the canal. It is a stream of considerable size and is navigable for canoes a distance of 20 miles, but is so swift flowing as to require "poling" or "lining" all the way. At the mouth of the river there is a good harbour, with anchorage in not too deep water. The mountains, which rise abruptly to a height of 4,000 or 5,000 ft., seem to be entirely granitic and show very marked glaciation to a height of 2,000 ft. or more. At eight miles from the mouth of the river,

Pintledanne Creek flows in from the north. From this creek there is a good trail, with an easy grade, to Tatsa Lake, which in turn flows into Ootsa Lake. The height of the pass is said to be 4,000 ft. and the distance from Gardner Canal to Tatsa Lake, 20 miles. This pass seems to afford an easy route to the Ootsa Lake country.

Pintledanne Group.—The Pintledanne group of mineral claims was staked in the spring of 1906 by Dakin & Poeklington, of Victoria, British Columbia. The claims are reached from the north side of Gardner Canal by following up the Kemano River to the mouth of Pintledanne Creek, a tributary flowing in from the North. There is an old Indian trail following up this creek and over the summit to Tatsa Lake, in the interior. This follows the north bank of the creek up for a distance of about 2½ miles, when it crosses the creek to the south side and rapidly ascends the mountain, reaching, at an altitude of a little over 2,000 ft., the claims in question.

Pintledanne Creek runs through high granitic mountains, which rise on either side to an altitude of 4,000 ft. On the mountain on the left side of the creek, two miles from its junction with the Kemano River, is a large and well-defined quartz vein. This is easily seen where the vein crosses the gulches which run down the mountain side. The vein has an approximate width of 100 ft. and crosses diagonally in a northwesterly direction over the range, a distance of several thousand feet. On this vein the Pintledanne group of claims has been staked. The vein was examined where it crossed the two gulches at an altitude of 2,000 ft. above the Kemano River, and at a distance from it of about two miles. The vein is well and strongly defined, with a frozen contact with granite on the lower side and diabase on the upper side. The diabase dyke is of a later date than either the vein or the granite. The vein-matter is rather sparsely mineralized with copper pyrites, bornite and molybdenite unevenly disseminated through the mass, and it is doubtful, with the present showing on the property, whether it would pay to work. The ore, however, appears to be well suited for concentration, there is ample water power to operate a mill and the transportation problem could also be easily solved. Careful prospecting might disclose pay shoots in the vein which would materially help the property.

Intended changes in the "mining machinery" item in the free list are announced as follows: (1) Will become dutiable—Coal-washing machinery, charcoal-making machinery, coke-making machinery, ore-drying machinery, ore-roasting machinery, ball and rock machinery, emery-grinding machinery, jigs, blast furnaces, water jackets, monitors, and giants, all of which can be now made in Canada. (2) Added to the free of duty list: Parts of miners' safety lamps and accessories for cleaning, filling, and testing such lamps; blast furnaces for the smelting of copper and nickel; and integral parts of machinery specified in the item.

FRANKLIN CAMP, BOUNDARY DISTRICT.

By R. W. Brock.*

FRANKLIN CAMP is situated on the east branch of the north fork of the Kettle River about 43 miles by road from Grand Forks. At present it can be reached by stage from the railway at Grand Forks in a day. Hotel accommodation and supplies are to be had in the camp.

Recently the camp has attracted some attention as a result of the development work now in progress, and the promise of a railway now under construction from Grand Forks.

A reconnaissance survey of this part of the country was made by the writer and W. W. Leach of this Survey in 1900 and the topographical features and salient points in the geology are shown on the West Kootenay map sheets, issued some time ago.

In the day's visit to the camp this summer nothing could be done toward correcting the outlines of the geological formations as given on the map. When the survey was made the country was timbered and the position of the geological boundaries had usually to be assumed. Since then fires have swept over the camp and the rocks and ledges are much better exposed.

The geology of the camp is somewhat complex. The oldest series of rocks represented consists of limestone usually much metamorphosed to crystalline limestone, to green lime silicate hornfels, to a baked-like siliceous rock, highly fractured, and to breccia or conglomerate-like rocks, some with limestone surrounded by green silicate and some with green silicate-nodules in a limestone ground mass; of argillites and of greenstone. The altered limestone is much more extensive than represented on the map. A large area consists of grey Nelson granodiorite which is intrusive in the basal rocks. Both these formations are intruded by a gabbro-like rock and a porphyritic syenite with long coarse reddish feldspar crystals. All the above rocks are cut by a light acid granite (Valhalla granite) toward the west fork divide and by pink alkali syenite (Rossland alkali syenite) to the east. Numerous dykes from these intrusives cut the older formations. Overlying the older formations like a mantle are Tertiary rocks which now occur in isolated patches but which formerly extended as a continuous capping. These rocks consist of a quartzite-like rock, gritty tuffs with coarse conglomerate bands, and conglomerate beds with interspersed ash rocks. Overlying these again are lava-flows consisting of andesites and trachytes and agglomerates formed from them, basalts and ash beds.

The conglomerates hold boulders, from one-half inch to two feet in diameter, of the older rocks, particularly grey granodiorite, limestone, greenstone, and an older fine-grained conglomerate. The con-

glomerate appears to cover a greater area than represented on the map, reaching in places to the north fork bottom. It is cut by dykes of the alkali syenite and by dykes from the volcanic rocks. The lavas have in places a basaltic jointing. Some beds are rich in gas pores in which calcite, agate and zeolites are developed. The abundant intrusive rocks have profoundly altered the older rocks and ore deposits are developed in the latter.

The deposits consist of several types:

(1) Iron and copper sulphides in a gangue of altered country-rock, *i.e.*, green lime silicates, as garnet, epidote, hornblende, quartz, calcite.

(2) Magnetite deposits, with some copper and iron sulphides, and the same gangue minerals.

(3) Galena-blende and chalcopyrite, with only a slight amount of the green silicates.

(4) Quartz veins, with galena-blende, pyrite and chalcopyrite, molybdenite, arsenopyrite, etc.

(5) Chalcopyrite in fractures and replacing minerals of the granodiorite or porphyritic syenite.

Both in the nature of its ore deposits and in its geology this district bears a strong resemblance to the Boundary Creek district. The rocks are very similar and the contact metamorphism, forming lime silicates and magnetic-chalcopyrite deposits, is the same. In Franklin camp, of course, it has yet to be proved that mineralization was on the same gigantic scale as in the Boundary, and that the ores have the minerals in the same proportion to make them so amenable to smelting.

The most extensively developed claim is the McKinley, which has had about \$30,000 expended on it in surface improvements, tunnelling, trenching and diamond drilling. Four leads have been discovered in a band of limestone running north toward Franklin Mountain. Development has scarcely determined the strike of the leads, but they appear to run transversely across the limestone band. Along the ledges the limestone is altered to green silicates, epidote, hornblende, garnet, etc. The lowest ledge yet uncovered has a large development of magnetite, with some iron and copper sulphides.

The second ledge outcrops for a width of about 30 ft., but the dip is at a low angle southwest. It contains a large amount of galena and blende as well as chalcopyrite, the silicates are only sparsely developed, unaltered limestone being in direct contact with galena. It is said to yield high grade ore, with good values in silver. The upper and best developed ledge has iron and copper pyrites as the chief metallic minerals, and a considerable amount of the gangue minerals. It is supposed to be about 40 ft. wide, dipping about 45 deg. south, and has been followed 300 ft. From a point 213 ft. in the tunnel the fourth ledge is cut for a distance of 15 ft. This seems rich in copper. The gold values are low, probably on an average lower than in the Boundary ores, but the copper is expected to run a good deal higher.

The same company that is developing the McKinley is testing the Banner claim on Franklin Mountain, by diamond drilling, etc. This claim was

*From "Summary Report of Geological Survey of Canada" for 1906.

not visited this season. At the time of the first examination there was a strong, very wide lead of quartz, carrying galena, blende and chalcopyrite.

The Maple Leaf claim on Franklin Mountain has ledges along the contact of the reddish syenite, with the altered basal rocks. The mineralization is chiefly confined to the syenite. Fractures are filled with seams of chalcopyrite and pyrite, or with green malachite resulting from the alteration of its copper ore, and the constituents of the syenite are selectively replaced by the sulphides. The coloured constituents are the first to suffer, leaving the conspicuous feldspar crystals in a sulphide base, but often the whole rock is replaced by the ore. At several points along the contact, which is drift covered, wide stretches of such mineralized rocks have been uncovered, and in the syenites, a few hundred feet back from the contact, a vein 4 ft. wide of fairly well mineralized rock has been opened.

The Gloucester group, now being worked under bond by the Dominion Copper Company, was not visited. On the G. H. claim of this group is a ledge of magnetite, with a little pyrite and chalcopyrite. In places it is at least 40 ft. wide, and it has been traced several hundred feet. It seemed to lie wholly in the grey granodiorite. On the Gloucester was a good showing of copper ore, with pyrite, molybdenite, calcite, and quartz, with grey granodiorite on one side at least, but the country-rock is badly altered.

A number of copper lodes occur in the grey granodiorite on Tenderloin Mountain, where the rock is crushed, sometimes to a sort of "ball" structure, round which the granite material wraps. In these crushed zones, particularly along fracture planes, the mineralization is quite heavy.

Deposits had been found in the older rocks of the camp—the altered basal rocks—greenstone and altered limestones, granodiorite, gabbro, porphyritic syenite. Lodes similar to the McKinley are likely to be found in the continuation of the limestone band and in other limestone areas in the camp. But deposits are unlikely to be found in the acid granite (Valhalla granite of the map), the pink alkali syenite (Rossland alkali syenite of the map), or in the capping of Tertiary lavas.

The work done in the camp is limited, and near the surface, so that it has yet to be demonstrated what values the deposits will carry at depth, and for the low grade deposits that they can furnish a large tonnage of pay grade ore. So far the results on the McKinley seem to be encouraging.

Since none of the claims are past the prospect stage, and none of the workings have attained depth, it cannot be definitely stated that another mining camp has been added to the British Columbia list. But the camp has many of the characteristics of a mineral bearing district. Additional discoveries are extremely probable and there seems to be a reasonable prospect that some of the properties may develop into mines.

PETROLEUM IN WESTERN CANADA.

MINERAL OIL in Canada had the special attention of the Dominion Geological Survey in 1906. In Press Bulletin No. 6 particulars are given of the Canadian petroleum industry. Its information concerning western Canada is as follows:

In western Canada, throughout all the provinces, a great deal of energy is being displayed in prospecting for petroleum. In Manitoba bore-holes are being put down at two places at least, where surface indication had been reported, or where signs of the presence of oil were said to have been found on sinking wells for water. One of these places is at Manitou, in southern Manitoba, and the other at Neepawa, on the Minnedosa branch of the Canadian Pacific railway.

Deep boring operations are also being carried on in Saskatchewan and Alberta. The latter province is more especially prominent in this direction. There are at present some 12 or 15 deep-drilling rigs, prospecting various areas between the International boundary in the south and the lower part of Athabaska River in the north.

In southwestern Alberta oil has been struck in two wells at depths slightly exceeding 1,000 ft. It is reported that these wells could be pumped and made to yield; but the lack of means of transportation is a drawback at present. However, prospecting is going on actively, and should the results obtained in this section, which lies southwest of Pincher Creek, justify it, a pipe-line or a railway spur, both of which are feasible, would be constructed.

At Calgary and Medicine Hat drilling rigs are in operation and at the latter place provision has been made to reach a depth of 3,000 ft.

In the northern part of Alberta search for petroleum is being carried on in the vicinity of Fort McMurray, on the Athabaska River, 300 miles north of Edmonton. The extensive outcrops of tar-sands in this region have frequently been referred to by various members of the Geological Survey. These certainly indicate the presence of oil-bearing strata, and there is little doubt that where the underground structure and other conditions are favourable large accumulations of oil have gathered, and this far north country may yet become quite a factor in the production of petroleum in Canada.

In British Columbia two companies were working in southeast Kootenay, in 1906. The boring operations were being carried on in the vicinity of oil seepages which were recognized and mentioned by Dr. Selwyn, the late director of the Geological Survey, as early as 1888. The depths reached in this district have not yet been carried down sufficiently far to be conclusive one way or another.

Some work was also being done in the Cariboo district, whence promising indications have been reported.

Boring for oil is in progress near Harper's camp, Cariboo.

THE KETCHIKAN MINING DISTRICT IN SOUTHEASTERN ALASKA.

Some Particulars of Its Mines and Smelters.

KETCHIKAN MINING DISTRICT is situated in such proximity to the Pacific Coast section of British Columbia as to possess more than passing interest to those connected with the mining and smelting industries of that part of the Province. Among the mine and smelter managers of Prince of Wales Island, which is a part of the Ketchikan district, are several who had previously been associated with similar industries in British Columbia. Further, ore from that district is being shipped in steadily increasing quantities to the Tyee Copper Company's smelter at Ladysmith and the Britannia Smelting Company's smelter at Crofton, both on Vancouver Island, British Columbia. Shortly the Alaska Industrial Company will commence shipping ore from its properties to the Tyee Copper Company's smelter, beginning with about 1,000 tons a month and probably increasing later in the year to three times that quantity. The Mt. Andrew mine, also on Prince of Wales Island, is now producing about 150 tons per day for shipment to the Britannia Smelting Company's works, which will, if there be no interruption to the carrying out of transportation arrangements, receive from this source between 4,000 and 5,000 tons per month. Several other Ketchikan district mines are expected to also ship ore, though in smaller quantities, to Vancouver Island smelters, which are at length to receive benefit from their long-continued efforts to establish regular smelting business connections with southern Alaskan mines.

Recently the *Ketchikan Mining Journal*, with results decidedly successful and redounding to the credit of its enterprising publisher, printed a special number, freely illustrated and giving much information about Ketchikan (including both town and district of that name), its history, progress, industries, and other particulars of especial interest to large numbers of people, both resident and non-resident. From this special issue, in the preparation of which great pains appear to have been taken, the *MINING RECORD* has pleasure in reprinting the following information, described in the *Mining Journal* as a "Condensed Report of the Mines Near Ketchikan":

Ketchikan, Southeastern Alaska, about 650 miles from Seattle, Washington, in latitude 55 deg. 25 min. North and longitude 131 deg. 18 min. West, is the first port of entry in Alaska after passing through British Columbia and can be reached *via* the inside passage of the great land-locked waterway by swift and commodious passenger steamers either from Vancouver, in British Columbia, or Seattle, in Washington, in from two to three days' sailing amidst diversified scenery, which, for beauty and grandeur, is unsurpassed in any other part of the world.

The town of Ketchikan is the distributing point for the entire Ketchikan mining district which embraces an area of 100 miles square. It has grown in a short space of time from a small fishing station

to a progressive town of about 1,500 inhabitants. From 5,000 to 6,000 people are in its immediate vicinity and in the contiguous towns and mining camps. Ketchikan is equipped with all modern and up-to-date improvements. Excellent hotels, stores and extensive commercial establishments, banking house, daily and weekly newspapers, federal and municipal courts, United States custom house, churches, schools, public library, fraternal orders, hospitals, waterworks, electric lights, steam heat (furnished from a central plant), salmon cannery, cold storage plant, saw and shingle mills, wharves, postoffice, chamber of commerce, a fire department, and all requirements for business and residential purposes. Telegraphic cable connection between Ketchikan and other towns in the district and various other localities in Alaska and the outside world, has been established by the Government and is in active operation. Reduction plants and smelting furnaces have already been erected in the district and are in successful operation, and additional facilities and equipment for handling a large tonnage of ore, the production of which is steadily augmenting, are required and in contemplation.

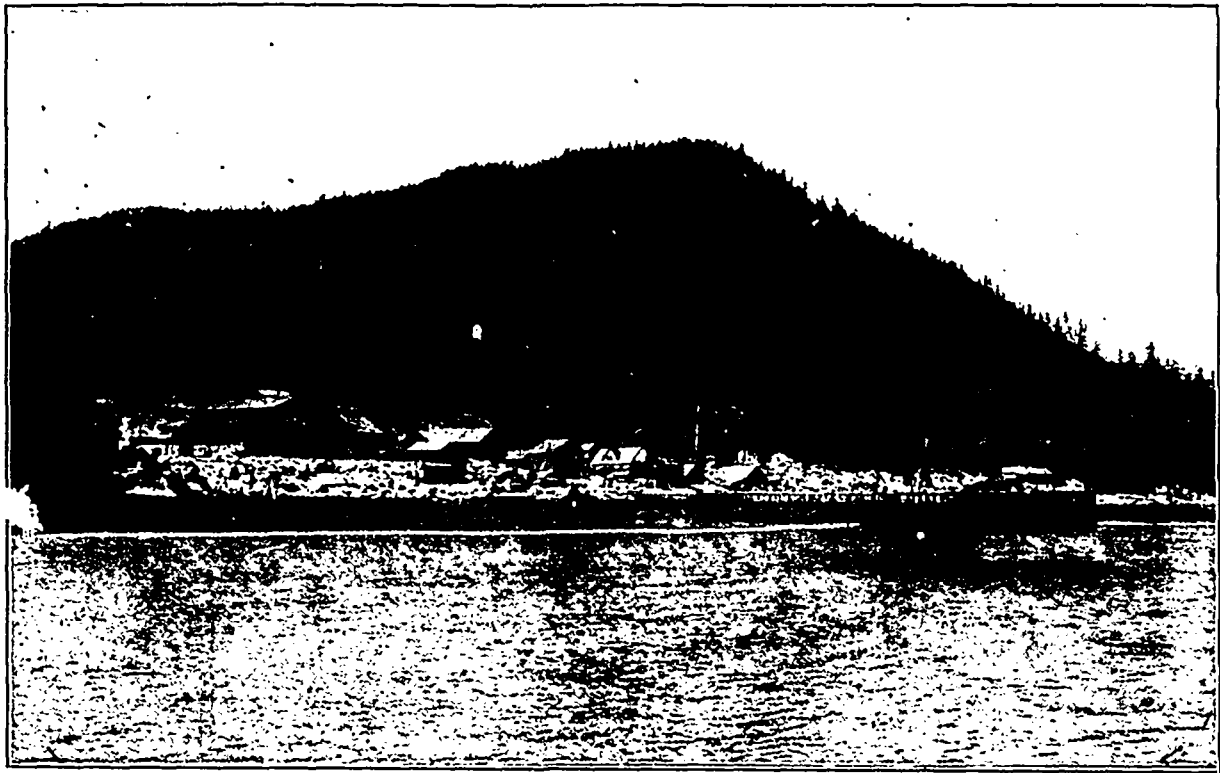
The early experiences and difficulties which confronted the pioneer miners of this district were similar in many respects to those had and encountered by the Argonauts in some of the now famous mining districts in the far West. Heretofore, unpreparedness to explore and work the mines advantageously, by reason of existing adverse conditions, such as inadequate facilities for transportation and obtaining supplies, irregular and slow communication between the then new mining section and commercial centres, lack of capital, and the many vicissitudes and hardships incidental to a new and almost unknown section of the country, have greatly retarded the development of the mining and other resources of this district. But, after a number of years of persistent effort, hard and patient toil, and enduring and surmounting of many perplexing conditions, results are now being produced which are highly gratifying to the venturesome and intrepid men who had faith in the mineral resources, and great future possibilities of this part of the country, and who had the nerve and courage to back up their judgment and belief in its ultimate successful outcome with their brawn, patience and money.

The Ketchikan mining district has already emerged from a prospective state into one of productive value and stability. Progress, improvement, expansion seem to be the slogan of every one engaged in the exploitation of the mineral and other wealth-producing resources of this part of Alaska, and since the opening up of the mines to a state of profitable production it has become apparent to all true observers of the situation that a great and lucrative industry is now being developed in this region, and which must prove highly important and beneficial, not only to the people of Alaska but in a measure to the whole of the United States in the not distant future. The Ketchikan mining district is now

attracting wide-spread attention as a gold, silver, copper and marble producing locality and is generally recognized and appreciated as a mining section of great merit. Nearly all of its mining locations are at or close to tide water, affording extraordinarily good facilities for cheap and convenient water transportation at all seasons of the year. The climate is mild, being tempered by the warm Japanese current, which permits mining operations to be prosecuted at all times. The country is densely timbered, and abounds in lakes and magnificent waterfalls coming

can be produced in this district at low cost. The Ketchikan region therefore bids fair to develop into a mining and smelting centre of great extent, and the time is fast approaching when Alaska and the Ketchikan mining district will become an important factor in the production of the red and precious metals.

Ketchikan mines are now making rapid strides in development, preparatory to entering the ranks of the great producing and dividend paying mines of the country. The district is coming to the front



General View of Hadley, Prince of Wales Island, Southeast Alaska.

from a high elevation, and which are capable of furnishing abundant and continuous power for mining, metallurgical and other purposes.

The coal mines of the State of Washington and the nearby bituminous coal fields in British Columbia now supply this locality at reasonable rates with a satisfactory quality of coal and coke required for mining and smelting operations, and the extensive semi-anthracite coal measures at Controller Bay, near Prince William Sound, and the bituminous coal deposits in the southeastern and other parts of Alaska, have already reached a state of development which insures an ample fuel supply of an excellent grade at lower rates as soon as arrangements can be made for its delivery and shipment. With these and other advantages at hand, the vast extent of the ore bodies of commercial value occurring in the mines of this locality, and the prevailing generally favourable conditions for conducting mining operations on a large scale, it becomes obvious that copper

not by the aid of booming advertising and misrepresentation, but on its merits and resources which are attracting the attention of men of means and experience throughout the country.

The following is a condensed description of the mines, smelters, etc., of the Ketchikan district:—

BROWN ALASKA COMPANY.

The name of B. D. Brown will always be revered in the Ketchikan mining district, for to him is largely due the credit of the present rapid development of the copper industry. When others lacked confidence in the ore of the Hadley country, Mr. Brown said 'you can not find a mine on top, you must go down,' and then he proceeded to follow the advice he had given. It required the expenditure of many thousands of dollars to prove that he was right, but his reward is in the Mamie mine and smelter at Hadley and in various other properties of the Brown Alaska Company of which he is the president.

The Mamie Mine—What is known as the Mamie

group of claims was located in the year 1897 and the first development work was done under the direction of George E. Green, now superintendent of the Hadley Consolidated Copper Company. John Hampson is the present superintendent. The mine commenced shipping ore to Hadley, awaiting the erection of the smelter there, in September, 1904, and shipped that year 1,220 tons. During 1905 it shipped 12,600 tons and in 1906 30,000 tons. The mine has 1,200 ft. of workings and almost as much diamond drill prospecting. The ore runs about 3.5 per cent. copper and 0.05 oz. gold to the ton.

The mine is situated on Kasaan Peninsula 5,500 ft. from the Hadley smelter, with which it is connected by an aerial tramway. There is also a horse tramway, 7,700 ft. in length, for transporting supplies. The mine is well equipped with modern machinery and at the camp there are the usual office buildings, assay office, compressor building, blacksmith shop, bunkhouses, ore bins, etc.

The mine is under the general supervision of N. O. Lawton, manager of mines for the Brown Alaska Company, who also has charge of the properties at Maple Bay, Portland Canal, British Columbia, and elsewhere, owned and controlled by this company. He is a capable man and his businesslike methods are beginning to tell in a satisfactory manner, though he did not take charge of the properties till December, 1906.

ALASKA SMELTING AND REFINING COMPANY.

The smelter at Hadley, Alaska, built and operated by the Alaska Smelting and Refining Company of which B. D. Brown is president, was completed and blown in December 5, 1905. The smelter has an initial capacity of 100 tons per day, but erected in a manner to permit of enlargement to 1,500 tons per day and to add converter works for converting into blister copper, the copper matte first made. From the date of blowing in to December 21, 1906, the furnace was in operation during 228 days and smelted 73,000 tons of ore, producing 4,450 tons of matte containing 3,525,000 lb. of copper, 2,600 oz. of gold and 18,600 oz. of silver, of a total gross value, according to present metal prices, of about \$870,000.

The outlook for 1907 for this smelter is encouraging for the mines which furnish the ore are all in good condition and the independent supply from outside properties is steadily increasing. During the past year the smelter made a good showing, yet the coming year gives promise of a large increase in output.

One of the practical men who has made his mark in the Ketchikan mining district is Paul Johnson, M. E., who built the smelter for the Alaska Smelting and Refining Company, and has since operated it, being still in charge. Mr. Johnson was born in Lund, Sweden, in 1857. He attended the university in his native place for a year and was then admitted to the Royal Technical High School and Mining School of Stockholm, and obtained a mining engineer's certificate there in 1881. He was granted a "stipendium" from the Swedish Government and

travelled in Germany to study copper smelting. In 1882 he came to the United States to get practical experience in this line of work, taking employment at the Orford Copper Company's works near New York. After two years' practical work he returned to Sweden. He has since been employed in many copper works in Europe and America, and has had experience in the mines of South America. He has seen much in the way of scientific smelting throughout the world. He possesses the confidence of capitalists and has been able to produce practical results in the broad field of copper production.

HADLEY CONSOLIDATED COPPER COMPANY.

The Hadley Consolidated Copper Company, operating the Stevenstown, Blue Jay and other mines near Hadley, on the east coast of Prince of Wales Island, is a Washington corporation with its home office at Seattle. Samuel I. Silverman is president and general manager of the company, and George E. Green superintendent in charge of the mines.

The property consists of 10 claims, comprising an area of approximately 200 acres, situate on Mount Andrew, about one and one-quarter miles south of Hadley, the headquarters of the Brown Alaska Company. These claims extend from tide-water to an elevation of 1,050 ft. along the slope of the mountain and are reached by rail and aerial tramways from the smelter at Hadley. The property has been developed by tunnels, glory holes, shafts, drifts, cross-cuts and open cuts. This development was begun on June 15, 1905, and on September 16 of the same year the first shipment of ore was made to the Alaska Smelting and Refining Company's smelter at Hadley. For the first two months the daily output amounted to but 50 tons per day, since which time it has been increased to 100 tons. The ore is what is termed self-fluxing, and for that reason is advantageously handled by the smelter company. The average returns from the ore have varied but little during the time since operations began, being about 74 lb. copper, \$1 in gold and 20 cents in silver per ton. The mine had produced up to the end of 1906 in the neighbourhood of 35,000 tons of ore.

The development of the mine from the beginning has been under the immediate supervision of Superintendent George E. Green, who has been Mr. Silverman's representative in Alaska since 1901. Mr. Green is a thorough miner, having followed that business since his boyhood, his field of activity having been in nearly all of the western states and British Columbia. He is a native of the State of Michigan, but the past 20 years of his life have been spent in the mines of the West.

To Mr. Silverman, the president and general manager of this company, the Ketchikan mining district owes a debt of gratitude. About the time he came here in 1900 several so-called experts who had been sent from the East to make reports on the prospects in this country, had given the district a black eye, so to speak. Mr. Silverman was one of the very first to try to prove it a good mining country. He had confidence in the ore, both as to its value and

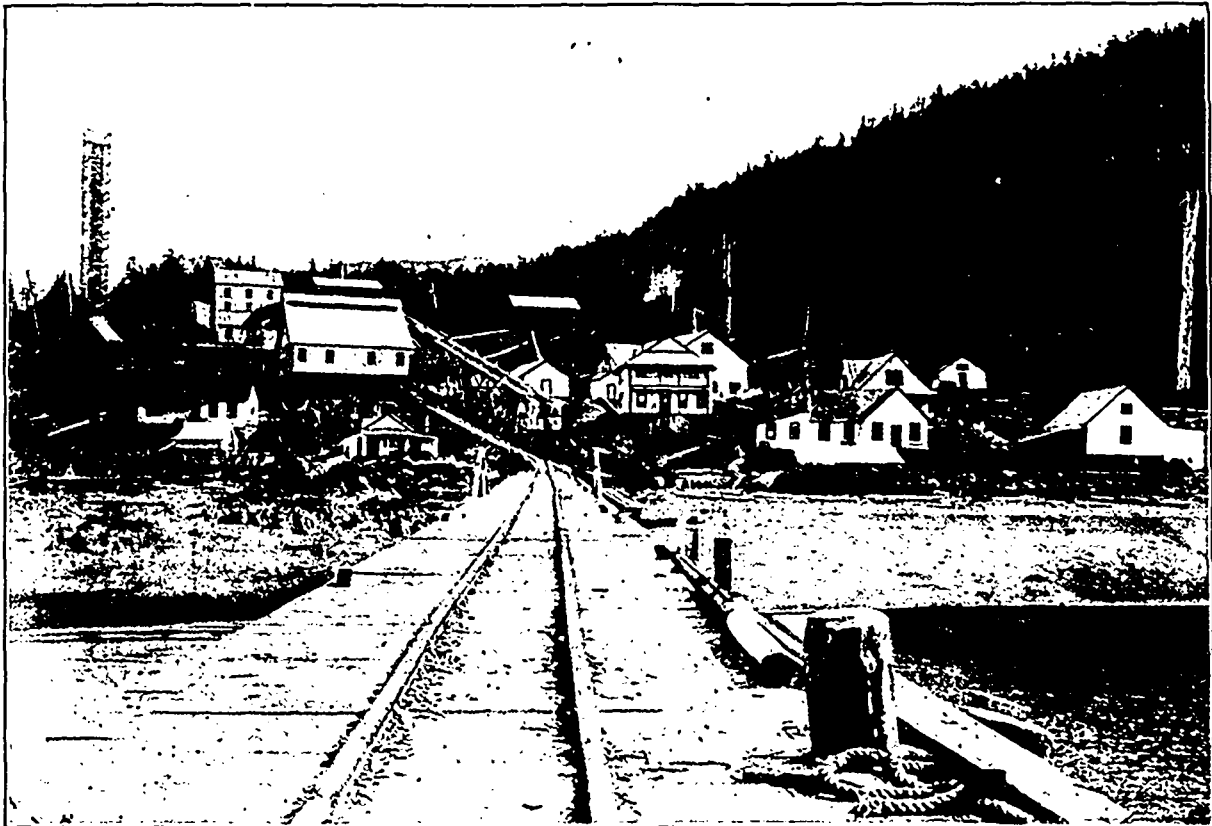
extent. His attention was first devoted to the properties now being operated by the Alaska Copper Company at Coppermount; then he went into the Hollis district, and afterwards associated himself with B. D. Brown of New York, promoting the three original companies, viz., the Silverman-Alaska, the Brown-Alaska, and the New York Development companies. The then existing conditions for future development in the mines were so promising that they suggested the establishment of a smelter, which was afterwards erected by the Alaska Smelting and Refining Company at Hadley. Mr. Brown was elected president of all the companies. Later Mr. Silverman sold his interests in these companies, at

From the date of the initial shipment in October to the end of the year in the neighbourhood of 9,000 tons of ore were taken from the mine to the Crofton smelter in British Columbia.

W. C. Freeburn, who has charge of the development of the property, is considered to be one of the best all round mining men in Alaska, and his work here substantiates the assertion.

ALASKA COPPER COMPANY.

This is a Washington corporation owning the Copper Mountain mines and smelting plant at Coppermount, West Coast of Prince of Wales Island. Its chief officers are: President, H. W. Mellen; general superintendent, J. Cuthbert Welch.



Alaska Smelting and Refining Co.'s Smelting Works, Offices, etc., at Hadley, Prince of Wales Island, Southeast Alaska.

the same time becoming more heavily interested in the Hadley Consolidated Copper Company.

Since the success attained by Mr. Silverman and his associates in the various properties became known capital has been convinced that the Ketchikan mining district is worthy of investigation and each year since the operations began has added to the number of operators.

MOUNT ANDREW MINE.

One of the properties added to the list of producers during last season is the Mount Andrew group, adjoining the Stevenstown workings, and lying in the same mineral belt. The ore is a high grade magnetite. The mine is well equipped and an aerial tram carries the ore from the mine to the beach.

The mines are situated on the southern slope of Copper Mountain, which attains an altitude of 3,800 ft. The ore bodies are contact veins between lime and granite. The New York vein carries mainly chrysocolla, the Indiana chalcopryrite, the ore running up to 40 per cent. copper with some gold and silver values.

The mines are connected by surface and aerial tramways with the smelter on the bench. The development consists of a series of tunnels.

The smelter was erected in 1904-5 and was blown in for an experimental run in June, 1905. Owing to lack of transportation facilities it has been impossible to operate the plant continuously. Arrangements are now being made to remove this difficulty.

The furnace building is equipped with a blast furnace capable of smelting 275 tons daily, the usual complement of settlers and other appliances. The slag flows from the furnace into a stream of water by which it is granulated and carried down a flume into the bay. The matte is drawn off into pans, broken up and removed to bunkers ready for shipment by water. The ore bins have a capacity of 2,500 tons and the coke bins 1,200 tons.

The sample mill is furnished with the customary elevators, samplers, etc., enabling the absolutely automatic sampling of all ore. The ore from the Copper Mountain mines is delivered to the sample mill bin by an aerial tramway. That received by water is unloaded and hoisted into receiving bunkers of 1,000 tons capacity on the wharf and is then drawn off into cars and hoisted on inclined trams to the mill. The wharf is supplied with the necessary hoisting engines and gear. An immediate improvement is contemplated in the lengthening of the wharf by an additional 300 ft. and the installation of a second hoisting engine and gear.

There are also general offices, sawmill, blacksmith and machine shops, bunkhouses, store and warehouses. A new assay office to be well equipped is in course of erection. Power for the smelting works is derived entirely from water, the present system being under a head of 300 ft.

H. W. Mellen, the president of the Alaska Copper Company, is a man well known all over southeastern Alaska. For the past 12 years he has been prominent in mining affairs. He had charge of the early development of the Jualin mine in Berners Bay, one of the best paying mines in Alaska today. He is a pioneer in the Ketchikan district and the organizer of the company of which he is now president, and during most of the time has been actively engaged in its development and operation.

J. Cuthbert Welch, general superintendent of the company, is a man of ability in his profession. For many years prior to coming to Alaska at the close of 1905, he was in British Columbia, eastern Washington and Montana, where he held important, responsible positions. He is an able smelter man and is confidently expected to make a good record at Coppermount.

CUPRITE COPPER COMPANY.

The Cuprite Copper Company was organized under the laws of the State of Washington in January, 1906; capital stock \$50,000, divided into 50,000 shares at \$1 each. The officers of the company are: President, Ed. LaBounty; secretary and treasurer, Chas. E. Bedford; trustees, Ed. LaBounty, Chas. E. Bedford, and J. T. Jones; engineer and manager, J. T. Jones; superintendent, A. J. Jones. The company's property consists of five claims and a millsite adjoining the Sulzer property on the east coast of Prince of Wales Island and running from the apex of the mountain down to the beach. At the apex the lead discloses 4 ft. of ore that averages net at the smelter \$58. The company is a close corporation and has no stock for sale. Active development

is in progress. In the early spring will be determined the location of the aerial tram and bunkers necessary for shipping the ore to the nearest smelter, which is the Alaska Copper Company's plant at Coppermount, some eight miles distant by water. This property has the ear marks of a mine that will be a fortune maker when placed on a producing basis.

MOONSHINE.

This property is situated on Cholmondeley Sound, on the east side of Prince of Wales Island. Considerable development has been done recently, including a shaft sunk about 50 ft. in ore and a tunnel driven some 70 ft. on the vein at 300 ft. depth. The ore is galena assaying 70 per cent. lead and 70 oz. silver. Work will be vigorously prosecuted on this property.

ALMA MINING COMPANY.

Dolomi, a town with a beautiful harbour, is the home of the Alma Mining Company, which has several groups of valuable mineral locations.

The Valpariso is one of the well known properties of the district. Development consists of a 165-ft. shaft, 400 ft. of drifts, beside several tunnels. A tramway was completed during the past season, one mile in length, connecting the mine with the beach. A 50-h.p. steam boiler, 26-h.p. hoist and a large new sinking pump are at the mine ready for installation.

About a mile from the Valpariso toward the Golden Fleece is the Amazon property, also owned by the Alma Company. Considerable development work has been done on this claim in the past and further drift and shaft work will be done this season.

Another of the company's properties is the Paul, on which 250 ft. of tunnel has been driven. This claim is near the Valpariso with one claim intervening.

The Amazon group consists of 10 and the Valpariso 7 claims. Both groups will be patented this summer.

Shipments have been made from these properties of some rich ore and there is no doubt that large producers will be developed in the very near future.

B. A. Eardley is president and general manager of the Alma Mining Company and he is regarded as a conservative mining man and believes in the full development of the properties in his charge. He is now preparing to obtain patents to the holdings of the company.

EAGLES NEST GROUP.

The Eagles Nest group of claims, located by D. Nicoll in Kasaan Bay, is being developed by the Sea Island Copper Company, a corporation interested through the efforts of Charles Guzman. The work done so far has shown satisfactory results.

OMAR MINING COMPANY.

The Khayyam mines, operated by the Omar Mining Company, are situated at an altitude of about 2,400 ft. above sea level, on the summit and north slope of a ridge 2.8 miles in an air line southwest from Kiam, on McKenzie Inlet. The ore is sent down on an aerial tram one mile long to bunkers and thence transported 2 1-3 miles over a surface

tram in cars to bunkers on the beach, where it is loaded on boats and shipped to the smelter. The cars are run in trains of six cars each, one train taking about 15 tons of pyritic ore, which goes about 11 cu. ft. per ton. The trains can transport 300 tons per day of 24 hours.

ALPHA MINING COMPANY.

This company owns what promises to become one of the finest properties in this district. It is located at Dolomi and consists of three claims, the Alpha, Pony and Juniata. There has been a lot of work done and the property is now ready for patent. The Alpha and Juniata are located on the same lode and there is a 5-ft. ledge showing on the surface for approximately 2,500 ft. which carries from \$3 to \$20 in gold, and copper values from 2.5 to 7 per cent. The development work consists of open cuts, a large amount of stripping and a shaft 35 ft. in depth. The outlook is considered promising.

The company consists of Grand Rapids, Michigan, capitalists. They are represented by F. M. Loomis, who came here from that place in February, 1902, and has accomplished a large amount of work in that section of Prince of Wales Island. He also located several other claims, in some of which the stockholders of the Alpha Company are interested. One of these, the Michigan, has much surface work done and a shaft down 25 ft., which is in solid ore with no walls to be seen. The ore carries values in both gold and copper.

There is also the Copper Lake, a claim which adjoins the Golden Fleece, the ore of which it much resembles in character. The values are exclusively in gold. Another claim is the Fortune, of which J. Clark Sproat of Grand Rapids, F. M. Loomis and H. J. Garness of Dolomi, are the owners. There are several ledges on the property which carry galena, grey copper and free gold. Prospecting work done consists of two 30 ft. shafts and a number of open cuts.

CYMRU COPPER COMPANY.

The Cymru Copper Company was organized under the laws of the State of Washington in January, 1906, with a capital stock of \$50,000, divided into shares of the par value of \$1 each. The company purchased three claims on the north arm of Moira Sound, Prince of Wales Island, Alaska, for \$22,500 cash and in addition has located three others. It subsequently expended over \$60,000 in construction and development consisting of wharf, bunkers, 6,000 feet of 36-in. steel railroad, open cuts and drifts, tunnels, etc. Ore has been produced in excess of the first cost of the mine and expenditure for development to date. A 25-h. p. gasoline hoist and a 3-drill air compressor are now installed, by the aid of which the daily product will be brought up to approximately 50 tons per day or 1,500 tons per month.

The property consists of a contact vein running north to southeast with the formation, varying from 4 to 40 ft. in width on the surface, with values ranging from 3.8 to 28 per cent. copper.

The officers of this company are: J. M. Miller,

Jr., president; Frank D. Nash, secretary and treasurer; J. M. Miller, Jr., Frank D. Nash and Frank P. Hicks, trustees; J. T. Jones, engineer; Geo. W. Grayson, superintendent and manager.

The work of development commenced in April, 1906, and the first shipment was made to the smelter on October 11, 1906. The management has every reason to believe that monthly dividends of 25 per cent. will be paid on the output for the ensuing year.

IRVING CONSOLIDATED MINING COMPANY.

The property of the Irving Consolidated Mining Company comprises six claims known as the Goldstream group, located on the southeast shore of Gravena Island, three miles from Ketchikan. The property has been carefully developed at a cost of some \$25,000, and a large body of ore has been uncovered. There are three parallel leads running right through the six claims. The formation is a schistose quartz. The ore bodies are well defined and much of the vein matter has been uncovered by a series of top cross-cuts the full length of the property. There is a small stamp mill on the property, and a full mine equipment. All requisite buildings have been erected, together with a wharf 100 by 40 ft. There is sufficient water for the largest vessels to land at any stage of the tide. The facilities for transportation are good as the property is located at tide water. The Irving Consolidated Mining Company was organized in August, 1906, by J. H. Irving of Seattle, and George Irving and Harry Brice of Ketchikan.

NIBLACK COPPER COMPANY.

The property of the Niblack Copper Company consists of two groups of claims, Lookout No. 1 and Lookout No. 2, in all 20 claims, located on the east coast of Prince of Wales Island, the farthest south of the working mines. The controlling interest in the company is held by a party of Cleveland and Milwaukee men, who have successfully devoted their time to the operation of iron mines in Michigan. M. P. O'Brien is president and treasurer; Frank P. Richards, vice-president, and S. C. Vessy, secretary.

For the past year most of the work has been confined to the Lookout No. 2 group. The main two-compartment shaft, inclined at 68 deg., is 225 ft. deep. Four levels have been opened; the first at 50 ft., the second at 100 ft., and the third at 150 ft. The bottom level, which was opened during the past year, is at 225 ft. depth. Within a month work will have been started to deepen the shaft to the 300-ft. level. Although the shaft is located but 100 ft. from the high tide line, and the collar 30 ft. above it, very little water is encountered in the mine, a No. 7 Cameron pump easily handling it. So far only what is known as the centre lens has been developed on the fourth level. Cross-cutting is now in progress and should reach both the north and south lenses in a short time. The ore found in the centre lens shows better values in both copper and precious metals than it did on the upper levels.

Neither this nor the south lens outcropped on surface; both were first found on the second level.

The north lens has been worked from the surface down. The outcrop of this body was what first induced work to be done on the property, it showing at high tide line. The power equipment consists of a 30-h. p. hoist; a Rand air compressor, furnishing air for six drills, and the requisite steam boiler plant. A 12,000-ton bunker is erected at the shaft, the ore being trammed from it by endless cable over a trestle 600 ft. to the hold of the ship.

During the past year there were shipped to the smelters at Tacoma and Coppermount, 21,000 tons of ore yielding 1,325,600 lb. of copper, with the usual precious metal values of the district. The company employs an average of 35 men, all work except stoping being as far as possible done by contract, the company furnishing tools and explosives. All the men live at the company's mess, there being no families in camp.

Since only the higher grade ores are shipped to the smelter, it is the intention of the company to ultimately treat the ore on the ground, so that the lower grade ore of the Lookout No. 1 and the low grade ore developed in the No. 2 group can be mined at a profit. However, such an installation will not be made until there is enough of both iron and silicious ores in sight to keep the smelter running continuously for such a time at least that the installation will pay for itself and give a fair profit on the investment. There is a good water power available at all times of the year, so smelting should be done at a comparatively low cost.

VENUS MINE.

The Venus property is located on Prince of Wales Island, near the head of Kasaan Bay and about one and a quarter miles inland from Venus Bay.

The ore body occurring here strikes east and west, dips to the north, and consists mainly of pyrrhotite and chalcopyrite carrying gold and silver in addition to its copper contents.

An open cut was made at the point of discovery and disclosed a smooth, even wall of diabasic rock dipping into the hill at an angle of about 80 deg. from the horizontal.

As the ore body was found to be magnetic a magnet survey was made and the magnetic contours plotted, thus giving the form and position of the magnetic area.

To verify the survey a short tunnel was run about 140 ft. from the open cut, and after passing through about 6 ft. of soil and boulder clay and 6 ft. of slate, which caps a considerable portion of the ore body, the ore was struck in the tunnel.

Another tunnel farther down the hill has been driven about 90 ft.; 72 ft. of this was soil and boulder clay, then came 6 ft. of quartzite and the last 12 ft. has been partly in quartzite and partly in ore.

From the open cut east the ore body has been stripped for a width of from 4 to 6 ft. for a distance of 50 ft., where it is again capped with country rock.

Ore has been exposed at different points for a distance of 190 ft. and appears to reach a maximum width of about 65 ft.

It seems as if this ore body is the result of a fissure through which rose mineral charged vapors and solutions which in part precipitated their mineral contents in the fissure and also replaced with ore a considerable portion of the enclosing country rock.

It is conveniently situated for working. Continuity with depth being probable, as indicated by its origin, it bids fair to in time become one of the prominent mines of this district. It is owned by U. S. Rush, L. A. Babcock and W. L. Bunard of Kasaan.

RUSH & BROWN MINE.

The Rush & Brown property is situated near the head of Kasaan Bay on Prince of Wales Island.

A 2,000-ton ore bin is located at deep water on Venus Bay. From here a railroad about two and three-quarter miles in length leads to the mine.

Two ore bodies are being worked by shaft at the present time. The larger one has been developed to a depth of about 90 feet., a width of about 35 ft. and a length of about 125 ft. It consists so far as exposed of a body of magnetite impregnated with chalcopyrite, carrying gold and silver in addition to its copper contents. There is some silica, feldspar and considerable calcite disseminated through the magnetite. The ore parts free from the country rock and the walls are practically vertical.

To the north about 160 ft. is the smaller body which dips toward the larger body at an angle of about 65 deg. from the horizontal. The smaller body, which ranges from 9 to 16 ft. in width appears to have been formed by the replacement in part of a diabase dyke with chalcopyrite. The chalcopyrite occurs in the altered dyke rock and also in lenses of various sizes. The largest one thus far encountered was solid chalcopyrite 6 ft. in thickness. The hanging wall shows vertical movement.

In the large ore body cavities were found which showed calcite, silica and sulphides of iron and copper which had been precipitated from solution, and inasmuch as at least part of the ore in the large body is traceable to the same origin as all of that in the small body, and as the large body stands practically vertical while the small body dips toward it at an angle of about 65 deg., it seems probable that the two bodies will unite with depth.

About 10,000 tons of ore have been shipped and a similar quantity is now broken down in the stopes.

The property is owned by U. S. Rush and Geo. E. Brown of Kasaan.

ALASKA METALS MINING COMPANY.

The general manager of this company is Geo. E. Bent. The property is situated two miles from Coppermount, on the west coast of Prince of Wales Island. The ore is a good grade of chalcopyrite with values in gold and silver. The company has equipped the property with a steam plant, compressor and hoist, etc., and is now engaged in sinking a shaft on the ore body. Previous development, from which ore shipped was taken, consisted of tunnels.

RED WING COPPER MINING COMPANY.

This property, operated by E. E. and Tola Wy-

man, is situated seven miles from Coppermount on the west coast of Prince of Wales Island. The vein is about 4 ft. wide consisting of chalcopyrite containing gold, silver and 7 per cent. copper. Development consists of a shaft 123 ft. deep with levels 70 ft. and 130 ft. long. To date the mine has shipped about 3,500 tons of ore. A new boiler is being installed to give power for drills, etc.

OLD HOMESTEAD.

This is owned by Sylvester Bros. of Seattle. It is situated on McLean's Arm. The owners are about to commence systematic development of this property. The ledge is about 60 ft. wide. Assays give gold 0.24 oz. and silver 2 oz. per ton, and copper 3.5 per cent. The intention is to place the property on a shipping basis as soon as possible.

MALLARD MINING COMPANY.

This company is about to commence development of its property on McLean's Arm on the east side of Prince of Wales Island. The ledge is 20 ft. wide carrying chalcopyrite. Assays yield gold 0.14 oz. and silver 5 oz. per ton, and copper 10 per cent. The property has a good outlook for developing into a mine of considerable importance.

TONGASS COPPER COMPANY.

Encouraging reports have just been received from the camps at the Tongass Copper Company's property on Thorn Arm, where prospecting has been going on for some time, and with satisfactory results.

The ore body encountered some time ago has been found large and of sufficiently high grade to warrant more extensive development work. The property is a copper and silver proposition with fair values in gold. Superintendent Waters recently returned from Seattle prepared to open the mine for shipping. The Tongass Copper Company is a Washington corporation with main office in Seattle. A number of the officers in the Hydah Copper Company figure prominently also in the Tongass.

NORTHWESTERN MINING AND EXPLORATION COMPANY.

The property under bond to this company from Victor Vigelius is proving satisfactory. This property is about four miles from water transportation, and the company has decided to discontinue work until spring. Before beginning work on the uncovered ore body 50 ft. in width, samples taken ran as high as \$86 per ton in gold, silver and copper. Work will be resumed by early spring.

EUREKA GROUP.

The surveying of the tunnel site of the Eureka group of claims at Niblack Anchorage has just been completed. This property is located near the property of the Niblack Copper Company, and it has the same class of ore, being a silicious copper and gold proposition. The ledge outcrops at an elevation of 1,200 ft. and at a distance of 1,000 ft. from the harbour. The owners state that it is practicable to drive a tunnel from the beach to tap the ledge when the character and extent of the ore body in the tunnel shall have been more fully determined. It is intended to develop the property from the lower level.

GIANT GROUP.

The Giant group of claims on the west side of Gravina Island has lately been bonded to Victor Vigelius by D. W. Sanford and Wm. B. Powers. The bond is a working bond and calls for early development. Parties are now on the ground doing assessment work. This property has a large deposit of carbonate of iron and iron oxide impregnated with copper sulphide. It is a copper proposition and is easy of access for transportation purposes.

ALASKA INDUSTRIAL COMPANY.

The Alaska Industrial Company, Chas. A. Sulzer general manager, owns several groups of properties near Sulzer on the west coast of Prince of Wales Island. The main development has been done on the Jumbo group, adjoining the properties of the Alaska Copper Company on the north side of Copper Mountain.

Development by tunnel has exposed a large body of chalcopyrite of probably an average value of 8 per cent. copper with some gold and silver. In addition there are large bodies of lower grade ore partially developed. The company last year installed an aerial tramway 8,000 ft. long and erected bunkers and a wharf on the beach. Mining is now in steady progress and the bunkers are being filled with ore preparatory to commencing shipment.

HYDAH COPPER COMPANY.

This is a Washington corporation, with its main office in Seattle. Its officers and directors are: President, Fred. J. Eitel; vice-president, J. A. Jackson; general manager, Victor Vigelius; secretary, E. W. Crary; treasurer, J. Albert Johnson; with seven directors.

The company is owner of the Mammoth group, located on the north side of Karta Bay, Prince of Wales Island. Development work thereon consists of tunnels, cross-cuts, and shafts, exposing a large tonnage of good grade of copper ore running also about \$2 per ton in gold.

The ore bodies have been traced over four claims in length. The highest altitude of the ledge is 481 ft.; its lowest outcrop discovered up to date is 80 ft. above high water. The claims extend to tide-water. A 3-rail surface gravity tram is now nearing completion; this will convey the ore 2,100 ft. to a deep water harbour. Wharf, bunkers and suitable loading facilities have been provided and the management is confident of shortly placing the Hydah among the producing mines of the district.

ALASKA GOLD STANDARD MINING COMPANY.

The Alaska Gold Standard Mining Company owns a compact group of 17 mining claims, situated on the west shore of Helm Bay, Cleveland Peninsula, about 25 miles from Ketchikan.

This is one of the oldest properties in the district, having been located in the fall of 1897 by T. F. Johnson, one of the pioneers of Ketchikan, and C. F. Dyer. The property was partly opened up during the next following year and the rich gold ore taken from it at that time was a strong factor in

attracting attention to this mining district and in stimulating the early growth of Ketchikan.

During 1899 a 5-stamp Risdon mill was installed on the property, a substantial boarding house and several other buildings erected, a tramway constructed from the mine to the mill and the property put in good shape for active operations. The mill was successfully operated during the next year, but was closed down in December, 1900, pending further development work on the property. This has been carried on from time to time, and during the winter and spring of 1906 a body of high grade ore was opened up. A selected shipment of this, sent to the smelter at Coppermount brought \$500 per ton, and it was then decided to resume work actively at the mine and to start the mill again.

Last fall the company installed an air compressor and machine drills, also a new steam pump, and it is now actively engaged in sinking a shaft, already down 150 ft., and driving ahead levels from this. It is intended to open up and develop the rich ore body now in sight and then increase the capacity of the power plant and mill, install additional machinery and put the property on a dividend paying basis.

This mine is most advantageously situated for economical operation, being right on the shore of a land-locked, deep-water bay, and the mouth of the shaft is but 225 ft. above sea level, and easily reached by a gentle grade from the shore. Fully 99 per cent. of the values of the ore are in gold, the small balance being in silver.

This mine is still in the hands of the original owners, T. F. Johnson, one of the locators, who has lived almost continuously at the property since it was discovered, being now in charge of the work at the mine, while Thomas Appleton, also interested in the original location, is looking after the business affairs of the company. The president of the company is a well known Seattle attorney, C. L. Parker. The company has its office in Seattle.

ALASKA MARBLE COMPANY.

The Alaska Marble Company, whose property is on Marble Creek, Shakan Bay, West Coast, was first opened up in the season of 1900, but little was done except to prospect and get out samples to ascertain the quality of the product. In January, 1904, the company was organized and work placed on a solid basis. Col. C. E. Nason, a man of large experience in marbles, was put in charge of the work. He had had practical experience in large marble quarries in Vermont for a period of 12 years. He was later in large marble works in Georgia for 10 years. Following this he was in the marble business in Chicago.

In 1904 the colonel took charge of the work on Marble Creek and the following year he built a wharf and a railroad from it to the quarries. The same year he stripped the property, installed machinery, and commenced to get out marble. Up to the present time he has shipped 2,500 tons, most of which has gone to Pacific Coast cities, though some has been sent to Chicago.

The marble stands high in the market, being equal in the best Italian in quality and texture.

Note—The shipment of ore in greater quantity from the Mt. Andrew mine has already been commenced. It is expected that fully 4,500 tons will be received at the Britannia Smelting Company's works at Crofton in February and that thereafter monthly average receipts will for some time be quite as large if not larger. During February also the Alaska Industrial Company will make its first shipment under its agreement with the Tyce Copper Company, and the receipts at Ladysmith from this source before the end of that month should total between 2,500 and 3,000 tons.

For the further information of readers of this journal interested in particulars of Ketchikan district mines it is here stated that the following articles, published in the *Mining Record* in 1906, also contain particulars of some of these mines: "Present Conditions Southern Alaskan Mining Development," in February number, pp. 51-9; "Ketchikan, Alaska," in August number, pp. 303-5; "Ketchikan, Southeast Alaska," in September number, pp. 365-6.—Editor *Mining Record*.

Tinstone has at last been discovered in a solid vein in Canada. Samples were received last month by the Geological Survey of Canada from the curator of the provincial museum at Halifax, and they proved on being assayed to be cassiterite, the most valuable of tin ores, containing 78 per cent tin and 22 per cent oxygen. The discovery was made at Lake Ramsay, three miles west of New Ross, Lunenburg county, Nova Scotia. The ore is found in semi-crystalline form disseminated through a vein of decomposed, kaolinized pegmatite in granite. In the reports of the Geological Survey tin ore is reported to have been found in drift at several places in Canada. It was found in New Brunswick on the Pokiok River, York county; in Quebec in Compton county, and in the gneiss of Buckingham, Labelle county; in Ontario in minute quantity at Sudbury, and the Vermillion mine, in the county of Denison, district of Algoma; in British Columbia in a 3-ft. vein of pegmatite cutting granite near Osoyoos Lake, also in Cariboo and Boundary districts; and in the Yukon in several tributaries of the Klondike River, but so far, most frequently in Bonanza, Hunker and Sulphur Creeks, where it occurs as stream tin in smooth rounded pebbles up to 2 in. in diameter, which remain with the gold in the sluice boxes, on account of their weight.

United States mint officials have compiled figures showing that the world's production of gold for 1905 was valued at \$379,289,200, an increase of practically \$20,000,000 over the figures for 1904. Africa held first rank, the production being valued at \$113,329,110; while the United States was second, with \$88,180,700; and Australia third, with \$85,926,500. It is estimated that the production for 1906 will reach a value of \$400,000,000.

CONDITION OF THE MINING INDUSTRY IN CANADA IN 1906.

Review by the Director of the Geological Survey.

CANADA'S MINING INDUSTRY appears to be in a flourishing condition. Particulars of production throughout the Dominion in 1906 so far available indicate that there was in that year a substantial increase as compared with 1905, the advance having been in quantity as well as value of the mineral output. A recently issued Press Bulletin of the Geological Survey of Canada thus deals with the mining industry of Canada in 1906:

The director of the Geological Survey has introduced into his "Summary Report for 1906" a new feature which will appeal to all those interested in the mining industry of this country. In a few words he sums up the principal items of the mineral production and shows that the mining industry has never before been in so healthy a condition. He writes:

It can be said without fear of exaggeration that the condition of the mining industry in Canada in 1906 has been one of large prosperity; and it has, in fact, achieved greater progress and given bigger returns than during any previous year on record. In the year 1905 the total mineral output reached almost \$70,000,000, as compared with but a little over \$60,000,000 in 1904. While actual figures of production are not yet available for 1906, the activity evidenced in both the metalliferous and non-metalliferous mining will, no doubt, result in another large increase being shown. There has been during the year an active demand for nearly all mining products, and the higher prices realized, especially for the metals and their ores, have not only helped to increase the actual output, but have stimulated development and prospecting throughout the country.

Metallie.—The increase in prices of metals during 1906 is distinctly shown by the following quotations. The average price of metals for 1905 was as follows: Silver, 60.35 cents per oz.; copper, 15.59 cents per lb.; lead, 4.7 cents per lb.; spelter, 5.82 cents per lb.; nickel, 40 cents per lb. During 1906 the prices of all these metals had increased, and in December, 1906, the quotations were as follows: Silver, over 70 cents per oz.; copper, over 22 cents per lb.; lead, 5.75 cents per lb.; spelter, 6.4 cents per lb.; and nickel from 45 to 50 cents per lb.

Nickel.—The nickel-copper mines at Sudbury have been actively worked throughout the year and will show an increased output. Electric power has been introduced and the general efficiency of the works greatly improved.

Copper.—The actual output of copper in eastern Canada, outside of the metal obtained from the nickel ores above mentioned, is comparatively small, but a great deal of work has been done during the year in the exploration and development of copper properties.

British Columbia is now Canada's great copper-producing province and more particularly the great

bodies of low-grade, but easily-mined, ores of the Boundary district. The shipments from this district during ten months of 1906 are estimated at close on a million tons or greater than the total output of 1905. The smelting capacity of three furnaces in the district was considerably increased during the year. Dividends were declared by one company aggregating \$1,215,000.

The copper mines of the Coast district in this province have been actively worked during the year, as were also the ores of the Rossland district, which are further mentioned below.

Gold.—The gold output in Canada has been showing a yearly decrease since 1900 due to a regular falling off in the Yukon placer production, and this decrease has, in all probability, continued in 1906. In eastern Canada the output has never been large, but Nova Scotia seems to have made a better showing in 1906 than in the immediately preceding years. In British Columbia the gold production has shown a slow but steady increase which has to some extent counter-balanced the decrease in the Yukon output. In Rossland an important amalgamation of interests took place in the early part of the year. The War Eagle and Centre Star mines, the smelting works of Trail, with the St. Eugene silver-lead mine of East Kootenay, and other interests, were united under one management known as the Consolidated Mining and Smelting Company of Canada. The consolidation is one which will, no doubt, tend to much greater stability in the mining industry.

The discovery of new ore shoots in the Centre Star and other mines, the payment of dividends by the Le Roi, the Le Roi No. 2, and the Consolidated Mining and Smelting Company, and the encouraging detailed geological work done by the Geological Survey under R. W. Brock, have all tended to put new life into the district and a bright future is looked forward to. The total ore shipments for 1906 may possibly not exceed or even equal those of 1905 owing to the unfortunate strike of coal miners at Fernie having caused the smelters to close down for some months in the latter part of the year for want of coke.

In Cariboo several properties, including that of the celebrated Consolidated Cariboo Hydraulic Mining Company, were acquired by the Guggenheim Exploration Company, and a large investment of capital is being made in the construction of many miles of new ditches, which will provide for a more regular and larger supply of water for the working of the huge areas of gold-bearing gravels this company possesses.

The Atlin placer deposits were worked about as usual, although a shortage of water had to be contended with.

The gold output of the Yukon will again apparently show a decrease. Official figures are not yet available, but from current reports apparently not more than \$6,000,000 is to be expected this year. In this district the large corporations are absorbing the smaller operators and the Guggenheim Exploration Company, under the name of the Yukon Consolidated

Gold Fields Company, has entered the field, buying up numerous claims. The company has already commenced the construction of ditches and flumes to provide water for operating its claims. Other large works are to be undertaken, such as the construction of reservoirs, a power plant, etc., and altogether a large number of men will be employed this winter.

Iron.—The iron industry has been active throughout the year, a good demand for all classes of iron products having been experienced and the iron furnaces have been operated probably more extensively than ever before. A new furnace plant is in course of erection at Port Arthur intended to utilize the ores of the Atikokan areas. The output of pig is likely to be larger than in 1905, and would probably have been still greater but for an unfortunate dispute between the Dominion Iron and Steel Company and the Dominion Coal Company in November regarding their coal contract.

Lead and Silver.—The argentiferous galenas of the Kootenay districts are again being worked on a large scale, the East Kootenay mines, St. Eugene and others being large shippers during 1906.

The Cobalt district of Ontario has attracted world-wide attention during the year and is rapidly becoming an important silver-producing district.

Zinc.—The concentrating of zinc ores in British Columbia has continued with considerable success. The large zinc smelter at Frank, Alberta, was sufficiently advanced for the first metal to be turned out in June. It is understood, however, that some further changes and improvements were found necessary before regular smelting could be undertaken.

Non-metallic.—Amongst the non-metallic class of minerals mined in Canada, the more important are mica, chromite, coal, corundum, gypsum, natural gas, petroleum and salt, besides the structural materials including the clay products, stone and lime and cement. The mining of all these products and others of lesser importance has been actively carried on during the year. The coal mining industry especially has made good progress in the various fields exploited, Nova Scotia, Alberta and Saskatchewan and the Crow's Nest Pass and Vancouver Island fields of British Columbia. In Alberta a rapidly growing population has created such a demand for coal that new mines are yearly opened up and a much larger output made. Nearly one-half the coal mined at the Crow's Nest Pass is converted into coke to supply the fast growing demands of the smelting industry in British Columbia and for export. Labour difficulties have interfered to some extent with the operations at Fernie and at Lethbridge, the latter causing a shortage of coal at certain points in Saskatchewan which threatened to become serious. These difficulties were, however, happily settled before the close of the year and no doubt in time to avoid any further serious trouble.

Asbestos mining in the eastern townships of Quebec has been particularly active during the year; prices have been good and a large increase in mill capacity to handle the mineral is contemplated. The

chromite ores of this district have also been mined about as usual.

Gypsum mining in Nova Scotia and New Brunswick and to a lesser extent in Ontario and in Manitoba has been carried on with increased output. Higher prices have also been obtained in this industry.

The corundum of Ontario finds a ready market; mica has been in good demand and at higher prices, while the natural gas, petroleum and salt industries of the Ontario peninsula have been worked as usual.

In the structural material class the production of clay products such as bricks, tiles, etc., stone and lime, has to keep pace with the growth of the population. The increased use of cement in all kinds of structural work such as buildings, sidewalks and roadwork, bridges and monolithic work, etc., has caused a great demand for this product and a largely increased output is consequently being made.

RECENT MINING DEVELOPMENTS IN SOUTHERN YUKON.

SOUTHERN YUKON continues to be noticed in the reports for publication of the Geological Survey of Canada. The latest Press Bulletin issued by the Survey contains the following particulars relative to mining in that district:

Until recently it had been generally supposed that the mineral wealth of the Yukon existed entirely in its placer deposits, and as these are mostly in the northern part of the territory, the southern part was considered of little value. The days of the individual placer miners appear to be almost a thing of the past, as none of the fabulously rich deposits such as caused the early Klondike excitements have recently been found, and the work of washing the sands and gravels is now chiefly carried on by large concerns, so the life of the Yukon, to some, appeared to be measured by the life of the gold sands to the north. However, quartz mining has recently become of such importance and promise as to practically dispel this former idea.

To reach this country the usual route is to go by boat from Vancouver or Seattle to Skagway, Alaska, a distance of about 865 or 1,000 miles respectively, thence via the White Pass & Yukon railway to Whitehorse, Yukon, a distance of 111 miles. From there steamers run down the river to Dawson, about 460 miles.

A few years ago a number of copper claims were staked just west of Whitehorse and some encouraging development work was accomplished, but for a number of reasons the camp had been, until this season, practically at a standstill. A few trial shipments of about 10 tons of ore were made. Three such samples from the Copper King gave returns of 46 per cent, 31 per cent and 29 per cent copper, and there appears to be plenty of such ore. This last season Byron N. White, of Spokane, commenced work on the Pueblo and by surface stripping uncovered a body of almost solid ore about 270 by 250 ft., and a shaft

was sunk in one place over 100 ft., and neither wall had at this time been found. The ore is hematite iron strongly impregnated with copper. The whole deposit seen would average at least 4 per cent copper, and carries some gold values. By hand sorting high grade shipments could be made. The contact along which the copper properties are located can be traced over fourteen miles, and is mineralized throughout the entire distance.

With this exception no quartz mining except a few assessments by prospectors in different places, had been done in this southern Yukon until about a year ago this last summer, when Col. J. H. Conrad commenced work on a number of properties in the Windy Arm district, which is along the railway, and about 40 miles south of Whitehorse. Since then considerable development work has been done on a number of properties both by the Conrad Consolidated and Anglo-American companies. The ores consist chiefly of high-grade silver minerals and gold in quartz veins, which are in true fissures, and vary from a few inches in width to more than 20 ft. Argentiferous galena is the chief mineral, often associated with rich silver minerals such as argentite, ruby silver and stephanite, and accompanied by pyrite and arsenopyrite.

The Conrad Consolidated has three Riblet aerial tramways in operation for carrying the ores of the different properties to the shores of Windy Arm; the longest being 18,697 ft. in length, with its upper terminal 3,469 ft. above the lower, cost \$90,000 to install. The others are much shorter.

Some shipments of ore have been made, but these were mostly trial shipments. The properties are as yet in the prospect stage, but for the amount of work done look promising.

The success of the Windy Arm properties encouraged prospectors to prospect more carefully this season; with the result that a number of valuable finds have been made. About the middle of June, quartz carrying free gold and telluride minerals was found between the Watson and Wheaton Rivers, about 18 miles southwest of Robinson siding. These quartz veins were traced in a belt about two miles wide for about 20 miles in a southeasterly direction and more than 700 locations were made. The quartz is well mineralized in places, carrying gold and silver values chiefly. However, no work has been done as yet to determine what values the veins really carry. The telluride ores from the original discovery on Gold Hill assayed into thousands of dollars per ton, but only a small amount of this was found. The average surface assays were, however, encouraging.

A large body of stibnite carrying mercury was also discovered towards the end of the season, to the west of the other properties.

So considering that there were only a few men in the country and these prospecting only a very short time, the results go to show over what wide areas the valuable ore deposits of the Yukon are distributed.

Added to this there is plenty of coal in the district.

An extensive basin of anthracite coal lies to the south of the Whitehorse copper deposits, and is easily accessible from the railway. Coal is also being mined down the river north from Whitehorse in different places, and will probably be found much closer to Whitehorse. The samples taken from Tantalus and Five Fingers mines give in the laboratory a good firm coherent coke. A smelter at Whitehorse, to treat the copper ores there, is, consequently, one of the probabilities of the near future. There is plenty of water power in the vicinity.

AN ENGLISH FIRM'S REVIEW OF PRICE OF COPPER IN 1906.

COPPER PRICES advanced considerably in 1906. In their report for the year, James Lewis & Son, a well-known London firm, state: An unprecedented advance has taken place in the value of copper during the year 1906, in consequence of the great expansion of trade throughout the world, and in sympathy with the extraordinary demand for iron, steel, and other metals, especially in the United States and Germany. Production has been curtailed by scarcity of labour in the United States and in Chili, and also by deficiency of means of transport in the United States, while the extended use of electricity for motive power has created an increased demand for this necessary metal. Advantage has been taken of the optimism generally prevailing to enhance the cost of copper to consumers 32 per cent.; large purchases of Standard being made by speculators and also on behalf of American producers, the moderate stock available—although it has increased 77½ per cent., or 3,108 tons—enabling those controlling it to rapidly force up prices to their present high level. In the course of the year the value of Standard copper was enhanced £25 10s. per ton—from £79 15s. to £105 5s.—though as low as £74 for three months prompt was accepted in January, and as high as £109 10s. realized in December—a difference of £35 10s. per ton. During the first seven months there was little change in values, but early in August a steady and persistent advance commenced, starting at £81 7s. 6d., and, stimulated at first by fear that the earthquake in Chili would diminish shipments from thence, and subsequently by the favourable harvest and consequent increased industrial activity in the United States, large sales of American Lake and electrolytic copper were made to home consumers and also for export for delivery up to the end of the year. These sales continuing with delivery extended to the first three months of 1907, copper for early delivery was found to be scarce, and the limited stock of Standard being almost entirely controlled by one firm, the price of this medium of speculation was rapidly forced up above that obtainable for refined copper.

COPPER DEPOSITS OF WASHINGTON, U. S. A.

By Hon. Albert W. McIntyre, Everett, Washington.

THE CASCADE CHAIN of mountains forms the central divide of the State of Washington. The rocks are granites, flanked by Palaeozoic, Mesozoic and metamorphic strata, and are much like the Sierras of California. They were upheaved in large part before the Cretaceous, and, since then, other movements have occurred. There are vast developments of igneous rocks, forming, as at Mount Rainier, some of the highest American peaks. West of the Cascade Range is a great valley formerly marking a drainage system, but now covered, partially, by glacial drifts, and largely by the waters of Puget Sound. The glacial deposits are enormous, and render the problem of working out the geology very difficult. Some glaciers remain on the heights, even to the present day. West of the Puget Sound basin is the northern extension of the coast range, locally known as the Olympics, and largely Cretaceous and Tertiary strata.*

This is an area of granite, traversed by late eruptions, and suggests geological conditions known to be favorable to copper deposits elsewhere, as at Butte.**

Prof. Milnor Roberts, dean of the school of mines of the University of Washington, says: "On the western slope of the Cascade Mountains in Washington in the region where the Great Northern railroad crosses the Cascade Range, is a belt, about 50 miles in length and several miles in width, extending both north-west and south-east of the railroad in which veins bearing copper (chiefly), gold and silver are numerous."

This region, so far as the outside world is concerned, is almost a *terra incognita*, many things having combined to deter discovery and development of mineral deposits. The prospector on the Pacific coast, looked, and still looks, for gold placers, next, for gold-bearing quartz. He was not in the position to profit by the discovery of copper-bearing veins or deposits, even if he had recognized them. They were simply "base" and worthless to him. An illustration is to be found in the Copper Mountain lode in Shasta county, California, which was known to prospectors for many years before it was suspected to contain large and rich copper deposits. If the prospector had known that there were copper deposits beneath these unprofitable cappings it would have made no difference to him. Transportation was impossible without trunk lines, either to bring out the ores or take in the necessary metallurgical plant. The almost impenetrable forests covering the slopes of the Cascade Mountains, render prospecting extremely difficult and add greatly to the work of

prospecting the higher peaks and ridges of the granite core, which can be reached only by trails cut, at heavy expense, through the timber and underbrush, tropical in their density. Where some of the more accessible veins were discovered, often in the edge of the belt, capital to develop, in amounts adequate to the purpose, was not obtainable, with the result that mere attempts were made with trifling capital, and often with management that would have failed with any capital, however great. The local community, without knowledge of mining or mineral resources, being farmers and loggers, could not be appealed to successfully for even the little capital in its possession, and which was largely dissipated during the stringent times of a dozen years ago. Without capital, often without the sympathy even of those engaged in other industries about them, the few who appreciated somewhat the character and value of the mineral resources of this region and strove to utilize them, struggled against a situation that would have discouraged anyone not absolutely convinced of the existence of copper deposits worth every effort and sacrifice to develop and market. The mining-stock sharper added his brilliant efforts to the sum total of drawbacks.

The discovery of gold in the Klondike swept practically every miner and prospector of the Cascades into the "frozen" north and only recently has something like a reaction set in that permits attention to be called to nearby resources of even greater permanent value.

Unfortunately for the development of the copper belt, as well as the valuable gold veins in the Mount Baker and Slate Creek regions, the Monte Cristo arsenic-gold district became identified with and regarded as typical of the whole Cascade Range and of the whole State. As a gold-arsenic producer, the district has no place here, but the effect of its geological character and its experiences, upon the development of the copper deposits, justify an attempt to differentiate and distinguish briefly the latter from the former.

So far as the writer is aware, the Monte Cristo mining district is the only one in the Cascades specially reported by the United States Geological Survey. J. E. Spurr's report is able, careful and comprehensive, so far as information was available at the time it was made. He distinctly avowed his limitations resulting from insufficient data, and conscientiously distinguished between fact and fancy. His statement concerning the character of the veins under consideration, that they were not "true fissure veins," but mineralized joints, was interpreted, against his caution, into a declaration that there were no "true fissure veins" in the Cascades. Mr. Spurr's statement, while guarded, that the data at hand indicated that as the joints were more open to the entrance of mineral-bearing solutions, at or near the surface, and tighter below, the ore bodies either did, or could be expected to, "pinch out" at depth. These two statements were interpreted to mean that in the Cascades the veins and the ores "did

*Kemp's "Ore Deposits of United States and Canada."

**Mining and Scientific Press, No. 2406.

not go down." He stated his opinion to be that the ores were the result of deposition from descending waters. None of these statements nor the interpretation placed upon them, would have been remembered but for the fact that the Monte Cristo district, for whatever cause, seemed to belie the name. Not unnaturally, it was taken as a type and sample of the whole Cascade Range, and its apparent failure was regarded as a demonstration of the valuelessness in a mineral way of the whole state of Washington, although the district was and is peculiar here, as it is peculiar in the rest of the United States, for the largest element of value in the ores is arsenic.

The failure in the past at Monte Cristo is claimed, with good evidence, to be due to high freight and treatment charges, to excessively wasteful methods of mining, of transporting the ores from mine to concentrator and railroad, and of concentration, and the failure of the mine owners to receive any return whatever for the arsenic, which was the chief value in the ore. It is only fair to state that prior to 1901 the smelter did not save the arsenic, of which there was, during the period when it was saved, an average value of \$9.34 per ton of ore or concentrates, according to the United States Geological Survey Report. Fairly reliable data give the average treatment charge before the shut-down as \$5; freight about \$4. These figures are for independent shippers. Some figures given are \$2.50 freight and \$7 treatment charge. The gold paid for averaged \$9.50 per ton, leaving some 50 cents margin for mining and transportation to the railroad. There is evidence that the Monte Cristo Mining Company paid \$1.50 to \$1.25 freight, and a \$3 smelter charge. The concentrator's custom charge is given as \$1 a ton. The cost of mining is not given. There was a mining company, a tramming company and a concentration company, as I learn on inquiry, besides the railroad company and smelting company. The loss in concentration is said to have been from 25 to 40 per cent. and even more.

In spite of these discouragements, several owners have been steadily developing during the last three or four years, and the workings have attained considerable depth. In one instance, in 1905, they drifted from a cross-cut tunnel 400 ft. below the old workings, and 700 ft. below the surface, encountering an ore body 11 ft. wide of shipping ore.

William E. Sutton, formerly superintendent of the Monte Cristo mine, whose name occurs frequently in Mr. Spurr's report, informs me that in the Justice, formerly known as the Golden Chord, the tunnel is more than 1,000 ft. deep, is 400 ft. lower than the former lowest workings, and is practically the same ore that was mined from the old Monte Cristo, arsenopyrite, the values somewhat better, and ore bodies about the same size. Another company has two miles of underground work, one portion of which is a cross-cut tunnel 1,800 ft. long, which intercepts three different veins, into which have been drifts driven into good ore in large bodies. In another property the tunnel is in the vein 1,000 ft. be-

low the surface, in ore. At the present time there is great activity at Monte Cristo. The Wilmans, the original discoverers and developers of this camp, are in ore 1,000 ft. below the surface and 1,000 ft. in, with the pay streak wider than it was at the surface and the values higher. They are now actively at work, as are also others, preparing for ore shipments, on a large scale. The great, old, rotten concentrator that has been idle for years, and other equipment, are being replaced and renovated. Everybody is at work, both in preparation and in getting out ore. The cause of the activity, from reliable information on the ground, is that a contract or arrangement has been made or is about to be made with the smelter to treat the ore at \$5, smelter to pay freight, and the smelter to pay \$14 for the arsenic in the average ore, which, added to the \$9.50 in gold, makes \$23.50, less \$5 total charge, or \$18.50 for the same ore which returned only 50 cents margin out of which to pay mining and transportation to the railroad.

The writer is reliably informed that competent engineers insist that the great concentrator was built wrong end up and had other serious, if not fatal, defects, some of them common to early concentrating machinery. Power was furnished at large expense of fuel, with abundant water power close at hand. It must be remembered that these ore bodies were not on the large scale of copper mines and that the ores are low grade, especially when leaving out arsenic, and require economical methods to get a margin of profit. It is hard to understand why such tremendous expenditures on railroad (nearly \$4,000,000) and on plant were made for so comparatively small a mine; and why, obviously wasteful methods were continued for so long a time and why they were not changed and why the shut-down to stop losses did not occur many years sooner.

Sam Silverman, well-known miner and smelter man of south-east Alaska, has recently taken hold of the Pride, Mystery and Golden Chord with the Wilmans brothers, after thorough examination by himself and a number of mining and metallurgical engineers. Everything is being changed, new methods being adopted, water power to be used, and an arsenic plant to be erected unless the smelter pays for the arsenic, which is said to be worth \$15 per ton of ore, on account of the present high price of that metal. Mr. Silverman is in the active management.

After the notable failure of the Pride of the Mountains and the Mystery under the old ownership, the re-purchase and continued operations by the Wilmans brothers, and the investment and active taking hold by Sam Silverman, a practical, capable man, well aware of the history of Monte Cristo, with all the signs of failure writ large all over the camp when he made his examination with other competent men, are significant, and the outcome will be watched with interest.

Not doubting Mr. Spurr's conclusion that there are no "true fissure veins" at Monte Cristo, only mineralized joints, which seem, however, to answer the

purpose of containing ore bodies fairly well, it is not proper to assume, nor does Mr. Spurr state that there are no true fissures in the Cascades.

Mr. Spurr mentions the absence of hot and other ascending springs as indicating that ore deposition must have resulted from descending waters.

In the copper region mentioned, which lies westerly from Monte Cristo, there are hot springs at Madison, Hot Springs, in King county, about six miles west of the Cascade tunnel on the Great Northern railway; at Green River Hot Springs, King county, twelve miles west of Stampede tunnel on the Northern Pacific railway; and Hot Springs near the headwaters of the Snoqualmie and at the head of Foss River in King county, Copper Lake is much warmer than its neighbours, apparently owing to hot springs beneath. Near Berlin, on the Great Northern railway, in King county, there is a locally noted soda spring, and on the north fork of the Skykomish River, above Galena, in Snohomish county, are important mineral springs, and near Mount St. Helens, in Cowlitz county, near Skamania county, are strong soda springs.

As the character of the veins is important, I may be pardoned for illustrating the fact that there are true fissures, or as Mr. Spurr designates them in the report, "true fissure veins," in abundance, in the Cascades, as well as elsewhere in the State of Washington. The Apex mine, in King county, on Money Creek, has about 5,000 ft. of development, as I am informed by Mr. Abner Giffin, president of the owning corporation. The ore is arsenopyrite, the same as that of Monte Cristo, carrying from \$35 to \$50, chiefly in gold and silver, not allowing for arsenic. The No. 5 tunnel is the fifth level and gives 2,500 ft. of backs above it. No. 4 is about 2,000 ft. in and above 1,000 ft. perpendicular. The ore at this point is the same in quality and much greater in quantity than 700 ft. higher up. The vein is 4 ft. wide at surface, with an 8-in. pay streak of \$35 to \$50 ore. Various levels have been run on this vein, which is throughout of the same width, with clean granite walls, the pay streak increasing with depth until on the lowest level it is about 20 in. with the same values. This is a shipping and paying mine and is now building six miles of narrow gauge railroad to reach the Great Northern.

The Copper Bell lode, in Snohomish county, five miles from Index, is a true fissure. V. V. Clark, manager, reports that the walls are hornblende-biotite granite, the vein is 10 to 12 ft. wide, and a level has been run 2,650 ft. in the vein to a point which is 1,450 ft. below the surface, the vein continuing to be of the same width, except that where the ore shoots or pipes occur, the mineralization reaches into the walls, making one ore shoot 65 by 35 ft.

The Bonanza Queen, at Silverton, Snohomish county, is 60 ft. wide at the surface. A cross-cut tunnel 1,090 ft. long cuts the vein vertically 1,000 ft. below. At this point the vein, with well-defined walls, is 134 ft. wide. On the surface from the

highest point, 3,600 ft. above sea-level to the lowest point, 2,100 ft. above sea-level, along the vein, a glacial stream has washed a deep gorge, exposing the walls and the vein contents, on one side of the ridge for a distance of 4,000 ft. On the other side of the ridge, for 3,000 ft., the vein is exposed at numerous points, and the tunnel has cut it in the middle of the hill as stated.

These are the typical veins of this region, not the Monte Cristo joints.

There is more being done now in the State of Washington, in the mining way, than ever before and nothing is being said about it. The time and limits of this paper will not permit more than mention of gold camps in the Slate Creek, Mount Baker and Blewett districts, where, in several well marked instances, active production is going on and the outlook is very promising.

The quiet, steady work mentioned is bringing close to the point of production a considerable number of desirable copper deposits which will soon take on the maturer and more attractive title of mines.

Some dozen or more are actually mines now, having large ore bodies developed, "ore in sight," and require only equipment and transportation, which in a number of instances, are being supplied. In one instance a railroad 25 miles long is being constructed in a precipitous mountain region by the company owning the mine, 16 miles of the mountain end of the grade being completed. A large amount of development work has been done in this case, many hundreds of feet of it, all in ore. The railroad's first use will be to take in a plant to treat the ore. Only assured large bodies of paying ore would justify such expenditures.

In the absence of excitement, and when capital is so much engaged elsewhere, it is obvious that only those having undoubted merit will be developed and equipped. The region indicated above should properly be extended so as to include the many large copper deposits partly developed in Chelan, Okanogan, Ferry and Stevens counties and in Skamania and Lewis counties. In fact, the Washington copper deposits blend, by the course indicated, into those of the Boundary district of British Columbia, where the Granby and others are now producing copper abundantly. The difference, where there is a difference, is that the natural showing and development, considerable in several instances, justify the statement that the higher grade copper deposits are those of the Central Cascade portion of the copper belt.

An important feature in the operation of the mines will be the water power of this region. Prof. Henry Landes, state geologist of Washington, has stated that the water power in the Cascades is unique. "If every atom of fuel, coal or wood, were removed, every wheel that could possibly ever be needed, whether for transportation, agriculture, manufacture or mine, in this whole region, could be turned by water, with an abundance to spare."

In mining, fuel is one of the most important items

of cost. The absolute elimination of this expense means a material lessening of the cost of mine products, bringing very low grade ores into the horizon of commercial value and increasing the profits of high grade.

The abundance of timber for all purposes, the position of the ores admitting operation for a long time, by tunnel, and the ever present water power combine to make ideal, economical conditions.

The copper belt, first mentioned, begins among the headwaters of the Foss River, which flows north; of the Snoqualmie, which flows southwest; and the Clealum, flowing southeast, about latitude 47 deg., 30 min., and longitude 121 deg., 15 min. The belt extends through the adjoining portion of King county, north-northwesterly, into and through Snohomish county, and seems to be a part of a belt or trend which appears on the coast and in the islands of British Columbia, in Prince of Wales and other islands of southeastern Alaska and on Copper River, Alaska. South of this belt, in the Cascades, in Washington, is a known copper region which I will describe later. It is obviously impossible to do more in this paper than to take up, briefly, a few typical copper deposits in the State of Washington; in no case reflecting upon those not selected. I may remark that in general the region is characterized by strong, wide veins, usually in granite, occasionally in diorite or slate-diorite contact, with abundance of igneous dykes both acid and basic. In the southeast portion of the belt, in King county, the Coast Range is from 3,000 ft. to 6,000 ft. in height and the summits have been swept clean by glaciers, in former times. The structure and vein systems exposed, at one point, on the surface may often be traced with accuracy long distances.* In Snohomish county the belt is in the lower hills of the Cascades, where heavy forests cover the plateaus, slopes and valleys, and only occasionally are veins easily traced, without work. There are, however, many instances of veins made plainly visible by erosion.

It has been difficult to secure accurate data, in some instances, but the writer has taken pains to avoid error, as far as possible, and made use of no information not entirely reliable.

I shall now take up a few types for, as stated, it is not within the purpose or scope of this paper to make a catalogue of the copper deposits of Washington, but merely to call attention to their existence.

I shall begin with the first one I became acquainted with, after a difficult climb over a glacier. On the high divide between the east fork of the Foss River and the middle fork of the Snoqualmie, at an elevation of 5,800 ft. above sea-level, in a hornblende-biotite-granite country, the flat surface of an ore shoot on the Dutch Miller shows as plainly as a strip of carpet, 18 ft. wide and about 175 ft. long; 12 ft. of the width is a solid chalcopyrite, somewhat mixed with hematite and slight quantities of zinc. The other 6 ft. is composed of about half and half

chalcopyrite and quartz. Evidently part of the original vein above the present surface had been carried into the canon below by glacial action. Several thousand tons of this ore have since been mined; it is now awaiting transportation facilities, which are being supplied by a railroad, for six and one-half miles of which the grade has been completed through a rough valley, and an aerial tram of five and one-half miles, the contract for which has been let by a representative of the Trenton Iron Company. C. E. Crane writes me that a careful sampling of all the ore taken out (several thousand tons) gives 16 per cent copper, 8 oz. silver, trace of gold, 28 per cent iron, 28 per cent sulphur, 3 per cent zinc, and I believe it from considerable knowledge of the ores. The open-cut and shaft work done in taking out this ore shows the vein to have well-defined walls of granite. The bottom of the shaft, some 60 ft., is in ore. At points along the surface of these veins, where the erosion has not removed the capping, is oxidized iron ore mingled with hornblende and quartz. The vein can be traced by the iron stain until it disappears under a glacier.

About 6,000 ft. from the ore shoot above described, following the gossan, an opening on the Lucky Boy has been made through the thin cap, disclosing chalcopyrite ore, in a vein of about the same width. No great amount of work has been done here, the object being to prospect, not to operate, at this point. This is all in an exceedingly rough and precipitous region. About two miles further in the same general direction, northwest, the Pedro ledge is stated to be more than 100 ft. wide and the showing is said by C. R. Blodgett of Seattle to be greater than that of the Dutch Miller; walls are of the same granite, iron capping with quartz pockets which are lined with crystals of quartz and iron cubes. The ore is chalcopyrite and bornite containing gray copper, gold and silver, with some bismuth and antimony; assays show high values in gold, silver and copper. This ledge can be traced more than two miles and leads to the Copper Chief and Eureka veins and others of the Foss River group. At the head of the west fork of Foss River the Copper Chief is by measurement 189 ft. wide at the Malachite Lake end and still wider on the Miller River end, where it is covered by talus, being plainly traceable for more than 4,000 ft. It has the same iron cap, hematite, limonite, hornblende and quartz, which has been penetrated at various points, disclosing remarkably pure bornite with gold and silver values, and ranging from 3 per cent to 54 per cent copper, gold from trace to half an oz., silver 2 to 46 oz. The Eureka vein is from 50 to 100 ft. wide, of like character, nearly parallel to the larger vein, as are four others ranging from 10 to 20 ft. in width, and more than 2,000 ft. in length, passing over a high ridge. Here on Foss River development now takes the form of a tunnel to cross-cut all of the veins of the group at an average depth of 1,000 ft. Chalcopyrite of a high grade has been uncovered in several of these parallel veins. This group will be supplied with transportation by the railroad to the

*Professor Milnor Roberts.

Dutch Miller. To the south of the Dutch Miller vein, first mentioned, in the Clipper group, the veins are larger and are in the same granite. One tunnel 200 ft. on the vein is all in ore, one 750-ft. cross-cut tunnel is in ore at the breast. From what are described as ore bodies containing more than 1,000,000 tons, general sample assays of different levels are stated to show $3\frac{1}{2}$ per cent to 10 per cent copper, about 2.4 oz. silver, 0.02 oz. gold. It is to this property that the 25 miles of mountain railroad is being actually constructed.

Ten miles north of Mount St. Helens, on the north fork of the Toutle River, on the line of Skamania and Cowlitz counties, the Polar Star, as reported by E. A. Sessions of Portland, has a tunnel on the vein 700 ft., all in ore, after passing through 100 ft. of iron sulphide capping, country rock, hornblende-biotite-granite. Gangue is iron sulphide in an altered granite. A cross-cut of 69 ft., 600 ft. from the tunnel mouth, shows 18 ft. above 10 per cent copper; 15 ft. above 15 per cent copper, with \$5 gold, 16 oz. silver; and 36 ft. average 3 per cent copper, with 0.15 oz. gold and 10 oz. silver. This is one of several veins, one other being equal to it. It is 25 miles from the railroad. The Tacoma & Eastern, now being built, will come within five miles of it.

Mr. Sessions states that the Sweden and Norway, nearby, has a tunnel 2,300 ft. on the vein, in ore all the way, after 150 ft. of iron sulphide capping. Chalcopyrite ore in cross-cut of 23 ft. shows 7 per cent to 10 per cent copper, with gold and silver similar to the last described. There are others in the district. These are the best developed.

The Sunset in Snohomish county, north-northwest of the Foss River group, is in the same granite walls, has three levels at about 100 ft., 200 ft. and 300 ft. depths, which, with upraises, expose, according to the report of W. E. Sutton, former superintendent of the Monte Cristo mines, and mentioned repeatedly by J. E. Spurr, in the Geological Survey Report above referred to, one ore body of 60,000 tons of bornite and chalcopyrite, sampled by him at \$12 per ton when copper was at 13 cents, and another ore body of 40,000 tons with \$15, at same price of copper. Sample assays given in report (1) average across 17 ft. of vein in adit cross-cut 0.04 oz. gold, 1 oz. silver, 5.7 per cent copper; (2) average in vein 14 ft. wide, 50 ft. long, adit cross-cut, 9-10 oz. silver, 7-10 per cent copper; (3) sample of ore taken from floor of stope, old workings (above), 22.3 per cent copper.

The Bonanza Queen has been partially described earlier in this paper. A tunnel 1,090 ft. long has caught the vein 1,000 ft. below the surface and with upraises and levels, together with the natural outcrop, open cuts and quarry work, two principal ore bodies are said to be exposed. One is stated to be 500 ft. long, 15 ft. wide and 1,000 ft. deep. The gangue is pyrrhotite and pyrite. The best that could be done under the circumstances to get at the values gives from 2 per cent to 3 per cent copper, \$1 gold, and 5 oz. silver. The other ore body is said to be,

measuring in the same crude way, 400 ft. long, 200 ft. deep or high, 69 ft. in width—is a hard pyrite somewhat lower in grade of copper and higher in gold and silver than the last named, the silver increasing sometimes to 11 oz. at greatest depth. Sylvanite occurs frequently along one wall. This property is reported as shipping three earloads a week to the Tacoma smelter; net, per ton, after paying transportation and treatment charges, is stated to be from \$8.50 to \$23. The surface ores are being handled by quarry method. There is lime enough in connection with a part of these ores, according to Herbert Lang of San Francisco, to make only 4 per cent to 5 per cent coke necessary to reduction.

I must pass by many that deserve description here and shall briefly describe three groups lying between the section containing the foregoing and the Boundary district, British Columbia.

The Belcher mine, about twelve miles northeast of Republic and six miles from the Washington & Great Northern railway, is reported to have 3,400 ft. of tunnel and winze. Depth of vein, 385 ft.; width of vein, 80 ft., all in ore; width of small vein, 28 ft., all ore.

Ore is pyrite (gold bearing) to depth of 1,808 ft., below which it changes to chalcopyrite carrying 4 per cent copper, with 30 to 50 per cent excess of iron over silica, which varies from 3 per cent to 10 per cent Si. Much of this ore runs \$12 gold and \$8 copper, with no silver. The smelters pay a premium on this ore for all excess of iron over silica. The railroad spur to the Great Northern branch, a distance of nine miles, will be completed shortly, when they expect to begin shipments of 300 tons per day. Capacity of railroad is 1,000 tons per day.

Q. S. mine is about midway between Concomully and Loomis on an ore zone which is traced for several miles. It is an immense low grade sulphide copper ore in diorite, with iron, but very little gold or silver. The ore zone on this property is now said to be 1,000 ft. wide. Only one wall has been found which is granite. Near the surface the ore is silicious, but lower the silica is replaced, to a degree, by copper and there is an excess of iron over silica. Small lenses of good grade are struck, but as yet no very large lens of sufficient grade to operate alone; in lower levels higher grade is expected. One tunnel is in 1,000 ft., giving a depth of 1,000 ft.; another will be driven to give an additional 1,000 ft. Much of the ore now is better than the Granby ore.

On Palmer Mountain, near Loomis, at a depth of 200 ft., the Copper World Extension has 20 ft. of ore running 48 per cent iron, 4 per cent copper, 6 per cent silica. The Granby smelter pays a bonus of \$1.40 per ton for this ore. In addition, there is here a large quantity of ore running 1.5 per cent copper.

This very inadequate description certainly indicates the presence of copper deposits, of magnitude and value, which the owners feel that they have been justified in developing at, however, great effort, and from which they expect, with confidence, to reap the reward for their sacrifice, their pluck and their faith.

HIGH LEVEL GRAVELS IN THE KLONDIKE DISTRICT, YUKON TERRITORY.

By R. G. McConnell.*

IN KLONDIKE DISTRICT the season's work consisted in measuring the volume and estimating as closely as possible the gold contents of the high level gravels bordering Hunker and Bonanza Creeks. In this work I was efficiently assisted by Jos. Keele, geologist, and F. H. Maclaren and F. O'Farrell, topographers, all of the Geological Survey staff. I was also fortunate enough to secure the services of such experienced miners as Robert Henderson, the discoverer of the Klondike gold-fields, and A. B. McDonald.

In the course of the season all the important bodies of bench gravels along Hunker and Bonanza Creeks, and the lower Klondike River, were measured as accurately as conditions permitted. The heavy covering of moss and muck which mantles most of the district rendered the definition of the back line of the gravels in a few places somewhat uncertain, but on most of the hills the outlines of the gravel areas could be closely followed by means of prospecting shafts.

The rocker was employed to obtain the gold values in the gravels. About 350 samples, measuring in most cases a quarter of a yard each, were rocked during the season. The samples where possible were taken in columns 6 ft. in height. Where the gravels were shallow several continuous sections from the bottom to the top of the deposit were washed at intervals along the face. In the deeper deposits continuous columns of the lower gravels only were washed. Above a height of 36 ft., samples were taken at intervals of about 20 ft.

In estimating the gold contents of the various gravel deposits due allowance was given to the statements of miners in regard to the values obtained in drifting and hydraulic operations. In most cases the values given agreed very closely with the results of our own work.

No attempt was made to sample the once rich pay streak running through the upper Bonanza Hill gravels. The pay streak in all these hills has been drifted out more or less completely, only occasional pillars and small areas of ground which the miners were unable to reach remaining unworked. These contain the principal values, but their distribution is so irregular that it was considered a closer estimate could be formed by generalizing the results of the various hydraulic operations now in progress than by a limited amount of sampling done by ourselves.

In addition to the Hunker and Bonanza Hill gravels, tests were made of several areas of bench gravels along the Klondike below the mouth of Hunker Creek.

Field work was completed at the end of September

and Messrs. Maclaren and O'Farrell immediately left for Ottawa, and have been engaged since their arrival in working out the volumes of the various tills. This work, and the estimate of value which depends on it, cannot be completed in time to appear in this year's "Summary Report," but will be published later on.

Mining on the Klondike creeks is at present in a transition stage. The individual claim-owner is being gradually replaced by companies owning groups of claims and working them with expensive plants. The fabulously rich placers which made Eldorado, Hunker and Bonanza Creeks famous have been mostly drifted out and the gravels which remain are too lean, as a rule, to be worked with much profit by the early pick and shovel methods. The necessity for a more economic treatment of the gravels has been met by the introduction of dredges on the creek and river flats, and hydraulic plants on the hills. During the past season four dredges were at work in the district and three others were in course of construction. Dredging in the Klondike where the gravels are thawed presents few difficulties. The gravels are very uniform in size and include few large boulders. The shattered bed-rock is also easily excavated by the buckets.

The hydraulic miners have had to depend so far on a small intermittent supply of local gravity water, or on water pumped up from the creeks, and no large plants are consequently in operation.

The insufficiency of the local supply has induced the Yukon Consolidated Company to undertake the construction of a ditch and pipe line designed to bring water from a point on Twelvemile River to the camp. The line has a length of 58 miles and a capacity of over 5,000 miners' inches. When completed it will add greatly to the productiveness of the district.

With 25 miles or more of proved dredging ground in the valley flats and tens of millions of cubic yards of low grade but still workable gravels on the benches profitable mining on the Klondike creeks is assured for many years.

Dominion, Sulphur and Quartz Creeks on the Indian River slope were not visited during the season. The valleys of all these streams still contain considerable unworked areas of medium grade drifting ground. Quartz Creek also is bordered for a couple of miles by an important white channel deposit only partly drifted out.

The sheriff of Nye county, Nevada, U. S. A., collected \$37,552.29 bullion tax during nine months to October 1, of last year.

The production of coal and coke in the State of Washington in 1905 and 1906, respectively, in short tons, was as under:

	Coal.	Coke.
1905	2,818,042	51,072
1906 (estimated)	3,200,000	60,000

*In "Summary Report of the Geological Survey of Canada for 1906."

CANADIAN MINING INSTITUTE.

ON MARCH 6, 7 and 8 next the Ninth Annual Meeting of the Canadian Mining Institute will be held at the King Edward Hotel, Toronto, Ontario. The secretary has notified members that the usual single fare rate will obtain over all Canadian transportation lines; that the King Edward Hotel offers a special reduced rate for members and others attending the meeting; and that an interesting programme of papers has been arranged. Members intending to be present at the meeting are requested to inform the secretary of such intention as soon as practicable.

The nominating committee, appointed in accordance with the by-laws, have submitted the following nominations for office for the ensuing year: For president, Frederic Keffer (Greenwood, British Columbia); vice-presidents, J. Bonsall Porter (Montreal, Quebec), W. G. Miller (Toronto, Ontario), and Wm. Fleet Robertson (Victoria, B. C.); secretary, H. Mortimer Lamb (Montreal, Que.); treasurer, J. Stevenson Brown (Montreal, Que.); council, to fill vacancies caused by retirement of members on completion of term of office, E. W. Gilman (Montreal, Que.), Jas. McEvoy (Ferne, B. C.), Frank B. Smith (Edmonton, Alberta), R. W. Brock (Kingston, Ont.), J. C. Gwillim (Kingston, Ont.), F. D. Adams (Montreal, Que.), H. E. T. Haultain (Craigmont, Ont.) and David H. Browne (Copper Cliff, Ont.).

It is hoped that some of the members of the institute resident in British Columbia will attend the meeting so that this Province, which is prominent in the Dominion in regard to the metalliferous mining and smelting industries, may be well represented and particular attention be directed to the considerable progress made during recent years in the production of minerals in this far western portion of Canada.

PUBLICATIONS OF THE GEOLOGICAL SURVEY IN 1906.

PUBLICATIONS of the Geological Survey of Canada since January 1, 1906, include a number of reports containing much information relative to the respective localities in which officers of the Survey have been working. Beside these several catalogues have been issued. Other publications are in the press.

The reports, etc., published last year are as follows:

No. 913. "The Mineral Pigments of Canada." By C. W. Wilmott. Pages 39. Published February 18, 1906.

No. 914. Supplementary List of Publications during 1904 and 1905. Pages 11. Published February 20, 1906.

"Mineral Production of Canada for 1905." Pages 16. Published March 15, 1906.

No. 939. "Preliminary Report on the Rossland, British Columbia, Mining District." By R. W. Brock. Pages 40. Published June 2, 1906.

No. 923. "Report on Chibougamau Mining Region." By A. P. Low. Pages 61.

No. 940. "Report on Graham Island, British Columbia." By Dr. R. W. Ellis. Pages 46. Published July 20.

No. 888. "The Geology and Petrography of Mount Yamaska." By G. A. Young, forming Pt. II. "Annual Report," Vol. XVI. Pages 43.

No. 955. French edition of 923. Pages 57. Published August 2.

No. 947. "Summary Report of the Acting Director, for 1905." Pages 144. Published August 31.

No. 950. "Palaeozoic Fossils," Vol. III, Part IV. (and last). By J. F. Whiteaves. Pages 208. Published October 10.

No. 956. Catalogue of Publications. Pages 129. Published October 12.

No. 907. "Annual Report" (New Series), Vol. XIV. Pages 1193.

No. 911. "Annual Report" (New Series), Vol. XV. Pages 1025.

No. 905. "Cruise of the Neptune." By A. P. Low. Pages 355. Published November 19, 1906.

No. 928. "Section of Mines, Annual Report, 1904."

The following reports are going through the press:

No. 902. "Report of Brome Mountain, Quebec." By J. A. Dresser.

No. 942. "Report on the Upper Stewart River, Yukon." By J. Keele.

No. 943. "Report on the Peel and Wind Rivers, Yukon." By C. Camsell.

No. 952. "Annual Report" (New Series), Vol. XVI. Pages 733.

No. 958. "Annual Report on Chemistry and Mineralogy." By G. C. Hoffmann.

No. 949. "Cascade Coal-field." By D. B. Dowling.

No. 961. Reprint of "Report on Nickel and Copper Deposits of Sudbury District, Ontario." By Dr. A. E. Barlow.

No. 962. Reprint of "Report on the Nipissing and Temiskaming Region, Ontario." By Dr. A. E. Barlow.

In Victoria, Australia, the greatest distance to which air is supplied by a rotary blower (Root's pattern) at the present time is 4,710 ft. This is at the Band & Loch mine, and includes the whole distance covered by air pipes from the surface to the faces at the 2,300 ft. level. The Star of the East mine follows close to this with 12-in. air pipes carried to faces at 1,900 ft. from the shaft. Two blowers, a No. 4 and No. 5, are used in the latter mine. Some years since, in an alluvial mine known as Winter's Freehold, in this district, one rotary blower was operated to ventilate faces at more than two miles distant from a shaft 300 ft. in depth. In that case the blower succeeded an old-fashioned pair of Cornish air ducts, to the very great advantage of all concerned with that mine.

FRIENDLY MESSAGES FROM "UNCLE SAM"
AND "BROTHER JONATHAN."

DR. R. W. RAYMOND, secretary of the American Institute of Mining Engineers, whose apt and graceful speeches on several occasions during the annual meeting of the Institute held in British Columbia in the summer of 1905 are still well remembered by many local residents who had the pleasure of hearing them, has once again contributed materially to the enjoyment of those who entertained the visiting members of the Institute and their friends, this time in England, where the American Institute was last summer welcomed and feted by the Iron and Steel Institute, which had the hearty co-operation of several other British institutes associated with metals, mining and engineering.

The Bi-Monthly Bulletin of the American Institute of Mining Engineers for November, 1906, contains an account of the proceedings at this, the ninety-first meeting of the Institute. From that summary of what transpired the following verses have been taken with the idea that they will be of more than passing interest to many readers of the *MINING RECORD* who have not heretofore seen them in print. Before quoting Dr. Raymond's introductory notes, though, it may be premised that the week spent in London witnessed a series of instructive visits to noteworthy institutions and works and of brilliant entertainments, commencing with a reception of the American visitors at the Grafton Galleries by President and Mrs. R. A. Hadfield. Passing over these without further mention, Dr. Raymond's account of the proceedings on Friday evening, July 27, is here reprinted from the *Bulletin*:

On Friday evening, the annual dinner of the Iron and Steel Institute took place at the Guildhall, which had been offered for this purpose by the Corporation of the City of London. This is said to have been the third occasion on which the Guildhall was thus tendered for a non-municipal purpose: the second having been that of the banquet given in 1889 by the Institution of Civil Engineers in honour of visiting members of the American Society of Mechanical Engineers and the American Institute of Mining Engineers. The nature of the first occasion referred to is not known to the writer.

President R. A. Hadfield, of the Iron and Steel Institute, occupied the chair, supported on the right by the Lord Mayor of London, and 600 guests were seated at the tables. Toasts were offered as follows:

1. His Majesty the King (patron of the Iron and Steel Institute, and Bessemer Medalist for 1906.)
2. Her Majesty the Queen, their Royal Highnesses the Prince and Princess of Wales, and the members of the Royal Family.
3. The President of the United States of America.
4. The Lord Mayor and Corporation of London (proposed by President Hadfield, and acknowledged by the Rt. Hon. the Lord Mayor of London).
5. The Imperial Forces (proposed by Lord Allerton, and acknowledged for the army by the Rt. Hon. R. B. Haldane, Secretary of State for War, and for

the navy by Admiral Sir Archibald L. Douglas, K.C. B., Commander-in-Chief at Portsmouth).

6. The Houses of Parliament (proposed by Sir Hugh Bell, Bart., President-elect of the Iron and Steel Institute, and acknowledged by Lord Stanley of Alderley for the House of Lords, and by Herbert Samuel, Esq., M.P., Under-Secretary of State for Home Affairs).

7. Our American guests (proposed by the Rt. Hon. Sir James Kitson, Bart., M.P., Senior Past-President of the Iron and Steel Institute, and acknowledged by President Robert W. Hunt, of the American Institute of Mining Engineers).

8. The Iron and Steel Institute (proposed by R. W. Raymond, Ph.D., LL.D., Secretary of the American Institute of Mining Engineers, and acknowledged by President Hadfield, of the Iron and Steel Institute).

The ladies of the party were received by Mrs. President Hadfield in the beautiful twelve-sided Common Council Chamber, and separately entertained at dinner, after which they were admitted as spectators and auditors to the galleries and balconies of the great hall.

At the close of the banquet a social reception was held in the magnificent Art Gallery, which contained on this occasion between 200 and 300 paintings, by eminent Flemish and modern Belgian artists, loaned for this purpose by their owners.

The Guildhall of London is the place of all ceremonial functions (including the annual election of the Lord Mayor and the Sheriff) and the centre of administration for the city proper, which occupies about one square mile in the heart of the metropolis. The first building on this site, of which little or nothing remains, is attributed to the 12th century. The present porch on the King Street front (an engraving of which adorned the *menu* of this banquet) is a beautiful piece of Gothic architecture, dating from 1430 A.D. The great hall, 155 ft. long and 55 ft. high, was built after the fire of 1666; but its exquisite openwork Gothic wooden roof and stained-glass windows are modern. It contains marble monuments to Nelson, Wellington, and Pitt, and two mysterious ancient wooden statues of giants, traditionally known as Gog and Magog, and said to represent two survivors of a conquered tribe, who were brought as captives to London, and compelled to stand as warders at the gates of the royal palace.

No attempt was made to report the addresses delivered at this magnificent banquet; and the secretary has hesitated to make an exception apparently in favour of himself. But perhaps he may be excused upon a plain statement of facts. On October 2, 1890, at the dinner of the Iron and Steel Institute in New York City, Dr. Raymond made an address, concluding with some verses, entitled "Uncle Sam's Welcome," which had the good fortune to please our English visitors. In 1906, President Hadfield, inviting Dr. Raymond to make one of the addresses at the Guildhall banquet, recalled in flattering terms these forgotten rhymes of 16 years before, and expressed a strong desire that the author thereof should include in his

Guildhall address "something more of the same kind." In response to this invitation, Dr. Raymond read at the conclusion of his speech in the Guildhall, verses entitled "Sez Jonathan."

Unfortunately, the shape and immense size of that hall made it impossible for any speaker (except the megaphonic official herald who announced each toast in tones not to be ignored and never to be forgotten) to be heard by more than a small part of the assembly. Moreover, the natural (and perfectly proper) fate of an orator who comes after the time when newspaper reporters must hand in their "copy" for the morning papers, is to be classed with those who, in turf parlance, "a!so ran." Consequently, Brother Jonathan's message was neither completely heard at the time, nor published immediately thereafter.

Moreover, "Uncle Sam's Welcome" is out of print, and the author is unable to comply with requests for copies of it, or of its recent supplement. He therefore yields to the request of discreet friends so far as to reprint both productions, with a few words from each address, needed by way of introduction.

From the Address of 1890.

I say our fathers were your fathers' brothers; in other words, your uncles. That is why U. S. stands for Uncle Sam, in view of which significant circumstance I beg to conclude with offering to you:

UNCLE SAM'S WELCOME.

I'm glad to see ye! Walk right in!
Set down and rest, and feel to hum.
Ef thar's one thing that makes me grin,
It is, to hev good company come.
Thet's wut I am,
Says Uncle Sam.

I hev my times o' gittin' riled.
Times when I let my eagle scream:
But ginerally I'm ez mild
Ez apple-sass, fixed up with cream—
Meek ez a lamb,
Says Uncle Sam.

I've got ez quick a hand to shake
An *open* hand, ez ever you see;
Although I reckon folks don't make
Much profit shakin' fists at me.
No ma'am!
Says Uncle Sam.

My doors air open all the time
To free, true men of every name;
But when the hummers' guard of crime
Brings riot's flag of blood and flame,
Them doors I'll slam!
Says Uncle Sam.

My table's big; my eatin's good;
There's plenty in the pantry, too,
For all the world. In fact, I could
Export more vittles than I do—
Especially ham!
Says Uncle Sam.

I've got a continent o' coal
An' gas—you bet!—just hear it roar,
Thar's stacks to melt, and mills to roll,
An' trains to haul—an' ez fur *orc*—
A puffedek jam!
Says Uncle Sam.

Now don't you mind me ef I brag;
Thet's jest my way to show I'm proud
To hev ye fetch yer carpet-bag
An' visit. Ef I speak too loud,
Why' thet's all flam,
Says Uncle Sam.

Fur I'm pertickilarly fond
O' sittin' down to talk an' dine
With brothers from across the pond,
Whose mother wuz the same ez mine.
I aint no *clam*,
Says Uncle Sam.

I'd like to show ye round my place,
From north to south, from east to west;
But 'tain't no use, into the space
You ingineers have so compressed
Thet job to cram,
Says Uncle Sam.

So make your plans to stop a while;
An' ef you sort o' call to mind,
Thet little-transatlantic isle,
Jest send the folks you left behind
This telegram,
Says Uncle Sam.

Don't worry over our delay,
They're goin' to put us through, or bust!
An' ef a few weeks more we stay
Than we intended to, you must
Not care a—bit!
Says Uncle Sam.

From the Address of 1906.

The American Revolution of the 18th century was no conflict between England and America. It was simply a struggle, in both England and America, between the party of liberty and the party of tyranny, in which liberty simply won its victory on our side, sooner than it did your side, of the ocean. Your best and greatest men were with us. Even your common people refused to fight against us. It was because, even upon the offered inducement of double pay, Englishmen would not enlist to serve against their American kinsmen, that the British ministry of that day was forced to hire European mercenaries for that repugnant work. Our victory was your victory; our war-cry has long been yours; the principles we then declared are the principles you already cherished, and for which you have since shed English blood.

Sixteen years ago, I spoke in the City of New York to this same toast. "The Iron and Steel Institute," and ventured to express you "Uncle Sam's Welcome." In

view of what I have just said, I dare to offer with confidence tonight "Brother Jonathan's" message:

SEZ JONATHAN.

Now don't tell me the British Oak
Was *split* by any lightnin' stroke!
Bless your soft head, that wa'n't a *split*,
But just a fork, that doubled it!
For Freedom ain't no sapling slim
A-feared to grow another limb:
Thar's two big branches to that tree.
An' one is *you*, an' one is *me*,
Sez Jonathan, sez he!

Your bough's the biggest up to date;
But mine has struck a lively gait,
An', fust you know, she'll shove her way
Right alongside o' yourn, some day.
While through 'em both, from foot to cap,
Tingles an' climbs the same old sap!
No matter whar them branches be,
Thar ain't but one trunk to that tree!
Sez Jonathan, sez he!

What's more, we're both a-branchin' yet
With every blessed chance we get;
An' every limb that we send out
Is welcome to grow staunch and stout
The sky above, the sile below.
Give room and food for all to grow,
An' limbs and leaves that flutter free
Jest add more glory to the tree,
Sez Jonathan, sez he!

Grow on, O stalwart oak an' tall!
Spread wide thy branches, great an' small,
While in their shelter nest the birds,
And in their shadow stand the herds!
Lift all thy heads to greet the sun
That crowns with splendour every one!
So men, till men shall cease to be,
May praise and bless the ancient tree,
Sez Jonathan, say we!

THE OUTLOOK FOR COPPER.

COPPER continues in strong demand at 25 to 26 cents per lb., says George L. Walker, in the *Boston Commercial*. Lake and electrolytic are being sold for delivery as far ahead as May and June at 25 cents. There are inquiries for September copper, but producers are refusing to make contracts farther ahead than four to five months. Consumers find it practically impossible to secure lots of copper for immediate delivery, as the cash supplies were long ago exhausted. This condition of things seems to have created the demand for far advance delivery contracts. Manufacturers who are requested to give figures on manufactured goods deliverable late in the year are unwilling to take chances on the price of copper, and as they are unable to find producers who will sell for August and September delivery they are obliged to fight shy of such business.

The fact should be appreciated more generally that copper is not sold at random in the open market as some other commodities are. Every producer and selling agent has his particular customers whom he supplies year in and year out with a given grade of copper from a certain mine or refinery, and the little copper that is dealt in in the open market represents the excess either of supply or demand. The custom of buying copper for two to four months' advance account is the outgrowth of the contract system in manufactured articles. A street railway company, for instance, orders 1,000,000 lb. of copper wire, and a car builder 2,000,000 lb. of brass trimmings for delivery four or five months hence. The manufacturer who takes these contracts, if he wishes to eliminate the speculative feature, must immediately buy his copper for delivery during the month in which he desires to begin using it. He thus protects himself as to the cost of raw material.

The speculative market in London has been used for two generations as a protection, or hedge, by foreign manufacturers of copper wires. When a customer made a contract to deliver copper goods several months in advance, he would protect himself in the copper market either by buying his refined metal at the current price and selling "G. M. B.'s" short; or through the purchase of "G. M. B.'s," if no refined copper were available at a satisfactory price, provided he feared an advance. He thus protected himself against financial loss in the event of either an advance or decline in metal prices. Of late years there have been such wide variations between the prices of "G. M. B." and refined copper that the greater number of manufacturers have discontinued the practice referred to.

The leading authorities in the copper trade freely express the belief that the average price of copper this year will be close to 25 cents. The production of the first half of the year is nearly all sold at about 25 cents, and as the last half of the year will be entered upon without any surplus supplies of metal in existence, it is safe to predict that there will be no weakening in market conditions until very near the end of the year, if then. There never was a previous time in the history of the trade when the outlook for the metal market was as rosy as it is at present.

Mining, with the metals commanding their present high prices, offers one of the best opportunities for legitimate investments today. Aside from gold, the price of which never varies, the other metals are at a remarkably high figure, and with a continuation of the general prosperity of the country, thus creating a constantly growing demand for them, these prices are bound to be maintained. With silver worth 70 cents an oz.; copper, 23 cents a lb.; tin, 42 cents; lead, 6 cents, and zinc, 8 cents; mining presents the greatest opportunity in years. This fact is well understood in the Eastern money centres, and as a result money is freely offered for legitimate mining purposes.—*Black Hills Mining Review*.

COMPANY MEETINGS AND REPORTS.

BRITISH COLUMBIA COPPER COMPANY, LTD.

The directors of the British Columbia Copper Company, Ltd., have issued the following circular to the shareholders:

Your company having outgrown the capacity and usefulness of its two furnaces and operating plant, which had a capacity of treating about 550 tons daily, has within the year just past erected three modern furnaces having a daily capacity of about 700 tons each, or say 2,000 tons in all, and has so extended and improved its operating plant as to bring it up to the highest modern standard of efficiency.

The engineers who planned and who had these important improvements in charge estimate that the company will now be able to produce refined copper at about 3½ cents per lb. and based on present prices of copper, with two furnaces, be able to earn approximately \$1,000,000 net per annum, to be increased when the three furnaces are operated.

Coincident with these improvements, the principal mine of the company has been further opened up to insure an adequate supply of ore for at least two furnaces. The company has also acquired additional mining properties of considerable promise, which are being rapidly developed.

The erection of the new plant and the improvements indicated naturally involved a stoppage of the company's operations for several months, cutting off its revenue and entailing heavy expenditures, with a resulting indebtedness which must be provided for from the net profits or through capital account.

The business of the company in smelting and converting ores and materials for outside customers is increasing, and everything should be done to encourage its growth, not only because profitable in itself, but because productive of considerable savings in the treatment of the company's ores. Carrying on this business, however, requires a larger working capital, inasmuch as custom ores and mattes must be paid for when delivered at the smelter, but are not realized on by the company until from 60 to 90 days thereafter.

Your board has, therefore, reached the conclusion that the company should be placed in a condition where its present free assets can be employed as working capital, and recommends an increase of the authorized capital stock by 200,000 shares of the par value of \$5 each (\$1,000,000) making the total authorized capital \$3,000,000, and to offer at par 116,160 shares, or \$580,800, of said increase to the shareholders *pro rata* in proportion to their holdings and subject to the favourable action of the stockholders. Members of the board have agreed to take all the stock at par not subscribed for by the shareholders.

As the company still has 12,800 shares of its stock in its treasury, this, together with the completion of the subscription, will leave 96,640 shares out of the total authorized capital available for such future uses, as may be hereafter properly authorized.

While all the three new furnaces are completed, only one is in blast, the prevailing car shortage making it impossible to procure an adequate supply of coke for the larger operations, but this difficulty is temporary only, and should before the end of the present month disappear. Steps are being taken to provide for sufficient storage to insure against a shortage hereafter from this cause.

With the company freed from debt it will be in condition to enter promptly on the payment of dividends.

If such increase of stock be authorized, stockholders of record at the closing of the books, on Wednesday, February 20, 1907, will be given the right to subscribe for an amount of stock equal to 30 per cent. of their holdings at that time and date, at the rate of \$5 per share, payable as follows: \$2.50 per share March 11, 1907; \$2.50 per share May 10, 1907.

Assignable "rights" and appropriate subscription blanks will be mailed to the stockholders on closing of the transfer books.

LETHBRIDGE COLLIERIES COMPANY, LTD.

The Lethbridge Collieries Company, Ltd., held its organization meeting recently at Winnipeg, Manitoba. The following shareholders were elected directors: J. S. Hough, Hon. Colin

H. Campbell, George Rogers (of Lethbridge, Alberta), Isaac Cockburn, Theo. A. Butrose, M. P., D. E. Adams and Jas. W. Bettes. Afterwards, at a directors' meeting, J. S. Hough was appointed president; Hon. C. H. Campbell and Isaac Cockburn, vice-presidents; and Jas. W. Bettes secretary-treasurer. The company's coal property is situated in Alberta, convenient to railways for transportation purposes. The coal is of excellent quality for domestic purposes.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi—December: Shipments amount to 9,700 tons, containing 2,650 oz. gold, 3,950 oz. silver and 164,500 lb. copper. Estimated profit on this ore after deducting cost of mining, smelting, realization and depreciation, \$1,200. Expenditure on development work during the month, \$18,000. (Office note—The sinking of the main shaft has now been commenced, and this accounts for a considerable portion of the increased expenditure. Arising out of the late strike at the coal fields, there is still difficulty in regard to the fuel supply at mine and smelter. There is also a shortage of miners. It is anticipated that these conditions will improve in the near future.)

Le Roi No. 2—December: Shipped 870 tons. The net receipts are \$14,665, being payment for 920 tons shipped and \$1,563, being payment for 62 tons concentrates shipped—in all \$16,228. Small tonnage owing to shortage of cars. Expect normal tonnage January.

Tyce—December: Smelter ran 10 days and smelted: Tyce ore, 2,015 tons. Matte produced from same, 150 tons; gross value of contents (copper, silver and gold), after deducting costs of refining, \$30,970.

U. S. A.

Alaska Mexican—December: 120-stamp mill ran 20 days; crushed 13,620 tons ore; estimated realizable value of bullion, \$30,958. Saved 252 tons sulphurets; estimated realizable value, \$19,459. Working expenses, \$28,850. Secretary adds: Short run caused by shortage of coal.

Alaska Treadwell—December: 240-stamp mill ran 20 days, 300-stamp mill 17 days; crushed 50,705 tons ore; estimated realizable value of bullion, \$71,633. Saved 1,005 tons sulphurets; estimated realizable value, \$49,371. Working expenses, \$64,615. Secretary adds: Short run caused by shortage of coal.

Alaska United—December: Ready Bullion claim, 120-stamp mill ran 20 days; crushed 13,590 tons ore; estimated realizable value of bullion, \$20,443. Saved 237 tons sulphurets; estimated realizable value, \$7,593. Working expenses, \$21,796. Secretary adds: Short run caused by shortage of coal.

DIVIDENDS.

A dividend (No. 46) of 50 cents per share has been declared by the Alaska Mexican Gold Mining Company, payable January 28. Total of dividends paid to date, \$1,572,381.

A dividend (No. 75) of \$1.50 per share has been declared by the Alaska Treadwell Gold Mining Company, payable January 28. Total of dividends paid to date, \$9,235,000.

A dividend (No. 4) of 30 cents per share has been declared by the Alaska United Gold Mining Company, payable January 28. Total of dividends paid to date, \$306,340.

The Consolidated Mining and Smelting Company of Canada, Ltd., owning the St. Eugene, War Eagle, Centre Star and other mines and the Trail smelter, has declared its fourth dividend, viz., of 2½ per cent. for the quarter ended December 31, 1906.

NOTES.

The Arlington Mines, Ltd., has had gazetted the customary notices of intention to apply for certificates of improvements preparatory to obtaining Crown grants of the Argo, Portia, Amos, East Side No. 2, and Bettina fractional mineral claims, all on Springer Creek, Slocan City mining division.

The Consolidated Mining and Smelting Company of Canada has commenced shipment of silver-lead ore from its Richmond group, situated near Sandon, in the Slocan district. The ore shipped was taken out in the course of development work, stopping for shipment in considerable quantity not yet having

been commenced. The ore is stated to average about 100 oz. silver per ton and 50 per cent. lead.

The New York Stock Exchange has listed 103,081 shares of the stock of the Granby Consolidated Mining, Smelting and Power Company, Ltd.; it will also list 31,919 shares prior to July 1, 1907, when this stock shall have been issued in exchange for stock of \$10 par value.

COMPANIES REGISTERED IN ENGLAND.

Lands Selection Syndicate (of Canada), Ltd.—Registered January 11, by Attenborough & Sons, 15 and 26 Thavies Inn, E. C., with capital £20,000, in £1 shares, to acquire any landed or other property in Canada or elsewhere, to carry on the business of farmers, graziers, meat and fruit preservers, brewers, planters, miners, metallurgists, quarry owners, etc. Minimum cash subscription, £1,000. The first directors are E. H. Turnbull, A. T. Wright, and J. W. Peters. Qualification, £200 shares or stock. Remuneration, £400 per annum, divisible.

Scottish Canadian Trust, Ltd.—Registered in Edinburgh, January 16, by Oswald & Son, Edinburgh. Capital £100,000, in £1 shares. Objects: To carry on financial, commercial, mercantile, manufacturing, mining, and other operations. The number of directors is not to be less than three nor more than seven; the first are to be afterwards appointed. Qualification, 500 shares. Remuneration, as fixed by the company. Registered office: 22 Meadowside, Dundee.

COAL MINING NOTES.

Vancouver Island colliery managers interviewed in Victoria were reported early in January to have stated that the demand for Island coal was very active. F. D. Little of the Wellington Colliery Company, was quoted as having said: "A keen demand for coal has sprung up along the Coast and hundreds of tons are being shipped north every month, while thousands of tons are being sent weekly to San Francisco, California." He added that the output of the Wellington (Extension) mines, which usually averages about 1,100 tons per day, had been temporarily diminished by 300 to 400 tons by reason of an epidemic of la grippe among the miners. Thos. R. Stockett, of the Western Fuel Company, Nanaimo, said that the demand for the output of coal had been greater recently than at any previous time. He attributed the increased demand to an enlarged population, a rise in the price of wood, and industrial conditions generally. For some time past the output of the Western Fuel Company had reached 1,600 tons per day. So great had been the increase in the demand for domestic purposes that he estimated it to be 70 per cent. more than at the corresponding period of last year. At the same time the shipping demand had also greatly increased and consignments of coal were sent in increasing quantities to both British Columbian and Alaskan ports.

The Hillcrest Coal Company has closed its coal mine near Frank, southwest Alberta, owing, it is stated, to its inability to get railway cars for the shipment of its product. There appears to be a probability of work being resumed shortly.

The *Fernie Free Press* states that a contract has been awarded Wm. Sandridge of Coleman, Alberta, for delivering 600 cu. yd. of building stone for the construction of a trial battery of coke ovens at the Canadian Pacific Railway Company's coal mine now being developed at Hosmer, Crow's Nest Pass.

A record output of coal was made at the Crow's Nest Pass Coal Company's Coal Creek mines on January 29. The production on that day was 2,600 tons. The *Free Press* further states that the company's purchasing agent and the superintendent of its car repairing shops have gone to Pittsburg, Pennsylvania, to purchase slack cars for the Morrissey, Fernie and Michel railway. Work has been resumed in the company's No. 5 mine at its Michel colliery which mine was closed during the very cold weather. Larger pumps have been installed in this mine.

The Frank Paper says that the secretary of the local board

of trade lately received from Calgary, Alberta, a telegram inquiring whether the mines of The Pass could and would furnish coal for Calgary if a sufficient supply of cars could be had. The companies operating locally authorized the reply that the mines would undertake to supply an unlimited amount of coal if the cars could be obtained for its shipment.

Two of the largest scows ever built at Vancouver have been launched. They have been built to the order of Macdonald, Marpole & Company, and will be used carrying coal from Vancouver Island mines to the City of Vancouver. The dimensions are: Length, 100 ft., beam 32 ft., and depth, 10 ft. Each will carry between 600 and 700 tons of coal. Three more scows of similar dimensions are to be built.

TRADE NOTES AND CATALOGUES.

The Canada Foundry Company of Toronto, Ontario, has established a special department for the construction of steam shovels, the Canadian Pacific Railway and Canadian Northern Companies, and several railway construction firms having placed orders with it for these machines.

The Canadian Westinghouse Company of Hamilton, Ontario, has distributed "The Westinghouse Diary," a pocket diary which, in addition to providing memoranda blanks, gives much information of a technical nature. The statistics are comprehensive and useful. Altogether this handy diary will be welcome to many, particularly to electrical workers.

In El Oro and Guanajuato (Mexico) alone the Westinghouse Electric and Manufacturing Company has installed more than 10,000 h. p. of electrical machinery, all of which is driven from a water-power source.

The Canada Foundry Company has published an illustrated booklet entitled "Steam Specialties" containing instructive information relative to new and scientific steam devices. From the same office has been issued a leaflet descriptive of the "Walker" fire hydrant.

"Some Notes Upon a Method of Drawing with Modern Appliances" is the title of a pamphlet, by W. F. Stanley, received from W. F. Stanley & Co., Ltd., London, England. Several interesting features of a new method of drawing are described in it.

The latest booklet received from the Canadian Rand Drill Company of Montreal, Quebec, is attractively printed in blue ink. It shows Rand drills employed in various capacities and gives information as to those using them and the excellent results they achieve. It claims that these drills are used extensively by the largest mining companies of the Canadian West, including the Consolidated Mining and Smelting, Pacific Coal, Le Roi No. 2, White Bear, Granby, British Columbia Copper, Dominion Copper and Daly Reduction companies, thus evidencing the merits of these machines in every day use.

Mussens Limited of Montreal, Quebec, is publishing a series of catalogues and leaflets, dealing with railway, mining, and contractors' supplies, etc. Catalogue No. 8 gives particulars of wheelbarrows and trucks, No. 9 of steel and twist drills, and No. 10 of some mine supplies. The Reading multiple gear chain hoists are described and illustrated in a booklet, while hoisting machinery and barrel forges are the respective subjects of two leaflets.

Hadfield's Steel Foundry Company, Ltd., of Sheffield, England, through its sole Canadian representatives, Peacock Brothers, engineers, Montreal, Quebec, is supplying the British Columbia Copper Company with one of its rock-crushers for installation at the Oro Denoro mine, Boundary district. This crusher is entirely of steel and has an opening 24 by 18 in. It will be driven by an electric motor.

To secure impermeability of concrete the *Revue Industrielle* recommends the admixture of a solution of 2 parts of caustic potash, 2 of alum, and 10 of water with the mortar, 1.5 kilos of solution being used per bag of cement. Concrete walls are then coated with this mortar. A patent has been obtained for impermeabilizing concrete and preventing efflorescence by adding paraffin, stearin, colophony wax, etc.

ORE PRODUCTION NOTES.

PRODUCTION OF ROSSLAND MINES IN 1906.

The *Rossland Miner* has published the following relative to the production of ore by the mines of that camp:

In an appended table is given the figures for the tonnage of ore produced during the 12 months ended December 31, 1906. It will be noted that the tonnage is 277,361, which is considerably less than in 1905. The falling off is attributable to the strike of the employees of the Crow's Nest Coal Company, which lasted two months. Estimating the value of the ore at \$12 per ton, which is a low valuation according to one of the most reliable authorities, it gives a total of \$3,328,332. With a desire to be conservative the figures have been rather under-estimated than over-estimated. The following are the details of production:

	Tons.
Le Roi	126,396
Centre Star group.....	114,500
White Bear	570
White Bear (milled).....	1,350
Le Roi No. 2.....	21,000
Le Roi No. 2 (milled).....	10,500
Jumbo	2,600
Mabel	25
Crown Point	355
O. K. (milled).....	65
Total.....	277,361

PRODUCTION OF BOUNDARY MINES IN 1906.

The production of the mines of the Boundary district in 1906 is shown by the *Phoenix Pioneer* to have exceeded that of 1905 by about 225,000 tons. Particulars of output of the mines are as under:

	Tons.	Tons.
Granby Company's mines.....		801,404
B. C. Copper Company's mines—		
Mother Lode	104,120	
B. C.	1,345	
Emma	12,881	
Oro Denoro	6,404	
		124,750
Dominion Copper Co.'s mines—		
Brooklyn-Stemwinder	140,685	
Idaho	2,960	
Rawhide	26,032	
Sunset	48,390	
Mountain Rose	3,555	
		221,622
Snowshoe		8,426
Big Copper		586
High-grade properties—		
Providence	1,140	
Skylark	589	
Strathmore	140	
Nine smaller shippers.....	339	
		2,208
Total.....		1,158,996

The output of the B. C. Copper Company's mines was practically suspended during several months occupied in the reconstruction of the company's smelting works at Greenwood.

The tonnage of ore smelted at district smelters in 1906 was 1,276,589 tons (this including ores brought in from other districts) as compared with 982,877 in 1905. The proportions reduced at the several smelters were:

	Tons.
At Granby Company's smelter.....	338,847
" B. C. Copper Company's smelter... ..	121,031
" Dominion " " " ..	218,811
Total.....	1,276,589

All the copper matte produced was converted into blister

copper at the works of the Granby and B. C. Copper companies, respectively.

PRODUCTION IN JANUARY, 1907.

The quantity of ore produced by Kootenay and Boundary district mines during four weeks ended January 26, is shown by the *Nelson Daily News* to have been as under:

	Tons.
Slocan-Kootenay mines	8,094
Rossland mines	15,455
Boundary mines	48,256

Total.....71,805

The ore receipts at the several smelters of these districts were:

Smelter of	Tons.
Consolidated Company, Trail.....	13,987
Le Roi Company, Northport.....	3,665
Hall M. and S. Company, Nelson.....	1,149
Sullivan Company, Marysville.....	2,400
Granby Company, Grand Forks.....	23,494
B. C. Copper Company, Greenwood.....	13,682
Dominion Copper Co., Boundary Falls.....	10,174

Total.....68,551

GOLD COMMISSIONERS' NOTICES.

Notices have been gazetted by the gold commissioners of the respective divisions concerned that all placer mining claims legally held may be laid over, as stated below:

Mining Division.	From 1906.	To 1907.
Arrow Lake	Nov. 22	May 1
Ashcroft	Nov. 1	May 1
Atlin	Sept. 15	June 15
Cariboo	Nov. 1	June 1
Clinton	Nov. 1	May 1
Fort Steele	Sept. 18	June 1
Greenwood	Nov. 1	May 1
Kamloops	Nov. 1	May 1
Lillooet	Nov. 1	May 1
Nelson	Nov. 22	May 1
Nicola	Nov. 1	May 1
N. E. Kootenay.....	Nov. 1	June 1
Omineca	Nov. 1	June 15
Quesnel	Nov. 1	June 1
Similkameen	Nov. 1	May 1
Skeena	Oct. 15	June 1
Vernon	Nov. 20	May 1
Victoria	Nov. 1	June 15
Yale	Nov. 1	May 1

AN IMPROVED FRONT HEAD FOR AIR DRILLS.

James Petrie, master mechanic at the Le Roi Mine, Rossland, has patented a front head for air drills, which, the *Rossland Miner* states, promises to come into general use on account of its giving greater efficiency to the drill, by tapping the air with a double leather packing. The head of the drill is composed of three, instead of nine pieces, thereby diminishing the cost of maintenance to a considerable degree and also facilitating the repairing. Twenty-three of these heads are in operation in Rossland in the Le Roi Mine, and two at the White Bear. Trial orders have been received for four heads from the British Columbia Copper Company, operating in the Boundary. Three heads have been in operation since June 26, 1906, in the Le Roi, and have cost 30 cents each per month to maintain them. The old heads cost from \$6 to \$8 a month for maintenance. This is a large saving as an operative expenditure, and one which every mining company will fully appreciate. The heads, it is thought, are destined to come into universal use. They will fit any make of drill, including the Rand and the Sullivan. Mr. Petrie is negotiating for the sale of his patent.

BOOKS, ETC., RECEIVED.

California State Mining Bureau.—

Bulletin No. 43, showing the mineral production of California for 19 years. Compiled by Charles G. Yale, statistician.

California Gold Product, showing total production of gold in California since 1848, by years. Compiled by Charles G. Yale, statistician.

Columbia University, New York City, U. S. A.—School of

Mines Quarterly. Vol. XXVIII. No. 1, November, 1906.

Geographic Board of Canada.—Sixth Report of the Geo-

graphic Board, containing all decisions to June 30, 1906.

Geological Survey of Canada.—Annual Report (new series),

Vol. XV., 1902-3. Accompanied by 21 maps and illus-

trated by a number of plates. Pages, with index, 1,133.

By Dr. Robert Bell, acting director. The several parts

composing the volume have been issued previously as

separate reports, as completed.

Inland Revenue Department of Canada.—The Metric System

of Weights and Measures. An outline of its principles,

together with some notes upon its advantages over the

British standards. Issued under the direction of the Min-

ister of Inland Revenue.

Imperial Institute, London, England.—Bulletin of the Impe-

rial Institute. Vol. IV., No. 3. 1906.

Papers by Reginald A. Daly, Ottawa, Ontario.—(1) The Dif-

ferentiation of a Secondary Magma through Gravitative

Adjustment. (2) The Nomenclature of the North Amer-

ican Cordillera between the 47th and 53rd Parallels of

Latitude (From *The Geographic Journal* for June, 1906).

(3) The Okanagan Composite Batholith of the Cascade

Mountain System (Bulletin of the Geological Society of

America, Vol. 17, pp. 329-376). (4) Abyssal Igneous In-

jection as a Causal Condition and as an Effect of Moun-

tain-Building (from the *American Journal of Science*,

Vol. XXII., September, 1906). These papers have been

published by permission of the Canadian Commissioner,

International Boundary Surveys.

BOOKS REVIEWED.

After Earthquake and Fire.—A reprint of the articles and

editorial comment, appearing in the *Mining and Scientific*

Press immediately after the disaster at San Francisco,

California, U. S. A., on April 18, 1906. Published by the

Mining and Scientific Press, San Francisco. Pages, 1904.

Octavo. Price, \$1.

This book contains scientific articles on the Earthquake

itself and others on the effects of the fire which added greatly

to the destruction of San Francisco. The editor, T. A.

Rickard, states that it commemorates an experience the

Mining and Scientific Press shared with its neighbours in San

Francisco, and is a tribute to the loyalty of that journal's

staff and to the goodwill of its friends. He expresses the

opinion that the collection of articles reprinted should have

a scientific value and in days to come serve as an interesting

record. Those who read the book will find in it much of

interest, not only in the particulars of a disaster without

parallel on the North American continent, but as well in the

scientific information and data also comprised in its pages.

The book is handsomely illustrated, the letter press excellent,

and the price moderate.

Lead Smelting and Refining, with some notes on Lead Mining.

Edited by W. R. Ingalls, editor of *The Engineering and*

Mining Journal, New York. Pages, 321. Octavo cloth,

freely illustrated, including numerous diagrams and draw-

ings. Price \$3, postpaid.

This book comprises a collection of important articles on

Lead Smelting and Refining by eminent authorities, reprinted

from the numerous contributions on the subject which have

appeared in *The Engineering and Mining Journal* during

recent years. The present compilation concentrates in compact form much literature applying to the industry, and also incorporates elaborate descriptions and accounts of the new processes of lime-roasting, including the Huntington-Heberlein, the Carmichael-Bradford and the Savelsberg experiments. The volume is up-to-date in detail and conveys comprehensively the progress and advancement made in other branches of lead smelting that have been developed in the recent past. It embodies valuable information that will materially assist the lead smelter when perplexing problems confront him. Altogether the treatise will prove of great practical utility to smelters and metallurgists.

The Cruise of the "Neptune."—This is a Report of the Domin-

ion Government Expedition to Hudson Bay and the

Arctic Islands on board the D. G. S. "Neptune" in

1903-4, by A. P. Low, B. Sc., F. R. G. S. An idea of its

scope will be conveyed by the following narration of the

titles of its various chapters, which are: I, Voyage to

the Bay; II, Winter Quarters at Fullerton; III, Summer

Cruise of the "Neptune"; IV, Historical Summary;

V, Arctic Islands; VI, and VII, Eskimos; VIII and IX,

Geology; X, Whaling; and XI, Navigation of Hudson

Bay. Appendices give meteorological observations taken;

information relative to birds, eggs, plants, and fossils col-

lected; notes on the physical condition of the Eskimos,

etc. The book contains 345 pages and an index; it is

octavo cloth, and has numerous half-tone illustrations of

scenery, native peoples, and other subjects dealt with in

the letter press, together with a map of the regions

visited. The volume was issued under the auspices of

the Department of Marine and Fisheries, Ottawa, Ontario.

OBITUARY.

Charles A. R. Lambly, Provincial Government agent and

gold commissioner at Fairview, Okanagan, died on January 29,

having succumbed to an attack of pneumonia. Arrangements

for the funeral, which took place at Vernon two days later,

were made by the A. F. and A. M., of which craft he had

been a member. The burial service of the Church of England

was conducted by Rev. J. H. Lambert.

The late Mr. Lambly was born in Megantic county, Quebec,

on May 14, 1852, of English parents. Later he resided in

Bothwell, Ontario, where he was articled to a civil engineer.

After several years engaged in railway engineering he left

Ontario, in 1878, for British Columbia, going via San Fran-

cisco. For 10 years after his arrival in this Province he was

employed chiefly in railway survey work, examining proposed

routes along the Skeena, Peace, Fraser, and other western

rivers. When construction of the Shuswap & Okanagan

railway was commenced he removed to the upper Okanagan

where, at Enderby, his brothers Thomas and Robert were

ranching. Shortly afterward he entered the Provincial Gov-

ernment service, first as assessor and afterward as mining

recorder, gold commissioner, stipendiary magistrate and Gov-

ernment agent. In this service he was stationed successively

at Enderby, Rock Creek, Camp McKinney, Osoyoos and Fair-

view, most of the time at the latter two places, going to

Fairview from Osoyoos in 1899. He held a commission of

justice of the peace when only 27 years of age.

In 1897 he married Miss Hester Haynes, eldest daughter of

the late Judge Haynes of Osoyoos. Beside his widow he

leaves two children, the eldest about 9 years old and the

youngest an infant in arms.

He was a Freemason of some 30 years standing, having

become a member of the craft in 1877, and was one of the

charter members of Enderby lodge. He was a gunner in the

artillery at New Westminster, in the early eighties.

It was, though, in his official capacity, during his long and

efficient service for the Government in the Osoyoos district,

that he was best known, and very few could have filled the

position with the skill and judgment which he displayed.—

Hedley Gazette.

MINING MEN AND AFFAIRS.

Alex. Grant, manager of the Marble Bay mine, Texada Island, was in Victoria recently.

A. A. Watson has removed from Olalla, Similkameen, to Cobalt, Ontario.

Oscar W. Erdal, for the last two years surveyor for the Alaska Treadwell Gold Mining Company, Alaska, died on January 28.

B. P. Little, manager of the Diamond Vale Coal and Iron Company's properties in the Nicola district, was a recent visitor to the Coast.

A large deposit of marble of excellent quality is reported to have been discovered near Mt. Cheam, eight miles from Chilliwack.

R. S. Robmson, late manager for the Slocan Cariboo Mining and Development Company, has left the Cariboo district for Puget Sound, Washington, U. S. A.

H. C. Bellingier is stated to have been engaged to supervise the construction of a smelter in the Greenwater district, California, U. S. A.

H. Harris, who lately resigned as superintendent of the Hall Mining and Smelting Company's smelter at Nelson, will probably shortly go to Mexico.

Selwyn G. Blaylock, for several years at the Canadian Smelting Works, Trail, has succeeded H. Harris as superintendent of the smelter at Nelson.

Lewis Stockett, manager of the Pacific Coal Company's colliery at Bankhead, near Banff, Alberta, visited several mines in West Kootenay early in January.

Anthony J. McMillan, managing director of the Le Roi Mining Company, is expected to remain several months in Rossland after his arrival there from London in February.

W. W. B. Melmes has resigned the post of commissioner for Yukon Territory. Ralph Smith, M. P. for Nanaimo district, is mentioned as his probable successor.

George H. Aylard, part owner and manager of the Standard mine, Slocan, has examined the Queen Victoria mining property situated at Beasley siding, near Nelson.

J. P. Couldrey, brother of the manager of the Le Roi No. 2, has left Rossland in company with R. L. Wright for Goldfield, Nevada, U. S. A.

George Huston, well known throughout the Slocan as a newspaper writer on mining matters, is now employed at a smelter at Mullan, Idaho, U. S. A.

J. M. Ruffner, general manager of the Pine Creek Power Company and the North Columbia Gold Mining Company, Atlin, paid a business visit to Victoria during the month.

Robert R. Hedley has resigned as manager of the smelting works of the Hall Mining and Smelting Company, Ltd., at Nelson British Columbia.

A. G. Larson, superintendent of the Le Roi mine, Rossland, went to Goldfield, Nevada, during January to attend the funeral of his brother, who died there recently.

Melbourne Bailey, manager of the Cariboo Consolidated Company's deep-drift gold mine at La Fontaine, Lightning Creek, has returned to the mine after having spent several weeks on the Coast.

J. B. Hobson, of Bullion, Cariboo, where he is manager for the Guggenheim companies operating near Quesnel Forks, has gone to New York, where are the headquarters of his principals.

Edmund B. Kirby, formerly manager of the Centre Star and War Eagle mines at Rossland but now a consulting mining engineer and metallurgist, has his office at St. Louis, Missouri, U. S. A.

Lewis Hind is spending the winter with his family in Victoria. He will resume work on the Slocan mining properties he has been operating as soon as the snow shall have sufficiently lessened to admit of his doing so.

C. D. Dunlop, of New Westminster, has been appointed an inspector of steam boilers and machinery under the provisions of the "Steam Boilers Inspection Act" during the absence of Inspector Thomas Goldie.

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Maurice M. Johnson, of Salt Lake City, Utah, U. S. A., who in his capacity of consulting engineer for the Dominion Copper Company is an occasional visitor to the Boundary district, was recently at Cobalt, Ontario, for Samuel Newhouse.

H. W. Turner, mining engineer of Portland, Oregon, the writer of an article on mines on Prince of Wales Island, southeast Alaska, which was reprinted in the *Mining Record* several months ago, recently returned from a trip to Prince William Sound.

George W. Grayson, of San Francisco, California, has been appointed superintendent of the Cymru mine, Prince of Wales Island, succeeding A. I. Jones, who is now in charge of the development of the Cuprite Copper Company's property, also on the island.

F. T. Hamshaw, of Hamshaw Bros., New York, who are largely interested in the McKee Consolidated and Amalgamated McKee Creek hydraulic gold mining companies, was in Victoria early in January on his return from a visit to Atlin.

Certificates of efficiency as assayers have been issued by the Provincial Minister of Mines, under the "Bureau of Mines Act Amendment Act, 1899," to the following gentlemen who last month passed the requisite examination: S. E. Belt, P. Bernard, L. H. Cole, J. J. Fingland, George R. Kiddle, H. J. Marshall, Alex. C. MacDonald, and George G. West.

Bertram Mellon has resigned charge of the operations of the Slough Creek, Ltd., at its deep-drift gold mine, Cariboo, and is proceeding to New Zealand on a trip through the mining districts of that country before returning to England. His successor at the Slough Creek mine is H. H. Water, who recently arrived from England.

James R. Brown, mining recorder at Fairview, Okanagan, will temporarily perform the duties of gold commissioner for the Osoyoos mining division consequent upon the death of

Charles A. R. Lambly, late gold commissioner for that district.

Roscoe R. Leslie, formerly of Rosland and afterwards superintendent for the Creston-Colorado Company at Minas Prietas, Sonora, Mexico, has removed to Copperopolis, California, U. S. A.

Gustavo Sundberg, for several years chief chemist and assayer at the British Columbia Copper Company's smelting works at Greenwood, Boundary district, and afterwards at the Alaska Smelting and Refining Company's smelter at Hadley, Prince of Wales Island, Alaska, has taken over from Charles W. Carpenter & Company, assayers and chemists, their Mexico City business.

J. L. Parker, at one time manager of the North Star mine, East Kootenay, and for the last two years manager for the Brown-Alaska Company of New York, with mines at Hadley, Prince of Wales Island, southeast Alaska, and Portland Canal, British Columbia, has retired from the latter position and opened an office at Seattle, Washington, as a consulting mining engineer.

Horace G. Nichols has been appointed manager of the Ymir gold mine at Ymir in Nelson mining division, and is expected to arrive at the mine during February. Mr. Nichols was with the Ymir company at the inception of its gold milling operations. He left Ymir in 1899 and afterwards was with R. Gilman Brown, consulting engineer, first for four years in California and later at the Aramecina mines in Central America.

J. E. Harrington, secretary of the Canadian Metal Company and one of its directors, is expected to reach Nelson about the middle of February, when he will discuss with the manager, S. S. Fowler, matters connected with the company's zinc smelter a Frank and Blue Bell mine at Ainsworth. At the latter development is being continued with satisfactory results and the construction of the concentrating plant is being proceeded with.

White Jacket Safety Blasting Fuse

MESSRS BICKFORD, SMITH & CO., Limited, are the ORIGINAL manufacturers of Safety Blasting Fuse which was invented in 1831 by the late William Bickford. WHITE JACKET FUSE is their LATEST invention, replacing Blue Jacket. It is the best fuse on the market being superior to the so-called Gutta Percha, Single Tape, and Double Tape Fuses. Stands twenty-four hours immersion in water, rough handling, and rapid changes of climate and temperature. The burning speed is very regular, it never runs, neither can the burning stop.

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

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

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

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

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

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

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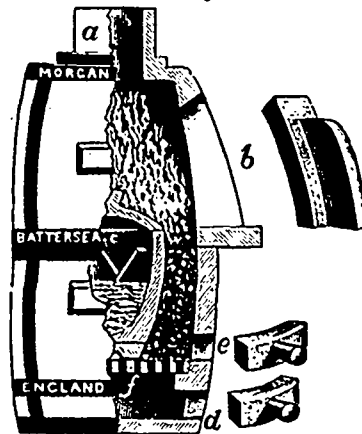
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