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MINING RECORD

ESTABLISHED 1895

VOL. XIII.

AUGUST, 1906.

No. 8

BRITISH COLUMBIA MINING RECORD

E. JACOBS,.....Managing Editor

Devoted to the Mining Interests of the Pacific Northwest.

PUBLISHED ON THE 15TH OF EACH MONTH BY

THE BRITISH COLUMBIA RECORD, LIMITED

VICTORIA, B. C.

Office—Province Building. Telephone 213. P. O. Drawer 615.

ADVERTISING AGENCIES:

London, England: E. Henderson & Co., Billiter Square Buildings,
Denver, Colorado: National Advertising Co., 423-124 Quincy Building,
San Francisco, California: E. C. Dake's Advertising Agency, 1001 Mas-
onic 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 distance from Dawson, Yukon, to Chena, on the Tanana River, Alaska, is 809 miles.

The Providence Mining Co., of Greenwood, Boundary district, is again on the list of dividend payers of the Province.

Preparations are in hand for thoroughly testing the gold values contained in gravel forming the bed of the Fraser River in Lillooet district, in the first instance by a Keystone drill.

Some 30 men are employed on the Great Cariboo Gold Co.'s deep-drift property on Lightning Creek. The shaft is down 195 ft., and it is stated that a short drift from it will reach the pay gravel.

The Kaslo *Kootenaiian* remarks: The recent rich strike at depth in the Rambler will prove a boon to the Silvery Sloean. We know of two influential companies in the district to shortly begin deep development.

Some 15 men are employed on the hydraulic gold mining property being operated on Lorne Creek, a tributary of Skeena River, which stream it joins between Kitsilas Canyon and Hazelton. Work here is reported to be resulting satisfactorily.

From the *Phoenix Pioneer* it is learned that about the middle of August another mine was added to the list of shippers from that camp—the Idaho. There seems to be no doubt that the Idaho will produce an immense tonnage of ore in the future.

The Brown-Alaska Co. has made its first shipment of ore from the mining property at Maple Bay, Portland Canal, it is operating. The ore was sent to the Alaska Smelting and Refining Co.'s smelter at Hadley, Prince of Wales Island, Southeastern Alaska.

The Mining and Scientific Press of San Francisco, California, with prompt courtesy, acceded to our request for the loan of the three engraving blocks appearing in this issue in connection with Mr. H. W. Turner's interesting article on "Ketchikan, Alaska."

After a year's shut-down, the Stenwinder mine at Fairview is preparing for extensive development, and a gang of men is engaged in excavating the rock on the south side of the 46-stamp mill for a foundation for a large air compressor which is now on the way.

The London *Critic* thus advises an enquiring correspondent: Hold your Ymir's for a recovery. The fall is due to the disappointing nature of the crushing returns, but developments in the mine continue favourable, and you should see your price again in the near future.

The *Free Press* states that the Elk River Coal and Oil Co., Ltd., formed some years ago by Fernie residents for the purpose of holding a large block of coal lands in the upper Elk Valley, has been reconstructed, and is now incorporated under the Companies' Act, 1897, as The Elk Valley Coal Co., Ltd.

The management of the Hall Mining and Smelting Co., says the *Nelson Daily News*, state that No. 2 furnace at the smelter is now completed and ready to be blown in as already announced it would be by September 1, but owing to the shortage of suitable men a delay is necessary until such men can be obtained.

Among a number of papers to be submitted at the seventeenth annual meeting of the Institution of Mining Engineers at Hanley, Stafford, England, during September, is one on "Development of Placer Gold Mining in the Klondike District, Canada," by Mr. J. B. Tyrrell, mining engineer, formerly of Dawson, Yukon, but now of Toronto, Ontario.

The special gold medal offered by Mr. E. W. Widgown as a prize for the best district collection of ores to be exhibited at the Fall Fair at Nelson, B. C., on September 19-21, is in the form of a miner's pan, containing nuggets supported by pick and shovel and surmounted by the Canadian beaver. It is made of gold from the Second Relief mine at Erie.

Mr. Geo. W. Cornish, of Greenwood, is getting together a representative collection of Boundary district ores for exhibition at the Fall Fairs at Nelson, B. C., and Spokane, Washington. The Boundary has for years made a creditable display of ores at Spokane, but this year's collection will probably be the largest and most comprehensive yet exhibited there.

The chief engineer on the Great Boulder Proprietary, Kalgoorlie, Western Australia, has patented an ingenious device for the treatment of mill residues. The machine, which is really an atmospheric filter, is to be known as Ridgway's continuous slimes process, and

is said to be doing good work on the mine. The inventor claims that the machine can treat 50 tons a day.

From the *Free Press*, published at Fernie, South-east Kootenay, the centre of the operations of the Crow's Nest Pass Coal Co., Ltd., it is learned that there is a steady immigration to Fernie of wives and children of English miners, who came earlier to get homes ready for them. The C. P. R. officials report a heavy passenger list among this class of people lately.

The advantages of the Huntington-Heberlein process for lead smelting are stated to be mainly cheapness in roasting, good metallurgical recovery, and a product very suitable for the blast furnace. It is also customary to smelt with a much higher lead percentage in the charge in the blast furnace, making it possible to obtain a better lead recovery in this part of the process as well.

The average analysis of domestic and steam coals from the Crow's Nest Pass Coal Co.'s Coal Creek mines is: Moisture, 0.75 per cent; volatile matter, 25.15 per cent; fixed carbon, 69.39 per cent; sulphur, 0.50 per cent; ash, 4.21 per cent. This company's coke averages: Moisture and volatile matter, 1.02 per cent; fixed carbon, 88.14 per cent; sulphur, 0.75 per cent; ash, 10.09 per cent.

In view of the possible importance of the discovery of gold in the Peace River District, recently reported, the accounts of that country reprinted on pp. 318-324 of this month's B. C. MINING RECORD will probably be regarded as of present interest. For the use of three of the blocks used to illustrate the article—those on pp. 318, 322 and 323—we are indebted to the courtesy of the Provincial Bureau of Mines.

With regard to varying statements that have appeared in the press concerning a Geological Survey appointment affecting Professor R. W. Brock's official status—Mr. Brock has been promoted to the vacancy caused by the advancement of Mr. A. P. Low to the position of deputy head and director of the survey. This promotion places Mr. Brock on the same footing in the department as that of the older group of geologists associated with the survey:

A portable acetylene lamp, invented by Mr. H. Basille, is described by the "Revue Generale de l'Acetylene" of August 25. The generator can be carried on a waist belt or otherwise, and is connected by a flexible tube with a burner and reflector mounted on a kind of frame or elastic helmet placed on the head or hat in such a way that the burner is nearly in

front of the forehead of the person who requires a good light to work.

From the *Cranbrook Herald* it is learned that it is the intention of the majority of shareholders of Sullivan stock in East Kootenay to combine and appoint Mr. James Findlay to represent their votes by proxy at the next shareholders meeting of the Sullivan Group Mining Co., which will be held in Spokane on September 22 next. Some important measures will be brought up for discussion at that meeting which will benefit shareholders to an enormous extent.

Mr. Chas. Biesel, manager of the Snowshoe mine, Boundary district, for the lessee (the Consolidated Mining and Smelting Co. of Canada) is gradually finding room for more men in the mine as the water is lowered. He now has about 45 employed, having put on a night shift as well. The larger air compressor—the high pressure half of a 30-drill Rand-Corliss compound engine—is now in use. Ore is being shipped to the lessee company's smelting works at Trail.

"Because of the good name which the product of the Crow's Nest Pass Coal Co. has gained for itself," says the *Fernie Free Press*, "certain inferior coals have been foisted on the public with the name 'Crow's Nest Coal.' This has made it necessary for the above company, in order to protect itself, to register the names 'Crow's Nest Coal' and 'Crow's Nest Coke.' This has been done, and in future the Crow's Nest Pass Coal Co., Ltd., will have the exclusive right to apply these names to their high class products."

The following is a press dispatch published lately: "Reports from the Granby Consolidated Mining, Smelting and Power Co., Ltd., for the year ended June 30 last, indicate net earnings to have been more than \$1,800,000. Copper production was just under 25,000,000 lb. Next year a further increase is expected—it is even estimated by one director that it will be more than twice last year's. Stock in the company is held by 2,500 persons, as against 900 in 1903. The annual meeting will be held in New York City on October 2."

The American Boy mine, which has been closed down since the accidental death last spring of the late Mr. Thos. McGuigan, who had managed it for years, is to be operated again, Mr. W. E. Zwicky, of Kaslo, manager of the Rambler-Cariboo mine, having taken charge of the American Boy as well. The mine is owned by the American Boy Mining Co., of Spokane, Wash., reorganised some months ago with its stock on an assessable basis. Assessments since made have brought in sufficient money to do necessary development work. During several years shipments of silver-lead ore of good grade were made from this mine.

The statement published in Vancouver to the ef-

fect that Mr. Thos. Kiddie, metallurgist, left Victoria on August 25 for the North was evidently made under a misapprehension, since he is still in Victoria. Mr. Kiddie has entered into an agreement with the Alaska Smelting and Refining Co. to take the general management of its smelter at Hadley, Prince of Wales Island, Southeastern Alaska, but the date of his leaving to assume charge remains in abeyance for a short time, by mutual agreement between the parties immediately concerned, pending the completion of certain business arrangements.

The Spokane and Trinket mineral claims, owned by a Spokane, Wash., company, and situated about a mile and a half from Ainsworth at an elevation of nearly 1,000 ft. above Kootenay Lake, have been leased by Mr. G. H. Barnhart and are being worked after having lain idle for eight or nine years. The lead crossing the claims is a bedded vein in schist and it has been traced on the surface for about two miles, the ore occurring in lenses and shoots. It is a solid coarse-cube galena, the pay streak varying in thickness from 3 to 24 in. The owning company when operating the property shipped three or four carloads of ore which gave a return of 60 to 70 per cent lead and an average of 30 oz. silver per ton.

A new strike of about a foot of clean ore running high in silver and lead values has been made in the Alamo mine of the Idaho-Alamo Consolidated Mines, Ltd., an English company under which were consolidated the old Alamo and Idaho mines, formerly among the largest producers in the Slocan district. The provincial mineralogist, after having visited the property some time since, reported that the Alamo had been developed for a vertical depth of 288 ft., by four levels driven from 1,000 to 1,200 ft., and systematically laid out with raises, etc. Above these levels the known ore had been extracted, but there was good ore in the floor of the bottom level and in a winze. The vein was from 3 to 8 ft. wide. The last shipment made was in 1898, when the output was about 400 tons of ore running 180 oz. silver per ton and 40% lead.

Commenting upon the value of gold-bearing gravels of Yukon streams which can be worked, Mr. F. T. Congdon, who appeared before the Railway Commission at Dawson in the capacity of legal adviser of Yukon Territory, said: "In California and other places they work gravels which yield less than 5 cents per cu. yd. We have in the Yukon an enormous extent of gravel which will yield as high as 10, 15 or even higher cents per cu. yd. This area will be worked as the cost of mining is reduced. There are four dredges in actual operation and three in course of construction, but there is no good reason why in the course of a couple of years 100 dredges could not be installed. Each dredge would give permanent employment to between 15 and 20 men, and this without in any way interfering with the mining industry as it is now carried on."

Mr. Stanley Searce, a Dawson merchant, who gave evidence at the session of the Railway Commission held recently at Dawson, when questioned about the population of the Yukon Territory, said: "I think the population of Dawson is from 2,000 to 3,000 people. Tributary to Dawson, Selkirk and Fortymile it is about 5,000, and on the Klondike creek, 6,000." He remarked, further, that: "Great changes have come about during the past three years. Today we must depend upon the installation of dredges and other machinery. Indeed, local merchants now derive their revenue from the installation of these large works." He added: "I believe that 6,000 tons of machinery will be shipped into this country every year for many years to come if the White Pass Railway reduces its rates. I think if we get lower rates many of the more distant creeks which now lie idle will be thoroughly worked."

In its "Behind the Scenes" comments the *London Critic* of August 18, made the following reference to what it designated "Quiet Rossland": "Mr. Stuart Cumberland is back in London looking well after his trip to British Columbia. In the course of a brief chat Mr. Cumberland informed me that Rossland, the centre of the British Columbian mining industry, is very quiet. The mines owned by the English companies are, he says, looking well, and some of the locally owned properties are giving good results. All the money necessary for the development of good mines is available in Canada, and I gather from Mr. Cumberland that Rossland now considers itself quite independent of London capital. It is, of course, a deplorable fact that most of the Rossland properties taken up by London capitalists were grossly over-capitalised, and their dividend-earning prospects ruined in consequence."

At the Centre Star mine which, together with the adjoining War Eagle mine at Rossland, is owned by the Consolidated Mining and Smelting Co. of Canada, electricity is to be substituted for steam for driving the big air compressor. For this purpose a Canadian Westinghouse Co.'s 650-h.p. type CCL induction motor, 180 r.p.m., 2,000 volts, 3-phase, 7,200 alternations, has been ordered and is due to reach Rossland in September. The 40-drill compressor, to be altered to two-stage air to meet the changed conditions, is a Canadian Rand Drill Co.'s compound steam engine with steam cylinder 22 by 40 by 48 and air cylinder 36 by 22 by 48. To the 30 by 60-ft. building an L-shaped addition has been made, dimensions 60 by 76 ft., to make room for the motor and also for the War Eagle 25-drill Ingersoll-Sergeant electrically-driven compressor which is to be removed to the Centre Star power house. The cement concrete foundations for the machines have been completed, and the above-mentioned changes will be made shortly.

The following information relative to the Iron Mask mine, situated near Kamloops, and owned by a company incorporated in England, has lately been

published in a provincial newspaper, which quoted the superintendent of the mine as its authority: The mine is situated about five miles from Kamloops. It is developed to a depth of 700 ft., with long drifts at the 200, 300, 400, 500 and 600-ft. levels. At the 500-ft. level the ore body is 68 ft. wide, and at the 600-ft. its width is 108 ft. Formerly the company operated a concentrator and a small smelting furnace, but latterly the grade of the sulphide copper ore has increased sufficiently to make it profitable to send the entire output to the Trail smelter, to which previously only the higher grade ore was shipped. The ore yields about \$25 per ton net profit. About two carloads daily or some 1,800 tons per month are shipped, traction engines and horse teams both being used in hauling it to the Canadian Pacific Railway, three miles from the mine. A year ago only about 60 men were employed at the Iron Mask, but now there are 160 on the payroll.

As the result of negotiations to secure the cancellation of the contract made last year, under which the whole output of the Le Roi mine at Rossland has since been shipped to the Trail smelter, an agreement has been reached which provides for a cessation of shipments from this mine to those works after some 50,000 or 60,000 tons more ore shall have been delivered at Trail. It is the intention of the Le Roi management to again smelt the ore from its mine at its company's smelter, situated at Northport, Washington, about ten miles south of the international boundary line, and eighteen miles by rail from Rossland. The increased output of the Centre Star and War Eagle mines, the resumption of production at the Iron Mask mine, also at Rossland, and the shipment of ore from the Snowshoe mine in the Boundare, together with the ordinary receipts from other sources, will provide sufficient ore to keep the Trail copper furnaces running. Preparations for starting some of the furnaces at Northport are in hand, and the smelter manager, Mr. A. I. Goodell, is confident he will save money for the company by smelting the Le Roi ore at its own works.

The following comment on "Cariboo Activities" is from the *London Critic*: Quite a flutter of excitement has been caused in the Cariboo district of British Columbia by the announcement that the Guggenheims—wealthy capitalists, whose name is a household word on the "other side"—have acquired important interests in the placer mines, and intend to spend large sums of money in operating them. For many years several of the placer mines in the district have been hampered through lack of water in the summer, and it is the intention of the Guggenheims to build some sixty or seventy miles of ditches and flumes to provide the necessary water. With the improved facilities promised, these placer mines should again bring the vast fields of placer gold into prominence, and the wonder is that capitalists have not before tackled these deposits in a systematic manner. The shareholders in such enterprises as the

Slough Creek, Cariboo Consolidated, and Cariboo Gold Fields will watch the new developments with interest, and maybe the Guggenheims will in time devote their attention to the deep lead possibilities of the district.

Mr. F. E. Simpson, editor of the *Cranbrook Herald*, lately paid his first visit to the Boundary district. The following excerpts are from his description of that section of British Columbia: The Boundary country is a wonderful section. Talk about riches! Why, the wealth of the Boundary country is still unknown. 'Tis true, already thousands upon thousands of dollars are being paid out each month for wages, but a beginning has hardly been made. There is copper in such vast quantities that even now, with all that has been done to meet the demand, the smelter capacity is inadequate. There are other minerals, and the sale of a mine today or tomorrow for \$50,000 or \$250,000 no longer causes comment. . . . Phoenix has a population of about 1,500, and a payroll of over \$60,000 per month. There are 700 men employed in the mines. . . . Greenwood is surrounded by enough wealth to make it a Denver. And the man who thinks Greenwood is not to have further growth is badly mistaken. It has mines in every direction, and smelters, too, and they are only a start to the transformation into one of the greatest mining camps on the American continent.

Dr. Robert Bell, F. R. S., chief geologist of the Geological Survey of Canada, has returned to Ottawa from a three months' visit to Europe, the greater part of which time was spent in England in examining the more important coal and iron deposits and obtaining information relative to methods of treatment of the ores, particularly at Middlesboro, in the north of England. The noted geologist also made special inquiry concerning methods of preparing peat for market. While in England he received the gold medal of the patron of the Royal Geographical Society, a decoration given each year by the King to the scientist or explorer recommended for it by the council of the society. The award on this occasion was made to Dr. Bell in acknowledgment of the great public service he has done in his geographical work spread over about half a century. The recipient of this year's medal has received numerous congratulations upon this well-merited recognition of his distinguished and valuable services, and there are many residents in British Columbia and other parts of Western Canada who gladly join in felicitating Dr. Bell upon the honour thus done him.

The following paragraph was recently published in several of the newspapers of the Province: "An assay of ore sent to Baker & Co., of Newark, N. J., by McRae Bros., owners of the Hamilton claim, Kennedy Mountain, returns 60 oz. in platinum per ton and 28 per cent copper." In view of the following comment of the provincial mineralogist (*vide* "Annual Report of the Minister of Mines for 1905," p. J23)

it would appear that it will be well to first have a check assay made elsewhere before taking it for granted that the assay returns above given are dependable. The provincial mineralogist remarked: "A number of finds of platinum 'in place' have been reported. Some of these were assayed by Baker & Sons, platinum refiners, of Newark, N. J., who reported finding considerable amounts of platinum, but upon close examination by this bureau, confirmed by the laboratory of the Canadian Geological Survey, of the identical ore assayed by Baker & Sons, no platinum could be found. As this has happened two or three times before, the conclusion is forced that assays made in a platinum refinery are apt to get contaminated by the dust produced by processes of manufacture."

The *Nanaimo Herald* quotes Mr. Thos. R. Stockett, Jun., general manager of the Western Fuel Co., as having stated that it is the company's intention to reopen the Brechin mine about October 1. It may be later, but it is the intention of the company to resume hoisting coal this autumn and that as soon as it can see its way clear to continuously maintaining operations in this mine, which is known officially as No. 4 Northfield mine. It is opened by two slopes driven parallel to each other, one being the travelling road in and out of the mine and the other the main slope up which all the coal is hauled. At Northfield Point, Departure Bay, north of Nanaimo, a shaft has been sunk 60 ft. and from this the slope has been driven under the bay in the Newcastle seam towards Newcastle Island, connecting through the old Fitzwilliam slope with the shaft sunk in the centre of the island in 1899 and which cut the Douglas seam of coal at 324 ft. down and the Newcastle seam at 384 ft. The coal mined at No. 4 Northfield is described as being "very good, hard and bright, similar to that from the lower seam in No. 1 (Nanaimo) and Protection Island mines. It varies in thickness from 2 to 3½ ft., and is worked on the long-wall system."

The recent action of the Hon. the Minister of Mines for British Columbia, in authorising Mr. Herbert Carmichael, provincial assayer and assistant provincial mineralogist, to visit the Big Interior group of mineral claims, situated in the interior of Vancouver Island, will in all likelihood result in the Alberni mining division ere long deriving the benefit of capital being interest in the promising mining property mentioned. The probability of such a desirable outcome soon following the publication of a thoroughly dependable general description of that property has been greatly increased by the action of the hon. minister in permitting Mr. Carmichael to furnish the requisite information immediately after his return from Alberni. This departure from what has been the usual custom of the department, viz., to hold over information of this nature until the publication in ordinary course of the "Annual Report of the Minister of Mines," is commendable and constitutes a precedent that may well be followed, for the sooner

official information of such an encouraging nature becomes available to the public the greater the probability of its leading to the provision of capital indispensable to the opening up and proving of the value of large bodies of mineral.

Ainsworth camp has taken on new life. More development work is being done and more mining properties are shipping ore than for ten or twelve years. Not only so, but arrangements are being made to shortly resume work on still others, so that the outlook for this, the oldest lode mining camp in the Kootenay, is distinctly promising. Among those being developed, some of which are producing ore, are the Highland, Highlander, United, No. 1, Krao, Albion, Tariff, Donald, Spokane and Trinket, and Maestro. The Krao is attracting most attention; it is owned by Mr. A. D. Wheeler and prior to his resuming work on it last year it had been idle since the early nineties. Last year more than 1,000 tons of silver-lead ore were mined from open workings near the surface. Lately the underground workings were unwatered, these comprising a shaft 130 ft. in depth and a 250-ft. drift. A shoot of clean galena, 4 ft. in width, was cut soon after work was commenced in the drift, and concentrating ore was found to occur for 11 ft. beyond, with the footwall not reached. Much of the ore, so it is stated, carries silver at the rate of about 70 oz. to the ton, and there are streaks remarkably rich. Two tons of picked ore sent to the Hall Mining and Smelting Co.'s smelter at Nelson is described as being the richest silver ore ever received at those works.

The Cariboo district was recently visited by Mr. J. A. Macdonald, leader of the Opposition in the Provincial Legislature, a lengthy interview with whom has been published in the *Rossland Miner*. Summarised, his conclusions at the close of a three weeks' trip are: Ordinary placer mining in Cariboo is largely a thing of the past, but with hydraulicking and deep-drift mining on the large scale undertaken by a number of partnerships and companies, there is ample reason to expect that the district will again become as great a gold-producer as in its most productive days, when individual miners recovered much gold. The class of mining now being done involves a preliminary expenditure of large sums of money. The outlay on the Cariboo hydraulic property, owned by the Guggenheims, had been large for years before they acquired it, and considerable further expenditure is being made to bring in a vast quantity of water for hydraulicking purposes. Other properties have also had much money spent on them to make them productive. The chief need of the district today is a railway, the freighting of machinery and supplies from the Canadian Pacific railway at Ashcroft to Bullion, 200 miles, or Barkerville, 280 miles, almost doubling costs. At present there is a great scarcity of labour all through the district. Amendments to the placer mining laws and regulations are required, new conditions making amendments absolutely essential to encourage investment of needed capital.

It is announced that the Iron Mask mine at Rossland has been purchased by the Consolidated Mining and Smelting Co. of Canada. This mine was operated for several years by the Iron Mask Gold Mining Co. of Spokane, Wash., during which period some 7,000 ft. of development work (including a 450-ft. shaft) were done and 17,655 tons of ore shipped. Operations were profitable, but in 1899 the company brought suit against the Centre Star Mining Co., the question involved in the action having been that of extra-lateral rights claimed by the defendant company under the old location law. The action attracted widespread notice at the time, and among the expert mining engineers called to give evidence were the late Mr. Clarence King, Dr. Rossiter W. Raymond, Mr. Louis Janin, and others. The case was adjourned; afterwards an agreement was reached by the litigants and a settlement effected out of court. The heavy cost of the proceedings, though, seriously embarrassed the Iron Mask Co., which continued operating its mine until the summer of 1901, having meanwhile raised money by assessment of its stock and by borrowing. Since that time the mine has not been worked. It passed into the possession of D. C. Corbin, of Spokane, who acquired it by foreclosure of a mortgage. Now it has been sold outright to the Consolidated Co., also owning the adjoining Centre Star and War Eagle mines, from the workings of one of which the Iron Mask ore shoots will be explored and mined.

It is pleasing to find that the high-grade Portland cement made at Tod Inlet, Vancouver Island, by the Vancouver Portland Cement Co., Ltd., of Victoria, B. C., has come into general favour for use in British Columbia and other parts of the Northwest. The demand for this material has increased to such an extent that notwithstanding the doubling of the capacity of the plant effected some time since the whole output of the works finds ready sale. In the introduction to his description of these works, published in the "Annual Report of the Minister of Mines for 1904," the provincial mineralogist made the following comment: "The success of the enterprise is largely assured by the personnel of the company, who are not amateurs in the business, but men who have for years been successfully engaged in the same class of manufacture in Ontario and who, before embarking on this new enterprise, have brought their Eastern experience to bear on a quiet but thorough investigation of the natural deposits and the facilities, and also of the probable market for the finished product." This forecast has been realised, as is amply demonstrated by the existence of a steadily extending market for the cement. The general use of this cement at mines, smelters, power stations and other places where building was in progress was noted during a recent visit to Kootenay so it will be seen that the demand is by no means restricted to the coast. On the contrary, much of this material is shipped to distant parts, and the outlook for this industry is distinctly satisfactory.

PAPERS FOR THE JOURNAL OF THE CANADIAN MINING INSTITUTE.

AMONG a number of papers contributed by members of the Canadian Mining Institute for inclusion in the *Journal* of that institution are several dealing with subjects connected with the mining interests of British Columbia and Yukon Territory.

The paper by Mr. Frederic Keffer, engineer in charge of the several mines of the British Columbia Copper Co., entitled "Notes on Diamond Drilling in the Boundary District," is well-timed, prospecting by means of the diamond drill being regarded with growing favour as a fairly effective and, at the same time, comparatively inexpensive means of exploring for minerals.

Mr. R. G. McConnell's "Note on Windy Arm Silver Bearing Veins" has been anticipated in large measure by his report on "Recent Mineral Discoveries on Windy Arm, Tagish Lake, Yukon," issued by the Geological Survey of Canada early in the current year, still it presents in brief form a general survey of that district, which is steadily increasing in promise of soon becoming productive.

Mr. J. B. Tyrrell's paper on "Yukon Mining Laws" presents some of the main provisions of the laws which have been in force for the past eight years, and points out the advantages and disadvantages of those provisions from the point of view of one who has had an extended experience and intimate knowledge of the practical results of their operation. How far the position will be affected by the recently adopted "Yukon Mining Code" can only be shown by a careful survey of the changes made since Mr. Tyrrell's paper was submitted to the Institute.

Mr. W. M. Brewer's "Observations Relative to the Occurrence of Deposits of Copper Ore on the Pacific Coast," give information gathered by that observant mining engineer during eight years' business connection with coast mines.

Of general interest throughout the mining districts of Canada is Mr. Tyrrell's paper on "A Canadian Department of Mines or Geological Survey." This subject being a "live" one at the present time, this paper is also reprinted in this month's *MINING RECORD*, as, too, are Mr. Mortimer Lamb's conclusions regarding the establishment of a Federal Department of Mines.

The paper by Dr. Frank D. Adams, of McGill University, Montreal, "On the Need of a Topographical Survey of the Dominion of Canada, Particularly With Reference to the Development of the Economic Resources of the Dominion," is another timely contribution, indicating the great desirability, considerable economy, and permanent benefit of such work being undertaken systematically instead of having it done piecemeal and disconnectedly, as under present and long-existing far more costly conditions.

Mr. D. B. Dowling's "Notes on the Utilization of Poor Coals and Slack" give some interesting com-

parative results of steam and gas tests, with the object of showing that even the poorest lignite has as a gas producer a value equal in power production to that of a good steam coal when used in the steam plant. The coals used in making the tests were chiefly lignites from Manitoba and Alberta, and comparison is made with tests made at St. Louis by the United States Geological Survey of coals from various States, a selection of results in half a dozen cases that appeared fairly comparable having been made by Mr. Dowling.

There are, of course, other valuable papers, but the foregoing brief summary may serve to indicate that the advance sheets of those lately distributed for discussion are well worthy of the notice of western mining men.

ANACONDA COPPER MINING CO'S WASHOE SMELTING PLANT.

AT THE meeting of the American Institute of Mining Engineers held in London, England, in July, a description of "The Washoe Plant of the Anaconda Copper Mining Co. in 1905," by Mr. L. S. Austin of Houghton, Michigan, U. S. A., was submitted. This interesting paper has since been published in its "Bi-Monthly Bulletin" (No. 10, July, 1906,) by the Institute, together with a number of illustrations. The following brief extract will serve to convey some idea of the magnitude of the operations at the smelting works dealt with in much detail by Mr. Austin in his valuable contribution to the "Transactions of the American Institute of Mining Engineers."

The various improvements in the Washoe plant have resulted in a largely increased production in 1905 above that of the preceding year. In 1904 there was treated daily 5,500 tons of smelting and concentrating ore, yielding an output of 350,000 lb. copper. In 1905 the plant handled 7,000 tons of ore daily, the resultant output of copper being 500,000 lb. The following was the average monthly output in 1905: Copper, 15,000,000 lb., at 18.53 cents per lb., \$2,780,000; gold, \$95,000; silver, \$432,000; total, \$3,307,000.

The monthly payroll during 1905 amounted to \$215,000. The average number of men employed in all departments at Anaconda was 2,450. The following data of daily operations may be of interest: Ore treated, 7,000 tons; coal consumed, 600 tons; coke consumed, 400 tons; limerock used, 1,600 tons; flue-dust produced, 190 tons; slag and tailings produced, 9,000 tons; yield of copper, 500,000 lb.

About 11,700 tons of ores, limerock, coke and coal are brought in daily by railroad cars, the switching being done on tracks of the Oregon Short-Line railroad. The ores and limerock come in 50-ton hopper-bottom or gondola cars. Deliveries of ores and limestone are made to bins or pockets, having outlet-chutes for drawing off the ore. Counting rehandled materials twice, more than 13,000 tons are handled about the works by means of 13 compressed-air locomotives, 12 weighing 13 tons each, and one 21 tons.

SECOND RELIEF MINING CO., LTD.

THE DIRECTORS of the Second Relief Mining Co., Ltd., of Nelson, submitted to the shareholders at the annual general meeting held on 4th inst. a decidedly satisfactory report on the company's operations to June 30 last. From the brief account of the meeting, printed on another page of this issue, it is learned that the subscribed capital was \$20,000 and the net profits to June 30 \$23,036.52, plus the net value (estimated at \$7,000) of about 18 tons of concentrates at the mine awaiting shipment. Last December the B. C. MINING RECORD published the following information relative to this company's property:

The Second Relief property is owned by the Second Relief Mining Co., Ltd. It is located on the north fork of Salmon River, about 13 miles from Erie, in the Nelson mining division. The company operating it was incorporated in March, 1905, under the laws of British Columbia for the purpose of acquiring the property from the Relief Gold Mining Co. The mill has been kept running steadily since the middle of April, making a profit above operating expenses. Late development work in the mine has resulted very satisfactorily and a materially increased profit will be made during the coming year.

The mine is worked through three adits, the lowest one giving a depth on the vein of about 400 ft. The ore consists of pyrrhotite in a quartz and greenstone gangue. There is sufficient ore blocked out on three sides to keep the mill running four to five years, and on two sides sufficient for several years more. The ore is conveyed to the mill by a gravity tramway 650 ft. in length. The plant consists of a 10-stamp mill, with 9 by 15 in. Blake crusher, amalgamating plates, Wilfley table, Frue vanners, cyanide plant (the latter not at present being operated), and 14-drill air compressor. The mill and compressor are driven by three Pelton water wheels under a head of 190 ft., the water being brought in a flume a distance of nearly two miles.

The results of the year's work are as follows: Development work done, sinking and raising, 160 ft.; cross-cutting and drifting, 550 ft.; total 710 ft. Ore produced 5,582 tons; shipped as crude ore, 22 tons; milled, 5,560 tons; concentrates shipped, about 400 tons. The average yield of the ore in the mill has been about \$10 gold per ton during 1905. Of the gold recovered 75 per cent was by amalgamation, and 25 per cent in the concentrates.

THE OUTLOOK FOR COPPER.

COPPER MINING should continue to be a profitable industry during the remainder of this year and through the greater part of next. This is the conclusion arrived at by leading authorities on the copper situation. Writing to the *Commercial*, of Boston, Mass., Mr. Geo. L. Walker says:

"The copper market is much more active, but prices are unchanged. Lake is selling at 18¾ cents and

electrolytic at 18½ cents per lb. Sales are being made at these prices for October, November and December account, considerable copper having been sold recently for delivery during the last month of the year. There is very little spot copper for sale, and it is not impossible that 19 cents may be paid for cash deliveries before the end of September."

A gentleman in close touch with the metal situation says: "The demand for metal during the month of August has been very heavy, and enormous sales of electrolytic for future delivery have been negotiated. These sales were made on a basis of 18½ cents, but with a continuance of anything like the present demand an advance in prices is certain. Both foreign and domestic consumers have been active buyers of the metal.

"The consumption of copper is increasing and there are practically no stock of the metal on hand. Owing to the scarcity of labour at all of the mining camps, the total production of copper at the end of the present year will show very little, if any, increase over 1905."

The fact that copper is being sold at 18¾ cents for December delivery makes it quite certain that the average price for this year will be fully 18½ cents per lb. At this price Europe and America will absorb the largest year's production in the history of the copper trade, aggregating as it will approximately 1,500,000,000 lbs. At the present moment the prospect is good that this price will be maintained during the greater part of next year.

Mr. Walker remarks further: "The copper mines of the United States, Mexico and Canada should produce this year approximately 1,200,000,000 lb. of copper at an average cost of 9½ cents per lb. This product will be sold at a net profit of \$108,000,000.

In the presence of Professor Parks, of Toronto University, a nugget weighing 800 lb., and containing 70 per cent of silver, was taken from a newly-discovered vein, 5 ft. wide, at the surface of the Cobalt mine, Ontario.

An extraordinary rich discovery of gold and silver has been made at a distance of three miles from the line of the Ontario Government railway, just north of the Hudson Bay watershed. Samples assayed by Government officials show a yield of 411 oz. to the ton of gold and 40 oz. to the ton of silver.

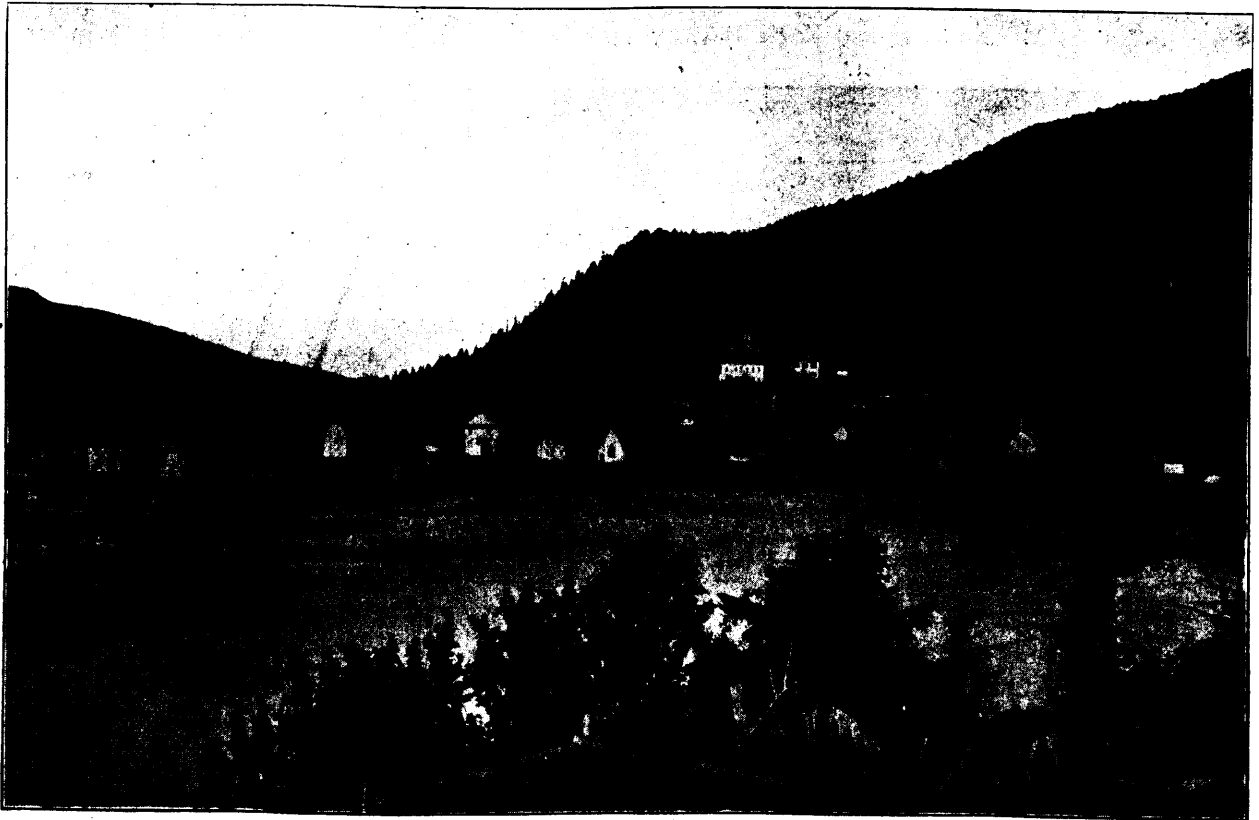
Mr. F. Aug. Heinze, the well-known copper mine operator, is reported to have recently said, in the course of his response to the toast of his health at a dinner at Boston, Mass.: "I can congratulate everybody who is interested in any way in the copper industry or in the metal because I believe that the future of copper is indissolubly connected with electricity. Electricity is practically the barometer of the progress of civilization, and there is no question that the production and development of copper resources cannot possibly keep pace with the demands of civilization for that metal."

KETCHIKAN, ALASKA.

THE MINING AND SCIENTIFIC PRESS of San Francisco recently published the following article, written for its columns by Mr. H. W. Turner, of the Ladds Metal Co., Portland, Oregon, U.S.A. For some time Mr. Turner was in charge of the mining operations of the Omar Mining Co., near Kiam, Prince of Wales Island, so has intimate knowledge of conditions at the Khayyam mines, of which he writes in particular, as well as dealing with the Ketchikan district in general. The steady expansion of business connections between Prince of Wales Island and Vancouver Island smelters makes particulars of mining in Southeast Alaska

quite bare of vegetation or soil; this denudation probably being the result of the scouring of glaciers that appear to have covered these islands at one time. Rocks near the shore, which have been protected from weathering by gravel and sand, show glacial grooving and striations plainly and the lake-beds of Prince of Wales Island appear likewise to be ravines dammed up by glacial detritus.

"The bottom of the numerous inlets of the sea and interior sounds is a marvel of marine life, star-fish of various colours, sea anemones, and even corals are to be noted. These deep, narrow inlets or fiords are an important feature of the region, permitting, as they do, steamers of 20-ft. draught to reach nearly all the camps on the islands. Water transportation allows



Ketchikan, Southern Alaska.

of increasing interest to British Columbia, so the following article is reprinted, with the kind consent of the *Mining and Scientific Press*, for the information of readers of the B. C. MINING RECORD:

"Ketchikan is situated on Revillagigedo Island, in extreme Southern Alaska. It is the first port of entry reached by the Alaska steamers and is the distributing point for Prince of Wales, Gravina, Annette, and other adjoining islands.

"The climate is warm and excessively moist, rain falling during the greater part of the year. Snow seldom lies long at the sea-level, but at an altitude of more than 2,000 ft. there is usually a heavy covering during six months. The slopes of the ridges are steep and rugged, but well covered with coniferous trees up to about 2,000 ft. The summits are often

of cheap freight and encourages the mining of low-grade ores, such as occur in most of the mines.

"The entire group of islands of the Ketchikan district is fairly seamed with mineralised lodes, the ores being rich in sulphides and adapted to smelting operations. Copper is the most abundant valuable metal; it usually occurs in the form of the yellow sulphide (chalcopyrite), though oxidised ores are found to a limited extent, especially on the west side of Prince of Wales Island at Coppermount and elsewhere. At present there are two smelters treating copper ores, one at Hadley on the eastern side of Prince of Wales Island, and one at Coppermount on the western side. Much of the ore, however, is shipped south to the Vancouver Island smelters and to Tacoma, the freight rate in large lots being as low as \$1.50 per ton and

the distance carried about 600 miles. Free milling gold ores, as in the Cracker Jack at Hollis, are known, but apparently they are not abundant. On the east side of Prince of Wales Island extending from the head of Kasaan Bay and Tolstoi Point to Cholmondeley Sound, is an area of rocks called by the United States geologists Kasaan greenstone. These are probably old andesites metamorphosed and rendered schistose by pressure. Nearly all the greenish minerals they now contain, such as hornblende, chlorite, and epidote, are of secondary origin. These rocks are much intersected by dykes of diabase, apparently intruded after the greenstone had been rendered schistose, as the diabase itself is usually massive, and does not exhibit the effects of pressure.

"Copper ores have been found in this greenstone at numerous points, notably at Stevenstown, northwest of Hadley; at Mt. Andrews and Karta Bay, on

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

"The Khayyam ore is chiefly a white iron pyrite (presumably marcasite) with disseminated chalcopryrite and with more or less pyrrhotite or magnetic iron pyrite. It occurs in the form of lense in the greenstone, much of which is a finely fibrous hornblende schist. These schists are nearly vertical and strike about S 75 deg. E, the ore lenses lying about parallel with the schistosity; they are of varying size, several of them crop out at the surface, where they usually show as gossan with some bunches of rich chalcopryrite and considerable pyrrhotite. The gossan is composed chiefly of scoria-

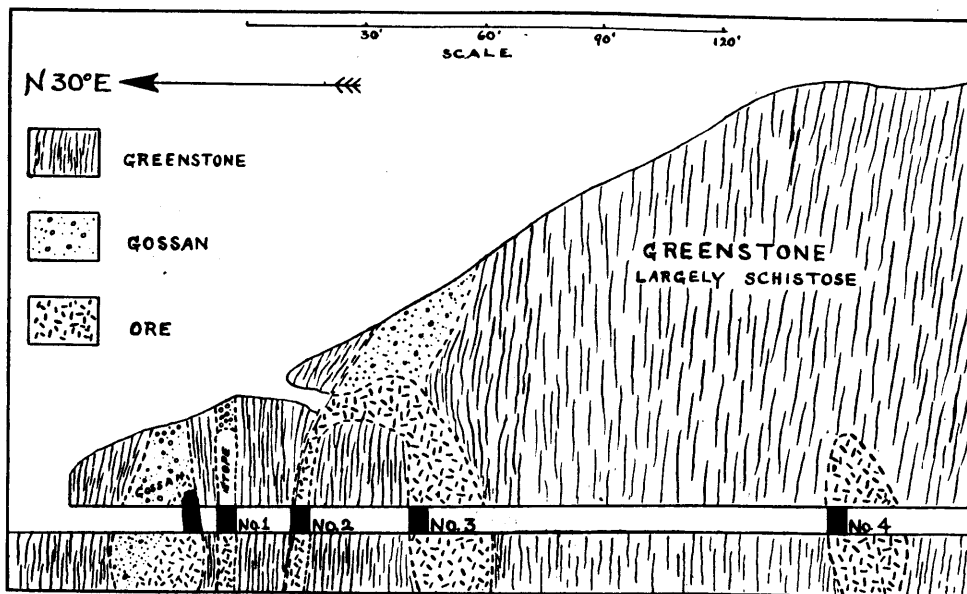


Fig. 1. Cross-Section of Khayyam Mine.

Kasaan Bay; and near Kiam on McKenzie Inlet, a south branch of Skowl Arm. In all cases the chalcopryrite occurs in grains and seams disseminated through magnetite, ordinary iron pyrite, or marcasite. Locally, in all the mines, rich boulders of chalcopryrite may be found, but they constitute a small portion of the ore. The average content of copper estimated on the basis of a large tonnage is from 2 to 4%. As but little detailed information was obtained of the mines in general, those of the Omar Mining Co., which were carefully inspected, will be more fully described.

"The Khayyam mines, operated by the Omar Mining Co., 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, a post-office on McKenzie Inlet. A section of the Powell adit and main workings is shown in Fig. 1. The ore is sent down on an aerial tram one mile long to bunkers and thence transported 2 1-3 miles over a sur-

like limonite, but not in any large amount. It contains but little gold and silver, and hence is not valuable as ore. The wall-rocks and sulphides immediately under the cropping are irregularly richer in chalcopryrite, which may be due to secondary enrichment. There are, however, no considerable bodies of such ore and the mainstay of the mines is the ordinary marcasite with disseminated chalcopryrite, showing a copper content of not over three per cent. No chalcocite was noted, nor is it to be expected in depth. The ores close to the surface appear to have the character they may be expected to retain in depth. They are essentially pyritic and admirably adapted to pyritic smelting. The zones of secondary enrichment so common in copper deposits are wanting, or they are too limited in extent to be of importance.

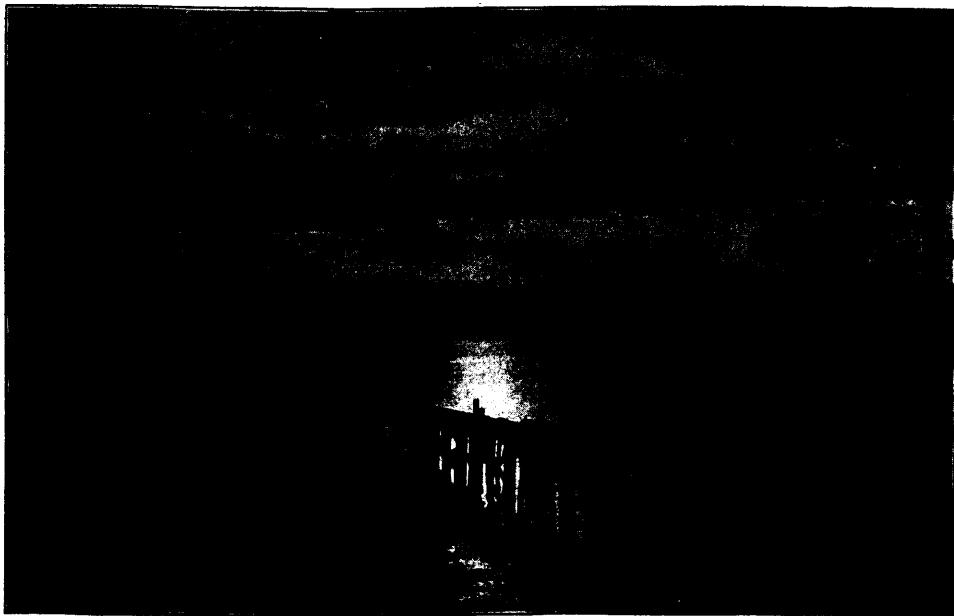
"There is abundant evidence that during late Tertiary time a mild climate obtained throughout the western temperate zone of North America. In late Tertiary deposits are found remains of palms, and of

animals the nearest relatives of which now live in warm climates. During this warm period, it may be imagined that the surface was disintegrated to a considerable depth, and under such circumstances the upper portions of the lodes may be presumed to have been in an oxidised condition, and the copper lodes may easily have had zones of secondary enrichment not far from the surface. This warm period was succeeded by the glacial epoch, when vast masses of ice from the continental region of British America moved southward, covering the islands at least as far south as Vancouver Island and Puget Sound. The loose and disintegrated surface of the late Tertiary may be presumed to have been scoured off by this moving ice-sheet, removing the upper portions of the lodes and any ores of secondary enrichment that existed. It is true that at Coppermount oxidised ores are said to be found for some distance below the sur-

	Gold, oz.	Silver, oz.	Copper, %
Chalcopyrite	0.16	3.60	29.97
Pyrrhotite	0.03	0.62	2.67
Impure marcasite	0.03	0.40	2.32

The copper content of the pyrrhotite and marcasite is to be attributed to finely disseminated chalcopyrite, but the much higher content of the precious metals in the chalcopyrite strongly suggests that the gold and silver favour the chalcopyrite. A qualitative test of the pyrrhotite for nickel was made and none found. In addition to the above sulphides, there is a little zinc sulphide present in the ore. The future of copper mining on Prince of Wales Island depends largely on the discovery of large ore bodies."

The aerial tramway built by the Riblet Tramway Co., of Nelson, B.C., and Spokane, Wash., lately completed, from the shore of Windy Arm a distance of



Dock at Sea-Level Mine, Revillagigedo Island.

face, but as these are (in part at least) in limestone, the open spaces along the lode formed by the leaching out of the lime and the consequent introduction of surface influences readily account for oxidation in depth.

"As it has been stated that the chief sulphide of the Khayyam ores is pyrrhotite, an average sample was taken from No. 4 lens in the Powell adit, about 100 ft. below the surface, and pulverised. The sand was treated repeatedly with a horseshoe magnet, and 7% of the pyrite was found to be magnetic, the remainder being chiefly marcasite. There being three sulphides common in the Khayyam ores, a separation of these was made for assay to determine if the precious metal accompanies any particular sulphide. The result, as determined by Lochiel M. King, of Oakland, California, was as follows:

3¾ miles to the Conrad Consolidated Mines Co's Montana group of mineral claims, situated 3,000 to 4,000 ft. higher than the waters of the arm, has one span between towers of 2,960 ft., which is said to be the longest span of any aerial tramway in the world, the next longest known being 210 ft. shorter. Another Riblet tram, from Windy Arm to the J. H. Conrad Bonanza Co's Venus mine, is almost ready for operation. Surveys for other tramways in this neighbourhood have been made, and construction will be proceeded with the ensuing autumn.

In testing for tungsten it is difficult to distinguish barite from scheelite, by physical properties alone when associated with other minerals. Heat a little of the finely powdered mineral with sulphuric or hydrochloric acid and add a fragment of zinc or tin. A blue colour indicates tungsten.

IMPORTANT DEVELOPMENT AT CONSIDERABLE DEPTH IN RAMBLER-CARIBOO CO.'S MINE.

Successful Result of Plucky Enterprise.

ONE of the most important events in the history of mining in the Slocan district was the recent encountering of ore at a depth of about 1,250 ft. in the mine of the Rambler-Cariboo Mines, Ltd., in McGuigan Basin, Slocan. The news of a successful result of the enterprise shown by this company has done much to revive interest and restore confidence in Slocan mines, and it is believed that other mining companies will now be encouraged to endeavour to provide money for development at considerable depth.

From a lengthy and interesting account of the Rambler-Cariboo Co.'s enterprise published by the *Kaslo Kootenain*, it is learned that some time after the manager, Mr. W. E. Zwicky, took charge of the Rambler-Cariboo in 1902, he made a thorough study of the known ore bodies in the mine. He always contended that the ore bodies of the district lived down to considerable depth, but it was a hard task to induce even a few to coincide with his ideas in this respect. The outlook was then simply that after the veins in sight had been worked out the mines would have to be abandoned. Mr. Zwicky's idea was to prove the value of the Rambler-Cariboo mine; to give it permanency or show it to be of no further value. He spared no trouble in exploiting the property, and after he had fully satisfied himself as to the prospects for success he submitted to his directors his proposal to drive a 4,300-ft. tunnel to cut the lead at a depth of about 1,400 ft., or 600 ft. below the main shaft, which had been sunk to a depth of 800 ft. At first the directors would not entertain this proposal, but Mr. Zwicky was persistent in recommending it, and finally it was sanctioned.

In order to give an idea of the past productiveness of the property the following information has been taken from the printed report of the company for the fiscal year ended June 30, 1902. This exhibits complete smelter returns for every individual car-load shipped from the mine from December 2, 1893, to June 30, 1902, including weight, contents in each metal (silver, lead, and zinc respectively), freight and treatment charges, and gross and net smelter returns. The following is a summary of values:

Shipments.	Returns.	
	Gross.	Net.
From Antelope claim, under lease to Kingen & Dechant	\$8,174.41	\$5,043.75
From Cariboo claim, under lease to John King & Co.	1,609.64	1,075.62
From main workings, Rambler & Cariboo Consolidated Gold and Silver Mining Co	183,189.78	128,473.04

From main workings Rambler-Cariboo Mines, Ltd	610,446.20	458,735.20
Totals	\$803,420.03	\$593,327.61

The ratio of concentrates to ore and metal contents of the ore are shown in the following extract giving the mill run for 1903: "The mill ran 212½ days. The approximate gross tonnage treated was 21,250 tons. The gross tonnage of concentrates produced was 1,758½ tons, equalling one ton of concentrates to twelve tons of crude ore, the average assay value of which was: Silver, 112.5 oz.; lead, 28.5%; zinc, 12.9%."

The property was visited in the summer of 1904 by the provincial mineralogist, who (vide "Report of the Minister of Mines for 1904," pp. 194-5) reported as follows:

"The Rambler-Cariboo group includes the Rambler, Caribou, Antelope, Tiger and Best Fraction Crown-granted mineral claims, situated well up in McGuigan Basin, at an altitude of about 6,000 ft. This property has, under various ownerships, been one of the large shippers of the district. It is now held by the Rambler-Cariboo Mines, Ltd., a company with a capital of \$1,250,000. Head office at Kaslo; president, Mr. A. F. McClaine, Tacoma, Wash.; general manager, Mr. W. E. Zwicky, Kaslo, B. C.

"The rock formation of the district is slate, through which a great mass of granite has been forced up, the whole being much cut by porphyry dykes. A well-defined quartz vein cuts through both the slate and the granite, and across the contact, and has been traced on the surface for a long distance, in a north-east by north direction, with a dip to the south or into the hill.

The mine was originally opened up by three cross-cut tunnels, connecting with levels about 100 ft. apart. No. 3 is the main working tunnel, and has a cross-cut 510 ft. long to the vein, and drifts to the extent of over 1,200 ft. Above this level all the ore, except a few small bunches, has been extracted some time ago. The lower workings were flooded and could not be seen. From this No. 3 level a shaft has been sunk for 500 ft., with levels Nos. 4, 5, 6, 7, and 8, at intervals of about 100 ft., and here the recent productive mining has been done. From the shaft, drifts have been driven: at No. 4 level, to the north for 63 ft., and to the south for 350 ft.; at No. 5 and No. 6 levels, to the north 280 ft., and to the south 350 ft. (most of which ground has been stoped); at No. 7, to the north 231 ft., and to the south 324 ft., of which 250 ft. has been stoped; and at No. 8, to the north 94 ft., and to the south 101 ft. From this shaft and levels some very good ore was obtained, and it is reported by the management that the ore-body is strong in the bottom of the shaft and is continuing with depth. The cost of hoisting from this shaft to a higher level, together with the cost of keeping it unwatered, added so much to the cost of mining that the company decided to abandon the workings temporarily.

and to run a long cross-cut tunnel in to the vein at the 1,400-ft. level, putting up a raise in continuation of the shaft, thus reaching the known ore-body from below.

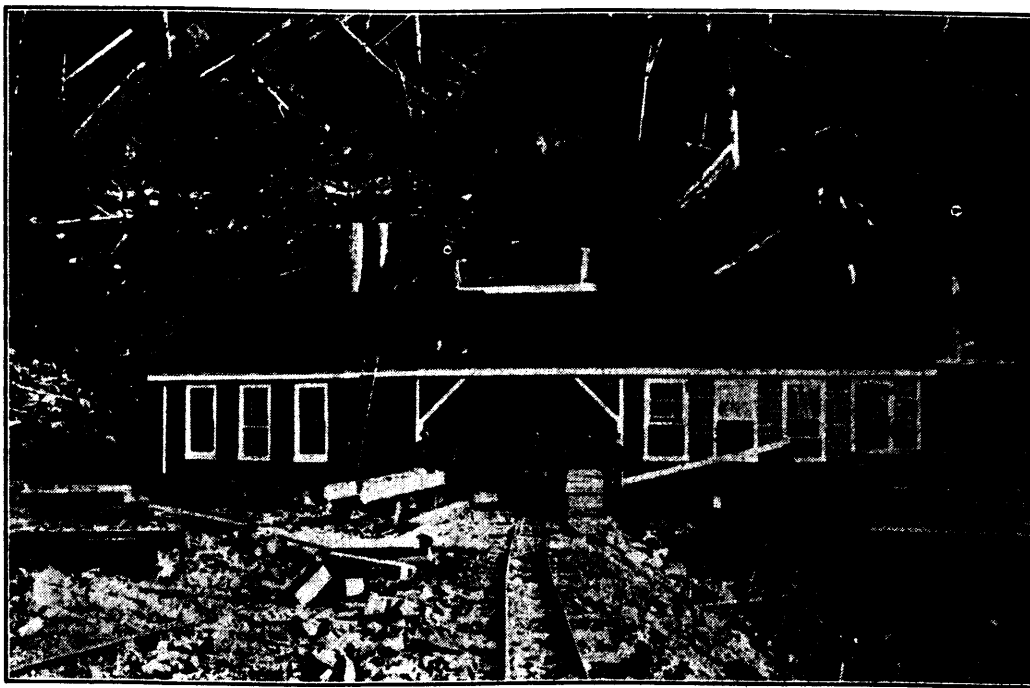
"Mr. Zwicky says he feels sure he has 'sufficient ore in sight on levels 7 and 8 to liquidate any loan secured to complete the new work.'

"The portal of the new tunnel is located on Dardanelles Creek, about half-way between McGuigan station and the mine, and near the wagon road. The tunnel will be 9½ ft. high by 7 ft. wide (7½ by 7½ in the clear) and about 4,300 ft. long, cutting the vein over 1,400 ft. deep, or 600 ft. deeper than No. 8 tunnel. It will take about two years to complete this tunnel (till July, 1906), and it will cost approximately \$60,000, exclusive of cost of plant. This tunnel was started on July 9, 1904, and by September 1 it had

ore runs about 280 oz. silver, 50% lead, and under 10% zinc. The mill is old, and rather out of date, but as the whole plant will shortly be moved to No. 14 tunnel mouth, any great expenditure on it would not be justified. The tailings run about 2½% lead and 10 oz. silver and are being impounded, an estimated amount of some 20,000 tons being so stored up.

"The air compressor plant has already been moved down the hill to a point below No. 14 tunnel. It is operated by water power, the water being taken out of both McGuigan and Dardanelles creeks, and conveyed from the flume to the plant in a pipe-line 1,600 ft. long, tapering from 12 to 8 in. in diameter. The water is used under a head of 750 ft. to operate a 36-in. Pelton wheel, which is connected by a belt to a 10-drill Rand air compressor.

"The company will, for the next two years, be en-



Portal of long Cross-cut Tunnel driven by Rambler-Cariboo Mines, Ltd., about half way between McGuigan and the Company's mine, on Dardanelles Creek, Sloean Mining Division.

been driven 460 ft., the work being done under contract, and progressing at the rate of about 11 ft. a day, the compressed air being supplied by the company from its new plant on Dardanelles Creek.

"In view of the changes being made, very little work is going on in the upper workings, only six men being there employed, while in No. 14 tunnel the contractors were running three shifts with 12 men.

"The company's concentrating mill, located just below No. 3 tunnel outlet, was employed running through the second and third-class ore-dumps, which would probably be cleaned up in 1904. This old dump is estimated to run about 3% lead and 20 oz. silver to the ton, and the ratio of concentration is about 12 into 1. The concentrates run about 35% lead, 112 oz. silver, 11% zinc and 18.5% iron. The first-class shipping

gaged entirely in development and construction, for which the previous production of the mine and the showing reported in the No. 8 level would seem to give ample justification."

The account of the *Kootenai*, already referred to, gives the following information relative to the cutting of the lead:

"This costly undertaking was begun on July 9, 1904, and has been going on steadily ever since. The work was first given out to contract, but the progress made was not satisfactory, and the manager decided to complete the work himself. This decision proved a wise one, as the original work planned was completed some weeks ahead of time and in comparing contract figures, much money was saved to the company.

"The limit of the original estimate of length of the tunnel was reached last May, but the result was disappointing. Although several small stringers of ore had been cut through, the main vein was not encountered, and funds were getting low. Disappointed but not discouraged, Mr. Zwicky then decided to raise through to No. 8, fully convinced of encountering the vein and at the same time securing a sure guide to find the ore later on in the 1,400-ft. level. It is believed the long tunnel is not yet driven far enough in to reach the goal desired. The manager then submitted a report to his directors, and was assured by them that if more money was needed, all required would be provided. This was very encouraging, and shows the absolute confidence reposed in the manager by the shareholders.

"The raise was commenced, and the result is now known. The ore body has been struck after raising 150 ft., and at a vertical depth of 1,250 ft. from the surface. The ledge is over 8 ft. wide, permeated with stringers and bunches of clean ore, and there is practically no zinc visible. This also appears to substantiate the theory advanced by a few, that a zinc zone exists in the Slocan mines, which has to be worked through before reaching galena again. This is apparent at the Rambler, and is borne out in other mines.

"The rich paystreak at the Rambler was cut into on August 5, but no mention was made of it at the time, as Mr. Zwicky wanted to be sure of what he had before making it public. Accordingly, the vein was drifted on for 20 ft., and it continued to improve as work progressed. That it is the main vein there is no room for doubt. The flow of water has increased, and the shrinkage of two feet in about 24 hours in No. 8 shaft, indicates where the water comes from.

"The ledge tapped is a very promising one. It is better defined than those above and the walls are more intact. The ore struck is as rich as, if not richer than, any taken out of the mine heretofore, and it is believed there is more than enough to pay all the cost of the big undertaking.

"Work has not been allowed to rest here. The raise to No. 8 shaft will be pushed ahead and completed before the employment of many men is considered. From No. 8 down to the long tunnel, a series of levels will be driven about 115 ft. apart, all connecting with the shaft and extending on both sides. The raise is yet to be driven about 450 ft. before No. 8 level is reached. From there to the 1,400-ft. level in the long tunnel is virgin ground."

There is as yet little to add to the foregoing account of the gratifying results of the Rambler-Cariboo Co.'s enterprise. Mr. Zwicky has more recently been quoted as having positively confirmed the report of the finding of the ore body at depth, and as having added that it will take nearly a year to get the mine properly opened up so as to admit of ore production being carried on to best advantage. Meanwhile assurance has been given that those who hold the con-

trolling interest in the company are not offering any stock for sale, but now that the main ore body has been definitely located at considerable depth, are content to await the further development of the mine for a return on their stock investment.

OBSERVATIONS RELATIVE TO THE OCCURRENCE OF COPPER ORE ON THE PACIFIC COAST.*

By Wm. M. Brewer, M.E.

FOR the past eight years the writer has been engaged in the examination of copper ore deposits and their development on the Pacific Coast. In a future paper he hopes to give a complete and detailed account of the results of his observations, but for the present he wishes merely to set forth a brief outline of the character and extent of these deposits.

Copper ore has been noticed to occur in five classes of deposits:

1. Bornite ore accompanied by some carbonates, chalcocite, and, at the deeper levels, chalcopyrite, which occurs in contact deposits between crystalline limestone and igneous rocks, usually felsite associated with garnetite.

- 2.—Chalcopyrite ore which occurs in a magnetite matrix in deposits of lenticular structure in fissures in the basic igneous rocks.

3. Chalcopyrite ore usually in a magnetite matrix which occurs as contact deposits between crystalline limestone, slate or schist, and basic igneous rocks.

4. Chalcopyrite ore occurring in association with iron pyrites, barite or heavy spar, and a small percentage of lime which has only been found up to date in a schist country rock.

- 5.—Pyrrhotite ore carrying low copper values sometimes in a gangue composed of a high percentage of epidote, garnet, amphibolite and some calc-spar, which occurs either in fissures in basic igneous rocks, or else at the contact of crystalline limestone and the igneous rocks.

I have not observed along this coast any deposit of copper ore with the true gossan outcrop resultant from the weathering of limonite or brown hematite iron ore, such as is found in the Ducktown, Tennessee, and many other copper ore deposits, and which usually overlies a zone carrying black oxide of copper, and native copper below which occurs chalcopyrite. The reason for this is that the zone of oxidation has generally been removed by erosion.

In the early history of prospecting for copper ore it was natural that men acquainted with the occurrences of ore underlying gossan outcroppings should presume that magnetite and possibly pyrrhotite outcroppings indicated deposits of valuable copper ore

* "Some Observations Relative to the Occurrence of Deposits of Copper Ore on Vancouver Island and Other Portions of the Pacific Coast;" from an advance copy of a paper contributed to the Canadian Mining Institute.

at depth, but at the present time most of us have found out that any such theory is not founded on fact. These minerals are found to be the matrix or gangue associated with the chalcopyrite ore, particles and masses of which are found shot through the bodies of magnetite and pyrrhotite, but I have never seen these minerals at depth give place to solid copper ores. On the other hand bodies of magnetite which carry a substantial percentage of chalcopyrite, theoretically almost pure, near the surface, sometimes give out entirely at depth leaving only a narrow seam of calcspar on the foot wall of the fissure in diorite which has previously been filled to a width of 8 ft. by the magnetite and chalcopyrite.

Let us take up the consideration of the various occurrences of copper ores in the rotation in which they are referred to in the list already given.

1.—The bodies of hornite ore accompanied by variable proportions of copper carbonates, chalcocite and at deeper levels by chalcopyrite:

The localities in which such deposits have already been found are Texada Island, Sidney Inlet on the west coast of Vancouver Island, Gribbell Island, and Whitehorse in the Yukon Territory. As these deposits have been already discussed several times in papers read before institutes of mining engineers, and in others published in technical journals, in this paper only brief reference will be made to results as shown from the latest and deepest development work.

The deepest workings on deposits of this character of ore are on the Copper Queen and Marble Bay Mines on Texada Island, on each of which the workings have been carried below the 600-ft. level, while on the Copper King in the Whitehorse belt the ore has been followed down to 200 ft. on the incline of the footwall, about 45°.

In each of these cases the ore body has been found strong, and giving every indication of maintaining its continuity for a still greater but undetermined depth. Its grade has not deteriorated, but, instead, on all the properties mentioned has increased in value. In the Texada Island properties the increase has been in the gold contents of the ore, while on the Whitehorse property it has been in a greater percentage of chalcocite as compared with that found on the 100-ft. level.

Prospecting carried on during 1905 in the mountains adjacent to Gardner Canal in the neighbourhood of Gribbell Island exposed outcroppings of hornite ore hitherto unknown. This fact may have an important bearing, because it tends to establish a relationship between the various known deposits of this character of ore along the Coast, and indicates that wherever a zone is found in which occurs crystalline limestone and felsite, the prospector may reasonably expect to find paying deposits of copper ore.

The question naturally suggests itself as to what is the extent of such zone or zones, and the probabilities with regard to continuity. So far as at present known the occurrences of such zones are few and far between, the extent of each being limited to compara-

tively small dimensions when compared with the other mineralised zones along the coast. Except in the Whitehorse belt the continuity of the contact between the crystalline limestone and felsite is confined within the boundaries of a single mineral claim, and often the contact cannot be traced even to that length. The ore bodies do not generally maintain the same continuity as the contacts but occur as lenses isolated from each other and rarely exceeding 100-ft. in length. Consequently this class of copper bearing ore deposits, although in every instance where systematic exploitation has been made they have proved of considerable commercial value, cannot be included among the big mines, but rather stand in a class by themselves as profitable small ones. The Whitehorse belt possesses the possibility of developing some larger mines because several claims along the line of strike of the contact can be grouped together and developed as one property.

Until thorough geological investigations shall have been made and surveys worked out in detail, or the coast line more extensively prospected and the relationship if any between these various zones established, it will be impossible to say how valuable or important this class of ore bodies may become.

2.—The second class of ore bodies, which comprises the deposits of chalcopyrite ores, occurring in a gangue or matrix of magnetite in fissures in basic igneous rocks, is one having a large number of representatives, especially on Vancouver and Prince of Wales Islands. Unfortunately development work on some of these has demonstrated that the ore bodies have pinched out at comparatively shallow depths. For this reason operators generally have lost confidence to such an extent that at the present time but very little work is being done on any ore body belonging to this class.

The surface outcroppings in almost every instance where such an ore body has been discovered have indicated such favourable conditions as regards the extent of the outcropping and grade of the ore that a few years ago this class of ore bodies was a particular favourite among the prospectors. As a matter of fact very few ore bodies of this character have received the attention they warranted.

The question of genesis of such an ore body appears to me to be one of vital importance, and nowhere on the Pacific coast has sufficient research been made to establish the theory on which to build a reliable opinion as to the genesis.

From a casual examination it would appear as though the magnetite was a direct resultant from the cooling of the molten mass of basic rock and that at or about the same time certain agencies had been at work which caused the deposition of chalcopyrite in particles and masses disseminated with more or less regularity throughout the mass of magnetite.

Whether such agencies worked on the ascending or descending theory is to my mind the most important feature to be demonstrated with regard to this class of ore bodies, but the development has not yet been

sufficient to warrant the expression of an unqualified opinion on this subject. One thing, though, is certain, that if the deposition of the chalcopryite had its origin from ascending gases, vapors, and solutions, then it is only reasonable to suppose that the ore bodies would maintain continuity to considerable depth, whereas if the origin is from descending waters charged with copper, which have percolated through the cooling mass of magnetite, it would be equally as reasonable to expect that such ore bodies would not maintain continuity except to such depth as channels extended through which the waters could percolate.

There is one phase of this problem, though, which must not be overlooked. It is a fact that so far as my observations have gone no chalcopryite occurs outside of the mass of magnetite, and at the point where the magnetite disappears the chalcopryite also disappears; therefore the conclusion presents itself that the magnetite must be to a very great extent responsible for the chalcopryite associated with it, otherwise one would expect to find the copper ore below the magnetite just as it is found below the gossan outcroppings derived from limonite.

In several instances which have come under my observation there is no question but that this class of ore bodies possess very considerable commercial value provided they are situated close to salt water, but where the question of transportation by means of long surface or aerial tramways has to be considered, operators, because of lack of confidence in the permanency of such ore bodies at depth, hesitate to make the necessary investment to perform sufficient development work required to block out a large enough tonnage of ore to warrant the installation of expensive tramways.

The fact that along the coast the zone of oxidation on the present surface is extremely shallow except in some isolated locations has also undoubtedly influenced operators and tended to increase their lack of confidence in this particular class of ore bodies. There is no use denying the fact that many deposits belonging to this class have the appearance of being the lower portion of a lenticular mass, the upper portion of which has been carried off by erosion, but up to the present time in every instance where development has been attempted, operations have been suspended at the point where the ore body had pinched, and no exploitation carried on to determine whether other lenses occur.

3.—The third class of ore bodies, that in which chalcopryite ore occurs at the contact of crystalline limestone, slate or schist and igneous rocks will probably prove to be the most important because of being the most extensive and permanent occurrences of copper ore along the coast.

In this class of deposits the chalcopryite generally occurs in a magnetite gangue, as well as in a gangue composed of garnetiferous felsite. Usually only one wall is well defined, especially so is this the case when the gangue is garnetiferous felsite. In such

cases the limestone wall is well defined and considerable gouge occurs between the ore and the limestone, but on the opposite side the solid ore gradually gives place to garnetite carrying a fair percentage of ore, which in its turn grades into perfectly barren garnetite, thereby giving the impression that the mode of deposition of the ore was by replacement and that apparently the garnetite had a stronger influence in the formation of the ore body than the limestone. Owing to the solubility of the limestone one would look for masses and pockets of ore to occupy caves in that rock, but I have only noticed such as very exceptional occurrences. Usually the limestone shows an almost perfectly clean and regular cleavage plan on which the gouge lying between it and the ore body has formed.

Where slate or schist forms a contact with igneous rock and the ore body occurs in the contact the deposits, though of lenticular structure, are nearly always of exceptionally great dimensions. As illustrations of this fact there are the Britannia mines on Howe Sound about, 40 miles north of Vancouver, the Beatson group on La Touche Island, Alaska, and the Gladhaugh mine at Ellamar, Prince William Sound, Alaska.

On the first-named of these properties the main ore body, known as the Mammoth Bluff, has been cross-cut more than 100 ft., the tunnel having been driven in ore all the way. This ore is extremely low grade in both copper and gold values, and occurs in a highly silicious gangue and should really be classed as iron pyrites carrying a percentage of chalcopryite sufficient to give it commercial value providing a successful concentration can be made. While this Mammoth Bluff ore body is the largest in extent on the property yet there are other ore bodies of much higher grade ore but more limited in extent. The Mammoth Bluff is practically a huge mass of ore about 600 ft. long, 200 ft. high and has been cross-cut upwards of 100 ft. These dimensions are taken from the base to the apex of the bluff, and nothing is yet known relative to the depth. In fact, no sinking has been done on the property, unless quite recently.

The property known as the Beatson mine on La Touche Island, Alaska, is apparently destined to become the most important copper mine in Alaska, because the ore body possesses both great extent and high grade. A bluff of ore occurs here from which shipments in 250-ton lots have yielded an average of about 10% in copper. Under this bluff a cross-cut tunnel has been driven which determines that the ore body is about 200 ft. in width. From this tunnel an upraise has been made to the floor of a quarry in the face of the bluff. This upraise is made in ore. A second cross-cut tunnel is being driven at a level 100 ft. lower than the upper one, but has not yet been driven far enough to intersect the ore body, but when this has been done, if the conditions on that level are as favourable as on the upper one, where a drift has been run in ore about 150 ft., there can be estimated a probable tonnage almost, if not quite, equal to that

on the Mammoth Bluff on the Britannia, and of a value far exceeding the ore body on that property.

The country rock in which the Beatson ore body occurs is a slate (graphitic in places) on the hanging wall side, and a greenstone on the foot wall. The zone of slate is quite wide and extends for hundreds of feet in length, but there are several intrusions of igneous rock some of which have apparently caused faulting in the belt of slate. No geological survey has yet been made to determine the details of the conditions surrounding this interesting property.

The third illustration mentioned as representing this class of ore bodies is the Gladhaugh mine, at El-lamar on Prince William Sound, Alaska. The development at this property has determined that continuity in depth may reasonably be looked for in such ore bodies because the ore is found at the 500-ft. level, the lowest depth to which the shaft has been sunk.

4.—The fourth class of copper ore deposits, that in which chalcopyrite ore occurs in a gangue composed of iron pyrites, barite, silica, and some lime is, so far as at present known, peculiar to the Mount Sicker district on Vancouver Island. The country rock is a sericite schist with numerous intrusions of igneous rocks, generally diorite, sometimes having a porphyritic structure. A portion of the schist is graphitic, and the ore bodies are generally in this portion of the schist belt.

The grade of the ore is higher than the general run of chalcopyrite deposits on the Pacific coast, and has averaged rather more than 4% copper, with 0.17 oz. gold and 4 oz. silver per ton, as shown by the returns from about 250,000 tons of ore smelted during the past four years.

These ore bodies have been more systematically and thoroughly developed than any other on the coast. They present a most interesting subject for study from a geological standpoint, because of the many pronounced evidences of extensive faulting and the fact that movements have taken place since the formation of the ore deposits as well as prior thereto. This latter condition is attested to by the numerous slickensided cleavage planes exposed throughout the ore bodies as mining operations have progressed, and that the former condition exists is apparent from a study of the surface, although the geology in detail has never been worked out.

The ore apparently occurs in large lenses, but these are so closely allied with each other along the line of strike that in a drift in the Tye mine some 1,300 ft. in length it appears at a casual glance that there has been no break in the continuity of the ore, however, on the Lenora mineral claim, adjoining the Tye on the west, the lenticular structure is more pronounced.

The interesting feature, from a commercial as well as a scientific standpoint, is the fact that no ore has been discovered between the 300 and the 1,000-ft. levels in the Tye, although the ore body above the 300-ft. level often reaches a width of about 50 ft. of clean solid shipping ore, and has been found practi-

cally continuous for a length of about 1,300 ft. Similar conditions apply to the ore body in the Lenora mine, except that the length of the deposit was not nearly so great, nor has the exploitation been carried on so thoroughly, systematically, or extensively in search of other ore bodies as has been done in the Tye mine.

On the latter property sinking has been carried to a depth of 1,000 ft., on which level an ore body has recently been exposed and is being exploited. Levels have been opened every 100 ft., and considerable cross-cutting and drifting done on each level. This drastic development work is being carried on continuously, and, in consequence, the underground workings offer a splendid opportunity for making a thorough study of the geological conditions.

Unfortunately, the owners of adjoining properties have suspended development work, apparently with the intention of awaiting the outcome of that being prosecuted by the Tye Co., consequently the full extent of the ore bearing zone is not known at this time. The schist formation, though, can be traced on the surface through Mount Sicker, and westerly across the valley of the Chemainus River on to Mount Brenton, except where intrusive masses and dykes of igneous rocks have cut it off. Even then the same character of schist is found towards the south, in which direction it has apparently been thrust.

Another feature, almost unique in mining, is the fact that on the Tye property there is no second grade ore or waste in the ore body itself. The entire width between the boundaries or walls is a solid mass of clean ore. The walls are well defined, both being schist, and have considerable gouge between them and the ore, so that in mining the latter is easily broken away.

5.—The fifth class of ore bodies is that in which occurs pyrrhotite ore carrying low copper values, sometimes in a gangue composed of a high percentage of epidote, garnet, amphibolite and some calc-spar occurring either in fissures in basic igneous rocks or else at the contact of crystalline limestone and igneous rocks.

In this class of ore bodies the copper values are carried by masses and particles of chalcopyrite disseminated with variable regularity through the pyrrhotite. The writer has observed instances where at comparatively shallow depth the pyrrhotite has apparently been replaced (this word is not used here with the same sense as is understood generally in mining parlance) by lenses of quartz carrying chalcopyrite of such high grade as to show by assay as much as fifteen per cent in copper, but usually at depth the pyrrhotite grades into marcasite carrying a low percentage of chalcopyrite together with low gold and silver values.

In appearance the pyrrhotite from some of these ore bodies resembles so strongly the nickel bearing ores of the Sudbury district that mining engineers well acquainted with the Sudbury ores have expressed the opinion that the pyrrhotite found especially on the

west coast of Vancouver Island was nickel bearing to a commercial extent, but several assays made for nickel have shown that this metal is only present in such minute quantities as to yield merely a trace.

On Prince of Wales Island in Alaska on the east coast of the island, as well as on the west coast of Vancouver Island, there are several illustrations of ore bodies of this character, but up to the present time none of these have been developed beyond a comparatively shallow depth, about 150 ft. being the deepest. From this level ore of a commercial grade is being shipped by the Niblack Copper Co. On most of the other properties of this character the greatest depth attained is less than 100 ft.

The low value of this class of ore and the difficulty of successfully sorting it have discouraged operators from investing in such properties, but the high price of copper during recent months has proved an incentive and at present a few of these properties are being worked to such an extent that in the near future many material facts will have been ascertained.

The perfection of magnetic separation is destined in the future to solve the problem of concentration, not only with regard to this class of ore bodies, but also with regard to the bodies of magnetite carrying chalcopyrite.

A CANADIAN DEPARTMENT OF MINES OR GEOLOGICAL SURVEY.

By J. B. Tyrell.*

FOR some years past there has been considerable agitation both in this country and in the United States, on the necessity for the establishment of a Department of Mines, with, in our case, a Minister of Mines in charge of the department, and in the United States a Secretary whose duty it would be to attend to the affairs of the mining industry.

Devoting our attention entirely to Canada let us consider for a moment what would be the duties and uses of that department.

The duties of the department would be confined to an encouragement of the mining industry, by detailed descriptions and maps of the known mines and mineral resources of the Dominion; by close investigation, in districts where mineral deposits are known to exist, but where their extent or even their character is not well understood; by explorations in unexplored districts with the object of finding new mineralised areas, or areas where valuable minerals might reasonably be looked for; by the preparation of special treatises on industries which appear to lag behind for want of knowledge; by carrying on such researches in laboratories as might seem advisable in the interest of mining and metallurgical methods, and by seeing that the information so collected is fully distributed among the people, so that they may be

brought to properly appreciate and rightly use the knowledge so gained of Canada's mineral wealth.

This department or bureau, as a business office, engaged in conducting part of the business of the country, should keep in view the furtherance of the wealth and progress of the community. This may seem a very material view to take of the matter, but mining is a business enterprise, conducted, if it is to be successful, on rational business principles, and the bureau which is to have charge of the welfare of the mining industry must also be conducted on business principles. Now business principles demand that there should be a reasonable profit on an investment, that profit should accrue within a reasonable time, and that the people to whom the profit accrues or who are making the investment should know of the profit. Violations of this last condition lead invariably to distrust and trouble.

In regard to the support of a Government bureau the people are the investors, and if they are to continue their investment they must be kept fully advised as to the profits that they are deriving and the benefits that they are receiving from their investment. It is not enough that an individual minister of the crown should know that the bureau is earning a profit for the people; the people themselves must know it if the bureau is to be an ultimate success.

The interest the people take in mining will always be commensurate with the money they make in mining, and a bureau or department that will assist the people to make more money out of their mines than they are now making will be supported by the people, but it must be conducted in a businesslike way, on financial principles, and must produce returns reasonably commensurate with the money expended on it.

There is no room for difference of opinion as to the present necessity of a mining department or bureau, which would be strong, efficient and thoroughly in touch with the requirements of the mining community, and there can be no doubt that the Government would be prepared to support such a bureau if the men who were interested in mining would demand it, and at the same time clearly indicate the character of the work and the way in which it was to be done.

Now there is in the country at present a department, under the Minister of the Interior, which is doing part of the work outlined above, namely, the Department of the Geological Survey. Many of the duties assigned to it do not refer to mining, or even to geology, as for instance the study of the plants and animals of the country and the care of a great national museum. These matters are of the greatest interest and importance, and should be liberally supported, but it is a mistake to any longer confuse them with the investigation into the mineral resources of the Dominion, and no further reference will be made to them here. In the Act constituting and governing the Geological Survey its first duty as therein defined is "To make a full and scientific examination and survey of the geological structure, mineralogy, mines and mining resources of Canada" and further

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"To prepare and publish such maps, plans, sections, diagrams, and drawings as are necessary to illustrate and elucidate the reports of surveys and investigations." To collect and publish as soon as may be after the close of the calendar year, full statistics of the mineral production, and of the mining and metallurgical industry of Canada." And again, "The deputy head and director of the department shall, as soon as may be after the close of each calendar year, make a summary report, to the minister, of the proceedings and work of the department for the year, and shall also furnish final and detailed reports to be issued from time to time in such manner and form as the minister directs."

These regulations, if carried out in an intelligent and business-like manner, are abundantly sufficient to provide for the existence of an advisory department whose duty it is first and foremost to further the development of the mining industries of the country.

There are, however, some prohibitory clauses in the regulations governing that department which strike at the very root of the financial life of its members, and deprive them of any interest that they might possibly have in the financial side of mining. The regulations provide that:

"No person employed in or under the department shall purchase any Dominion or Provincial lands except under authority of the Governor-in-Council; locate military or bounty land warrants, or land scrip, or act as agent of any other person in such behalf; make investigations or reports relating to the value of the property of individuals, nor hold any pecuniary interest, direct or indirect, in any mine, mineral lands, mining works or timber limits in Canada."

Such illiberal restrictions should be modified, and the members of the staff of the Survey should be treated as honourable men who would not take undue advantage of their positions to enrich themselves dishonestly, but who might invest any little money that they might be able to save in farms, timber limits, or mines, the same as other citizens, at all events in those parts of Canada in which they were not working at the time. This would turn their thoughts to the financial side of mining and bring them in touch with mining men as no other interest would do.

If, however, it is the fixed purpose of the Government to prevent officials of its Mining Department or Geological Survey from taking any personal interest in the financial side of mining it is clearly the duty of that Government to see that its mining engineers and geologists should thoroughly understand and appreciate mining conditions, and that, no matter in what part of the country they might be carrying on their investigations, whether among the mines that have been most fully developed, or in remote areas where rocks holding mineral wealth may possibly be found to occur, they should be kept thoroughly in touch with the progress of mining knowledge by being sent for a certain length of time each year to the most advanced mining schools, to visit mines, or to meet other men who are studying ore deposits, mines or metal-

lurgical processes. Such visits would serve to broaden their knowledge, quicken their ideas, enliven their enthusiasm, and raise and keep them on a par with the best mining engineers and geologists in other countries. Without such contact and mental communion the ablest men, especially in cases where they are isolated for long periods each year, would certainly lose enthusiasm and touch with the public, and would become mere recluses, incapable of intelligently communicating information which they might acquire or possess.

Finally, the work of a mining bureau such as our Geological Survey may be done efficiently and carefully, but unless that work is placed fully, intelligently and attractively before the public it is of comparatively little value.

In this, the most important branch of its work, the Canadian Geological Survey has been quite inefficient. Its officials have prepared reports and maps carefully and conscientiously, and then, as if the isolated life which they have been obliged to lead was not sufficiently depressing in itself, very limited editions of their reports were published, which, instead of being distributed freely where they would do the most good, were carefully hoarded until they became out of date and almost valueless. No abstracts were sent to the newspapers, and the information contained in them was almost as worthless, as far as the spreading of knowledge among the people was concerned, as if it was still hidden in the rocks.

The conclusions arrived at in this short paper, are as follows:

A Government department or bureau to advise the minister of the interior in regard to mining affairs is necessary.

It was clearly the intention of the Act constituting the Geological Survey that it should be such a bureau.

It can be made an efficient bureau for the purpose for which it was constituted:

By allowing its officials to invest in mines the same as other members of the community, or at least with only moderate and reasonable restrictions.

By insisting that all the officials, no matter on what work they may be engaged, keep in touch with mining conditions in other parts of the continent or of the world, and

By seeing that the public is kept fully informed of the results of the work of the Survey.

At the larger mines and the smelters in the Boundary district steam power is being cut out as much as possible and electricity substituted therefor. Already practically all the heavy machinery at Grand Forks, Phoenix and Greenwood, is electrically driven, and transmission pole lines are being constructed from the B. C. Construction and Distributing Co's distributing station at Anaconda, near Greenwood, to the B. C. Copper Co's Mother Lode mine at Deadwood camp, and the Dominion Copper Co's smelting works at Boundary Falls, respectively.

A FEDERAL DEPARTMENT OF MINES.

MR. H. MORTIMER LAMB, secretary of the Canadian Mining Institute, in his paper "On the Advisability of the Establishment of a Federal Department of Mines," presented at the last annual meeting of that institution, gave an interesting summary of the history of the Geological Survey of Canada in its relation to the mining industry. The efforts to bring about the establishment of the Geological Survey, Mr. Lamb showed, date back as far as 1832, but it was not until ten years later that Mr. W. E. Logan (afterwards Sir Wm. Logan) was appointed geologist, giving his services gratuitously for several months, the actual institution of the Survey taking place about May 1, 1843. After nearly seventeen years of zealous and invaluable work Sir Wm. Logan resigned the directorship of the Survey and was succeeded in 1869, by Mr. (afterwards Dr.) A. R. C. Selwyn. For nearly 26 years Dr. Selwyn directed the work of the Survey, resigning in the beginning of 1895, by which time much more attention was being given to mining developments than during the greater part of that gentleman's directorship. Dr. George M. Dawson, already distinguished for his splendid and particularly useful work in British Columbia and Yukon, succeeded Dr. Selwyn. From the time of Dr. Dawson's greatly deplored death in March, 1901, until a few months ago, the duties of director devolved upon Dr. Robert Bell. After narrating the circumstances attendant upon the establishment in 1902 of the Mines Branch of the Department of the Interior and showing what it was suggested its functions should be, Mr. Lamb submitted the following:

CONCLUSIONS.

This historical survey brings us down to the present time, and to review the economic work accomplished by the Geological Survey in a few words it may be said that practically all the information which we possess concerning the mineral resources of the Dominion has been collected by the officers of the Survey, with the exception of that which we owe to the Provincial Mining Bureaus of British Columbia and Ontario, and to the Mines Branch of the Department of the Interior, all of which have been established within the last few years. But while the Survey has been of immense value in the development of the country, the establishment of a separate Mines Branch in the Department of the Interior may be held to indicate that in the opinion of the mining men of Canada the Survey has not in recent years, on its strictly economic side, kept pace with the growing requirements of the mining industry, and that the immense mass of information which it has collected has not been reduced to a sufficiently accessible form.

In this connection, however, it must be noted, that with the exception of experimental metallurgy, every line of work which is set forth as within the purview of the Mines branch, has been already taken up or is now being prosecuted by the Geological Survey of

Canada. In making this statement it must be clearly understood that there is no intention, in what has been said, to minimise the value of the work accomplished by the Mines Branch of the Department of the Interior since its inauguration, but merely to point out that, while by means of a large special grant placed at its disposal the Mines Branch has been able to produce a number of reports of marked economic value, the production of such reports does not demand the existence of such a separate bureau. Given a properly reconstructed Geological Survey, of which the present Mines Branch might form part, it could employ the same extra grant with at least equal economic efficiency.

Such work of the highest quality, is being carried out on an enormous scale by the Geological Survey of the United States, which working in the territory immediately south of us, has to deal with conditions which resemble very closely those obtaining in Canada at the present time. Moreover, the work done by that Survey has so emphatically commended itself to the mining interests in the neighbouring republic that the government have repeatedly extended the scope of the survey and greatly increased the sum appropriated for its use.

As a matter of fact, our mining community in Canada, while admitting that the Geological Survey of Canada has accomplished an immense amount of good work in times past, points to the immense increase in the volume and value of the mineral output of Canada as shown by the following figures:

TABLE SHOWING MINERAL PRODUCTION OF CANADA.

	Value.
1871	\$ 5,044,830
1886	10,221,255
1887	11,321,331
1888	12,518,894
1889	14,013,913
1890	16,763,353
1891	18,698,953
1892	16,628,417
1893	20,035,082
1894	19,931,158
1895	20,648,964
1896	22,584,513
1897	28,661,430
1898	38,697,021
1899	49,584,027
1900	64,618,268
1901	66,339,158
1902	63,865,797
1903	62,532,210
1904	60,343,165

It also points out the present position which the product of the mine holds, as compared with the agricultural exports of the Dominion, as shown by the following figures:

TABLE SHOWING THE AGRICULTURAL EXPORTS OF THE DOMINION.

	Value.
1896	\$39,659,686
1897	46,377,927
1898	68,919,688
1899	62,528,107
1900	73,281,702
1901	66,872,296
1902	80,705,186
1903	99,420,195
1904	(about) 98,300,000

In view of these figures and of the fact that the agricultural interests of Canada have been and are being enormously developed by the Government, through the Department of Agriculture under the charge of a special minister of the Crown, our mining men ask why the great mining interests of the Dominion might not be similarly cared for.

It is not necessary to here enumerate the many ways in which the governments of other countries do, and our Government could, actively assist in the development of mining industry. Our views on this matter have already been set forth in a paper read before this Institute and printed in one of the volumes of our Transactions.* Our aim here is merely to point out that the mining industries of Canada might at the present time be greatly assisted if the work of the Geological Survey and the Mines Branch of the Department of the Interior were taken up seriously by the Government, correlated, systematised, extended, and made to conform to modern requirements. The duplication which now exists would thus, in the interests of economy, be avoided and the whole work put upon a proper businesslike basis.

If this were done, it is certain that the mining interests of the country would be well served and the action of the Government receive the hearty endorsement of everyone interested in mining, and furthermore, as the value of the work became increasingly evident the Government would feel justified in providing additional means for its prosecution, so that a larger staff of properly paid and thoroughly efficient men, *au fait* with the modern methods and results of science as applied to the study of these economic problems, could be permanently employed by the Government in the development of the mineral resources of our country.

All Canadians would be sorry to see the Geological Survey of Canada lose its independent existence, seeing that it is a branch of the service of which, with all its faults, we Canadians have reason to be proud. But if the happy result above indicated could be insured by the appointment of a Minister of Mines who would have direct supervision of this work, the expansion of the Geological Survey into a Department of Mines and Geological Survey, would receive the support of the whole mining community.

*"Journal of the Canadian Mining Institute, 1902." p.585

REVIEW OF PRESENT CONDITION OF THE MINING AND SMELTING INDUSTRIES OF BRITISH COLUMBIA.

By E. Jacobs.*

REVIEWING the condition of the mining and smelting industries of the Province, the writer recently contributed to the *Victoria Colonist* the following comments:

From time to time this year we have called attention to the increasingly prosperous condition of the mining and smelting industries of British Columbia, last year having been a record year in production, both as regards quantity of ore mined and the marketable value of the metals recovered, and the current year making such an excellent showing as to bid fair to considerably surpass that of last year. It is only necessary to mention that in the district of Yale alone, which includes that part of the Province commonly known as the Boundary, the output of ore to date is about 800,000 tons as against 965,000 tons for the whole of 1905. The increase in other districts is not proportionate, still there is an increase, so that it is evident this year's total production will be much larger than that of last.

But it is not in tonnage alone that a very marked improvement has taken place. A far more satisfactory testimony to the better state of things now existing is that found in the payment of dividends by a number of mining and smelting companies operating in the Province. In connection with no industry does the common expression, "money talks," have more force and effect than with that of mining. Given a return in the shape of dividends, and the man who puts money into mining is encouraged to increase his investments in this direction, and not only the one who has received a return, but others are induced to follow in his lead, with the result that capital is forthcoming to work other mines and the expansion of operations results.

Perhaps the statement that well on for \$2,000,000 is the known total of dividends paid or already declared out of profits made in mining and smelting in British Columbia this year, may not be regarded as giving cause for much satisfaction, but when it is remembered that in most cases the dividends have been paid by companies that have either never before returned their shareholders a profit, or have not done so for several years, it becomes manifest that there is ample room for congratulation at the position having substantially improved. It will be noted that the "known total" only is taken into consideration; there are instances in which profits are periodically divided by the owners of metalliferous or coal mines of which there is no public record, so that it is not unreasonable to suppose the amount above mentioned as the total of dividends paid this year is well within the mark.

Not only is it gratifying to be in a position to call attention to this record of profits divided, but it is also pleasing to be able to state that different parts of

the Province and various classes of mining have contributed to this total. For instance, gold-copper mines are represented by the Tyee Copper Co., of Vancouver Island; the Le Roi, Le Roi No. 2, War Eagle and Centre Star, of Rossland; and the Granby of the Boundary. Silver and silver-lead mines include the Reco of Slocan, and the St. Eugene of East Kootenay, with the Canadian Goldfields Syndicate deriving its profits as well from the last mentioned mine. The Lucky Jim of Slocan represents zinc. In coal the Crow's Nest Pass Coal Co.'s mines in Southeast Kootenay have continued paying their owners dividends regularly at the rate of ten per cent per annum. The smelting works at Trail, Grand Forks and Ladysmith, respectively, have also contributed to the sum total of distributed profits.

To those familiar with the situation it is hardly necessary to add that there are mining and smelting companies not mentioned above that have been, and are earning large profits. In several instances these earnings above cost of operating are being spent in further development and equipment of mines, additions to mills and smelters, and in other ways, looking to making adequate provision for increased production and eventual much larger profits. At no time in the history of mining and smelting in the Province has there been so much new plant and machinery going in nor so large an expenditure in other ways in connection with the industries under notice. It should be remembered too, that the prosperity of the mining and smelting industries influences the outlay of large sums of money in allied industries. That this is so is apparent when the reason for such a comparatively large expenditure on permanent works as that of the West Kootenay Power and Light Co. is sought. The main object in view in making provision for the supply of electric power on a scale not heretofore undertaken in British Columbia is that the power requirements of mines and smelters are steadily on the increase, hence the carrying out of works that in the absence of profitable activity in mining and smelting would not be entered upon.

The position as above indicated cannot but be regarded as favourable, but the whole has not yet been told. Much publicity has been given this year to the fact that in the more productive mining sections conditions have greatly improved and the outlook for increasing productiveness and profitableness is better than for years past. The immense tonnage of the Boundary and the finding of large shoots of ore in the bottom levels of Rossland mines have had much notice in the public press. But there are still other evidences of material progress to keep in mind. Not much, for instance, has been heard of Ainsworth camp of late years, yet recent developments in several mines there are decidedly satisfactory, and big with promise for that old-time profit-yielding section. The eastern part of the Slocan district, too, has lately come into prominence by the developments in the Rambler-Cariboo mine, good results having at last been attained after years of persistent work to prove

that the ore lives down to a considerably lower depth than had previously been reached. These are mentioned simply as instances of progress in other directions; they might easily be multiplied—by mention of developments in the Slocan Lake district, in Northern Lardeau and Northeast Kootenay, at Ymir, Kamloops, Similkameen and at Coast points, while from Atlin, Northeast Cassiar and Cariboo, which are the chief placer gold producing parts of the Province, generally good accounts of progress also come. It will, therefore, be seen that there is ample ground for satisfaction with the condition of the mining and smelting industries of British Columbia, not only for the reason that they have already proved profit-producing this year much in excess of the several years immediately preceding, but as well because of the really promising outlook for still better results for some time to come.

UPPER STEWART RIVER, YUKON TERRITORY.

IN the early eighties bar-mining was practised to some considerable extent on the lower Stewart River, but the upper waters of that river are practically unknown, except for such information as the Geological Survey of Canada has supplied through the medium of Mr. R. G. McConnell in 1900, and Mr. J. Keele, whose report on his explorations of last year is now being published.

That these upper waters do not traverse the desolate region one might suppose is plainly seen by a glance at Mr. Keele's report. He says, "the long hours of daylight are favourable for abundant vegetation," and that trees—among which are spruce, balsam, poplar, and birch—grow to heights of nearly three thousand feet above the river. Wild fruits grow in great abundance and "the region offers a great field for the sportsman and explorer." Several species of bear are found in the region, wolves and wolverine, moose, mountain caribou and mountain sheep. Of the fur-bearing animals, there are lynx, fox, beaver, marten, otter and mink.

The part, however, of Mr. Keele's report that will be read with the greatest interest is included in the paragraphs on economic geology. After describing the various rocks of the region, the author goes on to remark that "the bed-rock of all the productive placer ground in Yukon Territory is of a similar character to the above," a hint which, to those prospectors who read between the lines, may be of great value. Mr. Keele found gold "in the gravels of many of the small streams flowing over this area," but is naturally careful as to inciting false hopes, and adds "whether there is sufficient gold to pay for mining can only be determined by the usual process of reaching bed-rock."

The physical features of the district make interesting reading. We learn that the "scenery is very fine and the mountains gain impressiveness from their situation in low, wide valleys, and their colouring is

rich and varied. Some of the valley bottoms seen from a height have an extraordinary appearance, suggesting a mosaic floor in which the pattern is worked out by the bright surfaces of the countless lakes and ponds and the narrow dark-green land areas separating them."—Geological Survey *Press Bulletin*.

DAWSON, YUKON TERRITORY.

THE Canadian-Klondyke Dredging Co., operating the big dredge at the mouth of Bear Creek on the Boyle concession, has ordered another dredge which, with two ordered some months ago and the one it has in use, will increase its number of these big gold-saving machines to four. It is not expected that either of the new dredges will be received here this season. The company has been prospecting with four Keystone drills since about the middle of last winter, and it is believed that the pay gravel has been found much more extensive than was known earlier, hence the decision to largely add to the gold-saving plant for handling it.

Mr. Frank E. Davidson, general manager for the Canadian-Fortymile Dredging Co., who was in Dawson last week, with Dr. J. Ewart Brown, of Toronto, Ontario, president of the company, informed the *Yukon World* before leaving for the Fortymile that the company's new dredge will be in operation before September 1, and will begin digging right at the spot where its machinery has been assembled, making progress upstream under its own steam and taking the entire bed of the river as it goes along. From another source it is learned that the Moncrieff dredge, which was wrecked last spring in an attempt to take it through the canyon, is lying on a big rock below the rapids with a large hole in its bottom. The machinery, with the exception of the boiler and steam winch, has all been removed. A new hull is to be built next winter and the machinery will be taken over the ice to its destination and installed ready for operation in the spring. The small Rutledge dredge is in a slough off the main river; it does not appear to be much damaged.

Another dredging enterprise is that of Messrs. J. Gordon McLaren and Robert Milvain, who have returned from England, where a close corporation has been organized to work about six miles of the upper end of Walker's Fork in the Fortymile district, the ground having been acquired by purchase from individual claim owners. It is stated to average about 14 or 15 ft. in depth with 4 ft. of muck overlying the gravel which carries pay all through, down to bed-rock. A dredge of large capacity and latest type, with buckets to hold 5 cu. ft. of gravel, has been ordered to reach Fortymile next summer and be transported thence 75 miles to the company's ground at midwinter, after the ice shall have frozen solidly along that stream.

Good progress is reported at the Yukon Consolidated Goldfields Co.'s big Twelvemile ditch. The right of way has been cleared a distance of five or six miles

ready for the shovellers. One of the steam shovels has been started on a ridge known as the Mackenzie saddle, the ditch at this place being 15 ft. deep and 15 ft. wide on the bottom. During the first afternoon's work this shovel removed about 800 ft. of earth. Included in the cargo of the steamer "Whitehorse," which left Dawson for Twelvemile, landing on August 9, were 270 tons of machinery, much of it electrical apparatus for the power station, including three transformers, each weighing more than 10,000 lb.

The enquiry by the Canadian Government railway commission into the question of rates charged by the White Pass & Yukon Railway has been concluded, and the commissioners have left on their return to Ottawa. The decision of the commission, which will be rendered later, will be of the greatest importance to the Yukon. Merchants testified against the railway company, asserting that the falling off in population and the exhaustion of the rich placers make lower freight rates necessary in order to admit of lower grade gravels being worked and the prosperity of the country thus assured. President Graves, of the White Pass Co., contends that the railway must have a greater volume of business before rates can be lowered.

Rains late in July and early in August supplied water for hydraulicking on Bonanza and the large plants were enabled to operate. The Weinheim plant averaged 12 hours a day with one nozzle, and latterly used two. The White Chanel Co. was sluicing early in the month with about 500 in. of water in its ditch. The Northwest Hydraulic Co. (formerly the Norwood-Fuller Co.) and the Anglo-Klondike Co., both got to work. On Hunker Creek claims that were idle earlier were working full swing. The fall rains have commenced earlier than in most seasons, and if they continue until the close of the season will admit of at least \$1,000,000 more in gold being recovered before winter shall stop work.

Miners on Duncan River are eagerly awaiting the return of winter, so that the big pumps supplied by the Dominion Government may be transported to that section and put to work. They continue to have full confidence in the payable nature of the ground there, and believe that when the pumps shall drain off the water so that a cross-cut can be driven, pay gravel of great richness will be made accessible.

The Klondike Mines railway will be completed to Sulphur Springs, distant 31 miles from Dawson, early in September. This will be the terminus of the road for the winter. All told there are about 350 men at work on the road, the heaviest work on which is done.

The report of 1905 of Mr. Robert N. Bell, State Inspector of Mines, shows that in that year the State of Idaho produced 60,516 oz. of gold, 8,626,794 oz. of silver, 260,791,456 lb. of lead, 6,661,400 lb. of copper, and 2,174,960 lb. of zinc.

REPORTED FINDING OF GOLD IN THE PEACE RIVER COUNTRY.

INFORMATION has been made public concerning what is described as a very important gold discovery by a Dominion exploration party that has been at work in the Peace River district for about two years, selecting 3,500,000 acres of land the Province of British Columbia years ago agreed to convey to the Dominion Government in consideration of the latter aiding financially in the construction of the Esquimalt & Nanaimo railway from Victoria to Nanaimo, both on Vancouver Island. It was stated that crude assays made with an improvised mortar, quicksilver, and nitric acid, indicated values

non-Crown-granted mineral claim in British Columbia, had been taken out at a mining recorder's office in an outlying northerly section of the Province in the names of certain members of the Dominion Government and of other prominent Eastern Canadians, so arrangements were made early in the summer for the provincial mineralogist (Mr. Wm. F. Robertson), to go to the Peace River district with the object of finding out what the occasion of such an unusual proceeding was.

The late Dr. Geo. M. Dawson, in 1879-80, explored the country from Port Simpson, on the Pacific coast, to Edmonton, on the Saskatchewan River, and his official report, embracing a portion of the northern



Peace River—Below the Canyon.

ranging from \$7.50 to \$32 a ton; also that Mr. A. J. Macdonnell, leader of the party, brought out several sacks of rock, which he was taking to Ottawa to have subjected to an accurate laboratory test. Mr. Macdonnell is reported as having stated that the gold-bearing dyke is eight miles in length, as far as his men were able to learn; extending back to the old river bank, at the foot of a hill; crescent-shaped and about 5,000 ft. in width, and ranging in thickness from 50 to 200 ft. The rock is soft, crumbling freely, and appearing like a hardened deposit of silt, lying with gravel above and below it. A number of claims were located by individual members of the exploration party and of the Dominion Northwest Mounted Police engaged in making a road from the Peace River country to Atlin.

Last spring it came to the knowledge of the Provincial Government at Victoria that free miners' certificates, without which no person can legally hold a

part of British Columbia and the Peace River country, was included in the Geological Survey Department's published "Report of Progress for 1879-80." Dr. Dawson reported the occurrence of a big deposit of shale near the mouth of the North Pine River, about six miles east of Fort St. John and 17 miles from the boundary between British Columbia and Alberta.

It is noteworthy that while the Province agreed to convey to the Dominion 3,500,000 acres of land in the section above-mentioned, it retained all rights to control of precious metals contained therein. It is known that timber, coal and water power are abundant in the Peace River country, so that if the recent reports of the occurrence of gold in considerable quantity shall prove correct, conditions in these respects will be favourable to the establishment of an important gold-mining industry in the northeastern part of the Omineca mining division of British Columbia.

There is not much published information concerning the Peace River country available at present; after the return to Victoria of the provincial mineralogist later in the year, the Provincial Government may decide to have his report printed and issued in bulletin form as soon as practicable. Meanwhile, the following, taken from official reports, though not of recent date, may be of interest. Among other extracts from "Report by R. G. McConnell, B.A.Sc., Geological Survey of Canada," reprinted in the "Annual Report of the Minister of Mines for British Columbia, 1897," was one relating to the country under notice, as under:

"Peace River is the continuation of Finlay River,

junction of Smoky River with the Peace, by a trail of 65 miles. The ascent of the river may be made by boat or horse, the distances as given by Dr. Selwyn being as follows:

	Miles.
"Smoky River to Dunvegan	44
Dunvegan to Fort St. John.....	70
Fort St. John to Hudson's Hope	38
Hudson's Hope to head of Canyon by portage Mt. of Rocks	11½
Head of Canyon to mouth of Parsnip . . .	75

"(b.) The journey from Quesnel may be made entirely by water, ascending the Fraser River 110



Quesnel, Fraser River, as it appeared in 1896.

after its junction with the Parsnip. It flows eastward, close to the 56th parallel of latitude, from the 124th meridian into the North-West Territories, finding its way through Slave and Mackenzie Rivers to the Arctic Ocean.

"Access to the Peace River may be gained from the east by way of Edmonton and Dunvegan, N.W.T., or from the west *via* Quesnel.

"(a.) From Edmonton a wagon road runs north about 80 miles to Athabasca Landing, from which point the Hudson's Bay Co.'s boats go up the Athabasca 50 miles to Little Slave River, and up this to Little Slave Lake. The river is about 40 miles long, very crooked, and, in the lower half, shallow and rapid. To the Hudson's Bay post near the head of the lake is 65 or 70 miles, the width of the lake being from two to 14 miles. This post may also be reached overland from Edmonton by a trail 210 miles in length, and connects with Smoky River post at the

miles to Giscome Portage, 27 miles above Fort George. A portage of six or seven miles is here necessary to Summit Lake, whence a series of little lakes connected by streams, sometimes rapid, sometimes still, leads to McLeod Lake. Of this portion of the route, known as Crooked River, Dr. Selwyn writes in his Report, 1876, 'In some places the channel was 20 or 30 yd. wide, full of large, rounded stones and barely sufficient depth of water to float the boats over them; in others it is still shallower and, for long distances, we had either to walk alongside in the water, lifting the boats over the stones or to make a channel by moving the stones or digging out the gravel.'

"McLeod Lake, 17 miles long, with an average width of two miles, discharges at Fort McLeod into Pack River, which empties into the Parsnip, 17 miles below.

"The arduous ascent of the Fraser River and the difficulties of Giscombe Portage and of Crooked River

may be evaded by taking the overland route to Fort McLeod. This route follows the old telegraph trail from Quesnel as far as Tsinkut Lake, where it branches and runs to Fort St. James on Stuart Lake, 144 miles from Quesnel; from here to Fort McLeod is about 70 miles. Of this route Dr. Selwyn ("Geological Survey Report, 1876"), says: "Between Quesnel and Fort McLeod Lake the trail crosses 12 considerable streams and one narrow arm of a lake, beside a number of brooks from five to 20 ft. wide; these occur in the following order:

"1. West River flows to right; valley 100 ft. deep; descent over sand and gravel terraces 25 ft. wide; rapid current.

"2. River discharging Pantage Lake runs through wide, swampy flats; joins Westroad River below the lower canyon; 20 to 30 ft. wide.

"3. Westroad or Blackwater River, 120 ft. wide at the ford; wide valley, 300 to 400 ft. deep; a good bridge two miles below the ford.

"4. Chilaco River, about 40 yd. wide; swift current; fine grassy flats.

"5. Tsinkut Lake River; fine grassy flats; 30 to 35 yd. wide; good bridge.

"6. Strong Creek, 25 to 50 ft. wide; deep at both banks; wide flats with rich soil and luxuriant grass between this and

"7. Nechaseo River, south branch, 150 yd. wide; strong current of deep water; no bridge or ferry.

"8. Nechaseo, north branch or Stuart's River, 200 yd. wide; ferry; flats along river thickly timbered.

"9. Nine-Mile Creek, 25 to 30 ft.; bridge.

"10. Salmon River, west branch, 50 to 60 ft. wide; valley narrow, about 150 ft. deep; bridge broken, horses have to swim.

"11. Swamp Creek, or east branch of Salmon, 30 to 40 ft. wide; flats flooded by beaver dams; feed in patches poor and thin. The country between the branches is all sandy and gravelly, in ridges with boggy creeks and small lakes or swampy lagoons.

"12. Crossing of Carp Lake, 90 yd. wide; horses swim for about 20 yd.; the bottom on both sides is fine gravel.

"13. Long Lake River, upper crossing at outlet on McLeods' Lake. Between Stuart Lake and Fort McLeod, much of the forest had been burnt; the trail was constantly obstructed by large fallen trees."

"*Topography*—At the head of Peace River, the country is rugged and mountainous, the general level diminishing with the ascent of Parsnip River. Descending the Peace River, the main range of the Rocky Mountains is pierced, and the mountainous character continues as far as Hudson's Hope. Below this the country consists of more or less undulating plateau 600 or 700 ft. above the river, open prairie-like to the north, but heavily wooded on the south side of the river. The climate is exceptionally mild for so high an altitude, and combined with the great fertility of the soil, promises for the Peace River country a great future as a crop producer. Prof. Macoun says of the plateau north of Fort St. John: "For nine miles, the distance travelled, the whole country

was covered with the most luxurious vegetation; clumps of willows and poplars of various ages were interspersed with the most astonishing growth of herbaceous plants I ever witnessed; a thick mass of vegetation that averaged from three to five feet in height. It would be folly to attempt to depict the appearance of the country, as it was so much beyond what I ever saw before, that I dare hardly make use of truthful words to portray it. Rainy River, and the Little Slave Lake marshes are the only regions known to me that are in any way comparable to it. The latter, however, is swamp, while this is a plateau, nearly level, and in parts over 700 ft. above the river."

"Prof. Macoun, quoting from the Hudson's Bay Co.'s journal at Fort St. John, gives the dates of ice breaking on the river from 1866 to 1875, to vary from April 16th to 23rd, and the first ice drifting in the fall from October 31st to November 10th. ("Geological Survey Report, 1876.")

"*Geology*—The following brief notes on the geology of the district are culled from Dr. Selwyn's report of 1876:—The country generally is overlain by a thick deposit of drift, or by clay, sand, and gravel beds of Tertiary age, with indications of lignite, underlying large areas in Blackwater Valley and along the Parsnip. Outcrops of fine-grained quartzites, shales and slates, occur along the trail from Blackwater to Long Lake River, with some occurrences of diorite apparent. A band of limestone extends north-west and southeast from Fort St. James on Stuart Lake. Descending Pack River and Parsnip River, outcrops are sandy limestones; and limestone schists, shales and conglomerate and black carbonaceous slate, occur opposite Finlay River.

"Entering the main range of the Rockies, Mount Selwyn consists, so far as examined, of a massive reddish quartzite, overlain by grey calc-schists and limestones with clay-slate, which apparently form the main peaks of the range. Beds of sandstone occur at intervals, with conglomerate, thin bands of slaty shale and bituminous coal. Below Hudson's Hope are dark argillaceous shales, carrying fossils and associated with sandy calcareous layers, also fossiliferous. Beds of brown sandstone appear in the hill of the river, from which excellent grindstones have been made. Up Pine River the same rock occurs, and in the shale about 50 miles up the river near Table Mountain, Dr. Selwyn reports four small seams of bituminous coal of good quality.

"*Gold Deposits*—Fine gold has been found in numerous places on the Parsnip and Peace Rivers, frequently in paying quantities. The tributaries cannot be said to have been properly prospected, and little or no work is being done in this section now."

Mr. F. W. Vallean, gold commissioner for Omineca district, pursuant to instructions from the minister of mines, visited the Peace River district in the summer of 1901. From his report (*vide* "Report of the Minister of Mines for 1901," p. 675) the following has been condensed:

I left Manson Creek, Omineca, on July 20, going

by way of Fort McLeod. From Manson to Stuart Lake, a distance of about 125 miles, I followed the Manson-Quesnel trail. The country between these places is of a rolling character, the greater portion having been swept by fires, the result of which is that it is covered with fallen timber and a second growth of small jack pine and poplar. The trail crosses a number of creeks, in none of which, so far as I could ascertain, has gold been found in paying quantities.

The surface shows a heavy wash of boulders and gravel southward from Manson to within about 30 miles of Fort St. James, when the character of the country changes and becomes more level, with large tracts of open prairie and hay meadows. The only considerable height is Lookout Mountain, about 25 miles north of Fort St. James.

From Lookout Mountain to Fort St. James the timber consists of poplar and cottonwood, with a few white birch, some of the latter being quite large. Grouse and fool-hens are very plentiful along the



Gold Commissioner's Office at Manson Creek—Mr. F. W. Valleau in Front.

trail, but we shot very few, owing to most of them having their young with them.

From St. James to Fort McLeod the country is almost level, well timbered with pine, spruce and poplar, and dotted with innumerable beautiful lakes. The soil for 30 miles east from Fort St. James is very fertile, pea-vine and wild timothy growing to a height of four feet in many places. The trail, although grown up with young pines and willows, is a good one, and there is a fine hard bottom for nearly the whole distance. This trail is only used by the Hudson's Bay Co. for transporting supplies from Fort St. James to their outlying posts. A few years ago a small number of prospectors used it to reach the Peace River, but none have passed over it for the last three or four years.

The second day out from St. James we passed Lac-a-Long and crossed the river of the same name. We reached Fort McLeod on August 2nd. Lake McLeod is about 16 miles long, but narrow, and the

shore line is broken by a number of bays, some of which run back for a couple of miles. After purchasing sufficient provisions to last the party to Fort St. John, I left McLeod next morning in a very cranky "dugout." The lake at this point empties into the Pack River, which we descended and entered the Parsnip. The Pack is a small, swift stream, in some places almost blocked with drift-wood.

The Parsnip is a fine river, about 200 ft. wide, the water being clear but of a grayish green colour. Fish are wonderfully plentiful for its whole length, ling, char, trout (rainbow, brook and Arctic), being caught wherever a fly was cast. This river, when in flood, evidently rises very high, as the banks are caving in and driftwood is piled all along, in some places to the height of 25 to 30 ft. The banks are for the most part loam and vegetable matter, yet, on the bars, wherever I panned, I got a large quantity of black sand thickly studded with particles of fine gold. The timber is principally cottonwood and poplar along the river banks, but spruce predominates on the hills.

On Sunday, August 4, I got my first view of the Rockies. Flies of every description had been very bad since leaving McLeod. The timber on this portion of the river is smaller than that higher up, and banks of gravel appear on both sides. We passed the mouth of Nation River, at which point it is not nearly as wide as at the crossing of the Manson-Quesnel trail, some 110 miles further up stream.

The next day, August 5, we reached the confluence of the Parsnip and Findlay Rivers, the headwaters of the Peace River proper. For the last 25 miles the Parsnip is very crooked, and along both banks for this distance tremendous land-slides are met with, which have brought down rocks and trees and piled them on either side.

The view from the confluence of the Parsnip and Findlay Rivers is very beautiful. Away to the west can be seen the high, pointed tips of the Omineca Range, while to the east the Rocky Mountains give one the impression that it is impossible for the Peace River to force its way through them. Looking down the Parsnip River when about 5 miles from its mouth, I imagined its junction with the Findlay was a considerable distance away, but I soon found that I had also been looking up the valley of the latter, whose course, as it approaches the Parsnip, is in directly a straight line with it. The two last-mentioned rivers joining form the Peace. At the time of my visit the Parsnip was very low, while the Findlay was in flood. At the junction, islands have been formed of driftwood and wash, brought down year after year, and below the islands the river is anything but safe for navigating a canoe, as from the foot of these to the Findlay rapids it is one succession of tremendous swirls, requiring that a craft, such as I had, should be very carefully handled.

The Findlay rapids, which we ran, occur about three-quarters of a mile from the junction of the two rivers above mentioned. They are about 220 yd. in length, the river being over a quarter of a mile wide, while large masses of rock are scattered over its bed.

Out in the centre it would be impossible for any boat to run the rapids without being swamped, but by hugging the south shore very closely and swinging sharply into a small bay at the foot we got through safely, taking in very little water. At the foot of these rapids is a tremendous whirlpool, about 300 yd. in diameter, which has to be avoided by keeping close to the shore. After passing the rapids the river widens out considerably and the current settles down to a rate of about four miles an hour. To this point I saw no signs of cabins along the banks or other indications either of the presence of men or of mining having been carried on.

Next day, August 6, we again started down the river, and shortly after leaving camp I found a cache on the south bank, just at the foot of Mount Selwyn.

on the return trip, although I followed the south shore going and came back along the north.

The Rocky Mountains proper begin just below Mount Selwyn, and are well named, as from their base, at the river, to their summits, they are bare of trees, in many instances not even showing signs of grass or ferns. The summits appear to be 5,000 or 6,000 ft. high.

The current at this point runs at about the rate of five miles an hour. Below the Parle Pas (Don't speak) rapids, the river takes a sharp turn to the south for a couple of miles, when the appearance of the country changes entirely. Although very steep, the mountains seem covered with grasses to their summits. The Parle Pas rapids are formed by a sudden drop in the bed of the river of some 10 or 12 ft., and,



Looking Down Peace River Canyon.

I landed here and followed a trail for a distance of $2\frac{1}{2}$ or 3 miles up the mountain, where I found indications of prospecting having been carried on. These occurred in three places. Open cuts had been made in each instance, cross-cutting the ledges, which are composed of a white quartzite, in all three places about 15 ft. in width.

At Mount Selwyn a good house had been built, and a large quantity of tools of all kinds shipped in, together with provisions, but the place seems to have been deserted at a moment's notice. Near the bank of the river is a cache built on poles, containing provisions and tools of all sorts, but these have been spoiled by rust and mildew. I could find no posts or inscriptions, so am unable to say which of the claims located at Mount Selwyn I visited. These workings are the only ones I found either on my way down or

I believe, at high water are almost "drowned out." At low water the rapids can be run by keeping in close to the north shore, to which the current sets in very strongly, accompanied by large waves. From this point the Peace River widens out and the banks are generally low for a short distance, until the base of the mountains is reached.

Next day we reached the Peace River canyon about noon. Although the wind was down stream, we could hear the roar of waters fully half a mile before coming in sight of the gap. Coming down the river we swung round a point, when the whole stream suddenly seemed to disappear. It was not until we had passed a small sand-bar and I saw the opening running into the south bank that I could tell where the outlet was. The river, above the canyon, is fully half a mile wide and in places a mile, but at the canyon it sud-

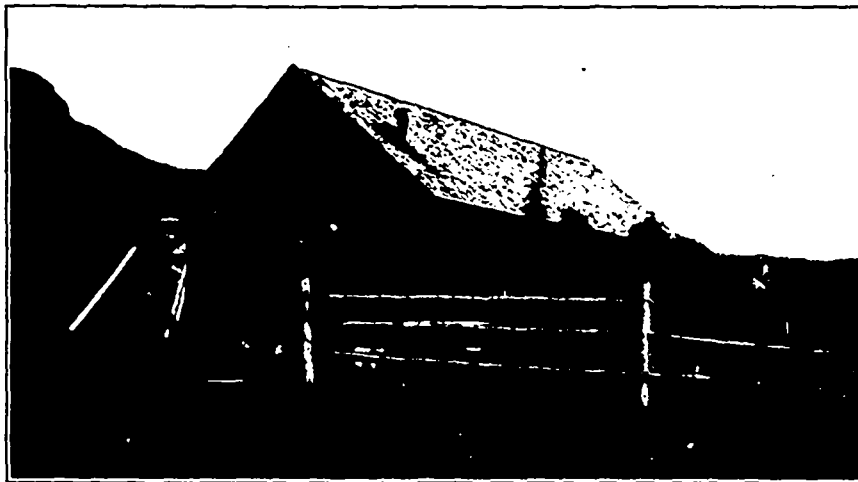
denly narrows to some 200 ft. while passing through the chasm. The rocks on each side of the canyon are water-worn to such an extent that in some places they overhang 20 or 30 ft. At the mouth of the canyon there were piles of driftwood on the rocks, 60 ft. above the level of the water at the time of my visit, showing to what a tremendous height it must "back up" during the time of flood.

We pulled our canoe out of the water and hid it in the brush, about 20 ft. above the level of the river, covering it with boughs. We also made a cache of everything we could do without, as we had a portage of 15 miles around the canyon to Hudson's Hope. At that point we hoped to get another canoe with which to continue our journey to Fort St. John, some 65 miles below the lower end of the canyon.

We started about 3:30 p.m., and camped for the night near the only water to be found on the portage, a small creek about half-way across. The next morning in two hours and a half we reached Hudson's Hope, only to find it abandoned. The trail from the

half miles below the canyon, there is a large flat on the north side of the river. This runs for about two and a half miles and extends about a mile back to the foot-hills, which are covered with bunch-grass. Judging from the banks and the height of the peavine and grass, the land is of the first class. A few scattered trees grow here and there, just sufficient to make it picturesque. Below this the river is divided by two rocky islands which rise perpendicularly to the height of 70 ft. or so, and are covered on top with a dense growth of spruce. These islands are formed of beds of sandstone lying horizontally, the bottom ones being about four feet thick and decreasing in size until at the top they are not over half an inch thick. This sandstone is very fine-grained, and from samples brought down I find it is very suitable for the manufacture of grindstones. On the rest of the route to St. John the river generally has sloping banks, with cliffs here and there composed of a dark blue slate mixed with clay.

We arrived at Fort St. John that evening, where I



Hudson's Bay Co's Post, Fort St. John, Peace River.

camp to Hudson's Hope was tramped down by bear and moose, some of the tracks showing quite fresh, but we did not meet any of the animals. There being no chance of obtaining a canoe, as expected, at Hudson's Hope, we followed the bank of the river. The banks here rise steeply to a height of about 150 ft., when they form a terrace wooded with pine timber. Open spots of prairie, here and there, give the country a beautiful park-like appearance.

About 3½ miles down the river we found dry standing timber, so I immediately set the men to work cutting down trees, preparatory to making a raft upon which to continue our journey to Fort St. John. By 9:30 p.m. we had our raft, oars and everything completed. The raft was 26 ft. long and 9 ft. wide.

Next morning, August 7, we commenced our journey on the raft. As the wind was blowing down river we hoisted a sail made out of a pair of blankets, which sent us along at a good rate, in fact, sometimes threatened to run us under water. About four and a

found that Mr. Bedson, the H. B. Co.'s officer in charge, and who is also deputy mining recorder, had gone to Peace River crossing for his year's supply of goods, and was not expected back for three weeks.

Fort St. John is now situated on the north bank of the river, having been moved across from the opposite side some years ago. The post is built on a level bench about 20 ft. above the river, and consists of a dwelling house and store. The situation is a pretty one, and the soil good. Grain and roots of all kinds grow well and ripen here. The hills, on both sides of the river, are grass-covered, but bare of trees.

Owing to Mr. Bedson's absence, I could not obtain any information regarding mining matters, as the man in charge knew nothing about them. There being no provisions available, I decided to commence the return trip as soon as possible.

I returned to Manson on the evening of September 1, having been gone six weeks and one day.

The distances travelled were as follows:

	Miles.
Manson to St. James	125
St. James to Macleod	90
Macleod to mouth of Parsnip	120
Mouth of Parsnip to Canyon	70
Over Canyon Portage	15
Canyon to St. John	70
Total	490

In 1904 the Provincial Bureau of Information published Bulletin No. 9, accompanying which was a map of the Northern Interior showing the two routes from Quesnel to Fort McLeod above-mentioned, and thence to Fort St. John; also the route taken by Mr. Vallean from Manson Creek. In the "Report of the Minister

route, he visited the gold district below Fort St. John. Not being a mining expert, Mr. Short was not in a position to make any statement about the value of the discovery, but he found the claim holders enthusiastic. He described the country on the north side of the Peace River between Dunvegan and Fort St. John as having all the characteristics of an excellent farming country. It is a rolling prairie, lightly timbered, on which the grass and hay grow luxuriantly. No settlers have gone in and none of this land is cultivated.

The Nelson 20,000 Club has adopted an effective plan of calling attention to the weekly returns of ore shipped by Boundary and Kootenay mines and smelted at district smelters, as compiled by and printed in the *Nelson Daily News*, which returns it sends by mail in



Guides and Boats on Northern Interior River.

of Mines for 1905," (pp. 1 93-102), may be found the notes of the provincial mineralogist on that portion of his trip to "The Northern Interior Plateau" between Quesnel and Fort St. James.

Regarding the Edmonton-Dunvegan route to the Peace River country, Mr. W. H. Short, manager for the Revillion Co., spent July and August of this year travelling between Edmonton and the Peace River country. A press despatch states that he took the prairie trail from Peace River crossing to Fort St. John and back, a distance of 220 miles each way. This is the trail which was made by the Dominion Government eight years ago and was repaired two years ago by the Northwest Mounted Police. He found the trail in excellent condition, the bridges intact, and good travelling all the way. While on the

all directions. It is well that such useful information be as widely disseminated as practicable and the enterprise of the *Daily News* in getting it together be made to serve so useful a purpose.

The special correspondent at San Francisco, California, of the *New York Engineering and Mining Journal*, says: It is announced that the gold from Alaska and the Klondike country will be minted in San Francisco this year, instead of at Philadelphia, where it has been sent for the past two years. Most of this gold is received at the United States Assay Office at Seattle, the next largest receiver being the Selby Smelting Co. of this city. Between \$20,000,000 and \$25,000,000 in gold yearly comes from these northern regions.

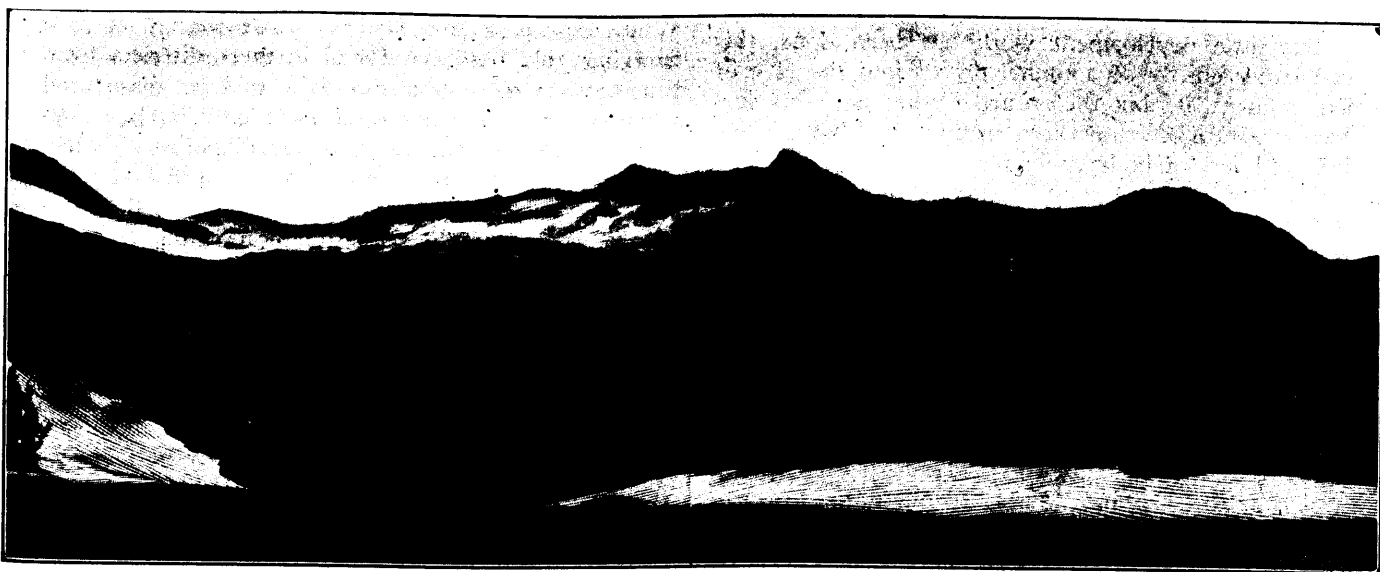
THE BIG INTERIOR GROUP OF MINERAL CLAIMS, VANCOUVER ISLAND.

PROMINENT among big surface showings of mineral discovered in the Coast districts of the Province is that of the Big Interior group. In January of 1905 the B. C. MINING RECORD published a short notice of the Big Interior, as follows: "This property is located almost in the centre of Vancouver Island, at the head waters of Bear River, and is reached *via* Alberni and Great Central Lake. Its altitude is about 5,000 ft. above sea level. Last year the owners cut a trail from the head of Great Central Lake to the workings and built two claims, one to each end of the lake. The trail from the head of the lake to the mine is about 10 miles long. This year

to get in to the claims, with the intention of bonding them."

Recently Mr. Herbert Carmichael, provincial assayer and assistant provincial mineralogist, acting under instructions from the minister of mines, made an examination of the property, and on his return to Victoria was authorised to give out for publication a general account of his impressions of it, which confirms reports previously received as to the great size of the showing of mineral.

Going from Alberni, Great Central Lake, which lies east and west, is reached by wagon road in 11 miles. As its elevation above sea level is only about 200 ft., the lake can be reached without difficulty. Thence for about 25 miles, the approximate length of the lake, travelling is by boat. From the head of the



Panoramic View of Big Interior Group, Showing Cliffs of Mineralised Rock.

they have done sufficient development work to prove that the very considerable showings of low grade ore are not merely superficial. These ore showings are most remarkable, being exposed the distance of nearly a mile, cropping out in steep cliffs about that distance. The ore body is of horseshoe shape, forming a basin, which, however, was covered with snow at both times the writer (Mr. Leonard Frank, of Alberni) visited the property. The photograph accompanying this description was taken in October, 1904. From present indications the property is capable of developing into an important productive mine, but capital is required to take the work in hand. There is available near by an abundance of water for power purposes."

Brief reference was made to the property in the published report, on the progress of mining in Alberni mining division during 1905, of the gold commissioner for the district, who said: "On the Big Interior group, in the great Central Lake country, assessment work was performed on seven claims. An attempt was made too late in the season by a party

lake to the mine the distance is as already stated about 10 miles. There is a gradual rise of something like 1,500 ft. in all, until a point within a mile and a quarter from the Big Interior is reached, when an abrupt ascent, described as nearly perpendicular, of 2,075 ft. has to be made, this landing the traveller on a plateau having a slight fall towards a small lake, about three quarters of a mile long by 400 to 500 yd. wide, on which there is a boat. From the farther end of this lake the trail runs north into the basin below the cliffs shown in the accompanying view. The head of this basin is hemmed in on three sides by precipitous cliffs, 1,000 to 1,300 ft. high, with peaks, snow-capped during the greater part of the year, rising at the back of them to a height of about 2,000 ft. above the lake at the foot of the cliffs, the highest points being 5,700 ft. or more above sea level. The summit of the high ridge forms a "razor-back," and the waters from the separate parts of these mountains drain in entirely different directions—north to Buttle's Lake and thence to Campbell River, east in the direction of Comox, south to Great Central Lake, and west by Bear River to Clayoquot.

The group consists of the Big Interior Nos. 1 to 7 (both inclusive) mineral claims. Practically the entire face of the cliffs, along a distance of about 4,000 ft. and averaging something like 1,000 ft. in height, appears to be strongly mineralised, the whole having a red colour. It is a granitoid rock, with copper pyrites, pyrrhotite and pyrite showing freely all along the face of the cliffs, the mass being generally of low grade with streaks of higher-grade ore occurring at irregular intervals. The mineralisation continues beyond the snow lying above the cliffs, the grade of the ore at an elevation higher than the highest point shown on the extreme left of the view herewith appearing better in places than in the face of the cliffs. At the base of the cliffs there lie thousands of tons of mineralised rock that has been eroded and has fallen down during ages of exposure to the elements.

But little development work has been done, this consisting chiefly of a tunnel driven into the face of the cliffs 31 ft., but the nature of the enormous surface exposure of mineralised rock is such that the few hundred feet of underground work it would be practicable for prospectors to do would not aid greatly in determining the value of the property. Development must be on a large scale to prove the extent and general grade of the ore, and this can not be undertaken by the present owners. However, the attention of capitalists has been directed to the property, so that it is probable it will ere long be bonded and arrangements be made for opening it up extensively.

Mr. Carmichael emphasises three points in particular, viz., that the property is of great size, that it is by no means so inaccessible as generally supposed, and that apparently the ore is suitable for concentration by a water process, the gangue being of a quartz character. As regards the question of accessibility, he says that there is a valley of considerable size towards Ash Lake, appearing to afford a fairly easy grade for a railway from the direction of Comox and that lake. The property, though, is one suitable only for operations on a scale commensurate with what surface indications suggest is its enormous proportions. A great deal of development work will have to be done to conclusively show whether large expenditures in connection with the provision of reduction and transportation facilities will be fully warranted. There should, however, be no great difficulty in thoroughly proving the property if ample capital be available, for, notwithstanding the altitude, the snow does not lie very deep on it in winter, and the climate is by no means severe, so that necessary communications could be maintained and underground operations carried on throughout the year.

The owners of the Big Interior are developing a small quartz vein on a claim situated in the same neighbourhood. It is about 30 in. wide of quartz mineralised with arsenical iron and carrying good values in gold. They have been heap-roasting some of the ore and have put in an arrastra for the purpose of recovering the gold from it.

WHITEHORSE, SOUTHERN YUKON.

WHITEHORSE mining district, as proclaimed in January, 1905, for the purposes of the mining regulations in force in Yukon Territory, has been divided into two mining districts, to be known respectively as the Conrad and Whitehorse mining districts. The former comprises all that portion of Yukon Territory tributary to Lake Bennett, Lake Nares, Lake Tagish, and Lake Atlin. The remaining portions of the old Whitehorse district now constitute the newly defined district of that name. The proclamation of this change took effect on August 1.

Discoveries of gold-quartz have been made in the Watson and Wheaton River districts, at points from 15 to 25 miles southwest of Robinson Siding on the White Pass & Yukon Railway. Although float rock carrying gold has been found in these districts from time to time since 1898, no claim to have discovered a gold-quartz ledge has been made until lately. President Graves, of the White Pass Railway Co., when in Dawson a fortnight ago, was reported by the *Yukon World* to have said: "The strike at the head of the Watson Valley is unquestionably genuine, though I have not had time to visit it in person. It is very accessible, as one can ride direct to the mines on horseback."

In the Windy Arm section of the Conrad district much development work as well as prospecting is being done. It is stated that in all there are about 500 men employed on some 40 claims, nearly half of this number being engaged in developing the various properties of the several Conrad companies. The question of whether the ore can be most economically dealt with by smelting in its crude state, or whether it is suitable for other concentration at low cost, is being carefully looked into by the management, which is arranging for exhaustive tests to determine these matters. Meanwhile few bulk shipments are being made, but a close record of assay values of the ore mined in the course of development is being kept. Good progress has been made with the work of constructing Riblet aerial tramways from the mines to the lake shore. The White Pass & Yukon Railway Co., which has had two different routes for a branch railway surveyed, is delaying construction until after the mining companies shall have decided the question of ore reduction—both as to method of treatment and location of reduction works.

The source of the fine specimens of native copper obtained at the head of White River and exhibited in Dawson in the summer of 1905, is reported to have been discovered by M. C. Harris and partners. Mr. Harris states that they found the vein some 700 ft. up the side of a steep mountain and that at a depth of ten ft. there is 30 ft. of copper ore between well defined walls. Upon news of the discovery spreading, between 100 and 150 men from the head of White and Tanana Rivers, Copper River and down to Valdez, and Klucane in the Whitehorse district, stampeded to the

locality of the new discovery. There is some doubt as to whether the claims are in Yukon Territory or Alaska, so, to make sure of holding them, they have been recorded in both countries. It is believed, though, that the locality is well within Canadian territory. Mr. Harris informed the *Yukon World* that in the centre of the ledge where opened is a streak of native copper from which a slab estimated to weigh about two tons has been taken out. Harris is on his way to San Francisco, California, where he will endeavour to make a deal for the property with Mr. Henry Bratnaber, who helped the partners by supplying them with stores, etc., when they were prospecting the section in which they made the discovery. Harris has been in the White River country eight years. His account of his find is believed in the Yukon.

Mr. Byron White, of Spokane, Washington, well known in the Slocan district, in which he has for years been operating the Slocan Star group of silver-lead mines, is opening up the Pueblo and Carlyle copper claims in the Whitehorse district. His principal work is being done on the Pueblo, where there are, so it is stated, thousands of tons of ore blocked out, while at the Carlyle about 100 tons of high-grade copper ore are on the dump. The mines were lately visited by the president and manager of the White Pass & Yukon railway, and arrangements for the shipment of 1,000 tons of ore discussed. A wagon road to the Pueblo is being constructed by the Government, and over this the sacked ore will be hauled to the railway. Mr. White's intention is stated to be to mine throughout the autumn and winter, employing some 30 men.

The Whitehorse *Star* has been informed that the Bullion Hydraulic Co. has recovered \$1,362 from 700 to 800 cu. yd. of gravel, this having been its first clean-up this season. Mining Recorder L. T. Burwash, on his return from an official trip to Teslin and Iron Creeks, reported fairly good prospects on the latter, on which a dozen men were working. From Livingston Creek 1.025 oz. of gold were received recently, and other placer fields in the district send encouraging reports.

MINING IN OREGON, IDAHO, AND WASHINGTON, U. S. A.

FROM the "Report for the Year 1905" of British Consul Laidlaw, of Portland, Oregon, the *Mining Journal*, of London, England, took the following information:

The mineral exhibits at the Exhibition at Portland, Oregon, during 1905, were most interesting, and the wide variety of ores from the States of this district shows its potentialities. The principal new developments have been in cinnebar properties in Lane, Jackson, and Crook Counties of Oregon and in the copper properties of Southern and Eastern Oregon and Northern Idaho. There is a continued advance in mining business in all three States of the district, and while there are numerous prospects which are

erroneously called mines, there is a very large amount of genuine development being done. Most interesting experiments were carried on at the Lewis & Clark Exhibition by Dr. Day (the chief of the Division of Mining and Mineral Resources of the United States Geological Survey) upon the black sands found on the beaches of this coast, and these are still being carried on at the expense of the United States Government. Dr. Day believes he has demonstrated that these sands can be worked at a profit and the valuable minerals they contain extracted.

I have made up the following table of the production of gold and silver from the preliminary estimates of the United States Mint and the very able report of Mr. Robert N. Bell, State Inspector of Mines for Idaho:

State.	Gold.		Silver.	
	Quantity. Fine oz.	Value. £	Quantity. Fine oz.	Commercial Value. £
Idaho . . .	60,516	250,172	8,626,794	1,039,254
Oregon . . .	63,863	264,033	81,560	9,950
Washington .	17,842	73,765	115,412	14,080
Total . . .	142,221	587,970	8,823,766	1,063,284
Total 1904	162,352	691,166	8,614,839	985,742

The large smelting and refining works at Tacoma, Wash., which not only treat British Columbia and Alaska ores, but also those from all the Pacific States and even from Mexico and South America, report the following product during 1905: Gold 238,949.58 oz.; value £987,817; silver, 2,178,964.55 oz.; value £261,227.

The Tacoma copper product was 20,351,261 lb., and that of Idaho 661,440 lb., average value 7½d. per lb. There was a strong demand during the year.

Lead was also in demand at higher prices than in 1904, averaging 18s. 9d. per 100 lb. Idaho produced 260,791,456 lb., and the product of the Tacoma smelter was 30,032,718 lb.

Formerly zinc ores were considered of little value in Idaho, but the product of the mines of that State in 1905 was 2,174,960 lb. of an average market value of £1 3s. 6d. per 100 lb.

There have been further developments of coal deposits in Idaho, which appear to be extensive and of good quality, selling at 10s. per ton at the mines.

No change has taken place in the status of coal mining in Oregon, the mines at Coos Bay are, the only workings of any extent, producing from 100,000 to 120,000 tons per annum. The coal, like most coast coals, is a lignite of good quality and non-coking. Coal is known to exist in other counties of the State, but the veins have not been worked pending the advent of railway transport.

The quantity of coal mined in Washington decreased during the last two years. The output of thirty-one mines was 2,818,045 short tons, which is fully 87,000 tons less than in 1904. This is attributed to the increasing use of oil as fuel. Exports are small and most of the coal is consumed locally or sent to southern ports on the Pacific coast. Production of coke was 50,972 short tons.

CORRESPONDENCE.

THE CANADIAN MINING INSTITUTE AND
THE NORTHWEST.

The Editor,—Ill-health has prevented me from replying to the article in your issue for May, headed "The Canadian Mining Institute and the Northwest," until this late date. But as the article contains several inaccuracies and mis-statements, which I feel sure you will be anxious to correct, I venture, though tardily, to place at your disposal the facts of the case.

Your contention, as I take it, is that the rules under which the business of the Institute is at present conducted, do not sufficiently take into account Western interests; and in proof thereof you point out that at the last annual meeting held in the City of Quebec, the West had but one representative in attendance. You further state that the Institute, during "the eighteen years it has been in existence," has held, so far as you are aware, but one meeting of members in British Columbia, that intimation has not been given to Western mining journals in respect to the annual meetings, nor have accounts of the proceedings been handed to the press, and, finally, you complain that British Columbian members of the Council have practically no voice in conducting the business of the Institute, that it is seldom, if ever, the opinion of these gentlemen is sought, even on important matters, and that only members of the council present at its meetings are allowed to vote. Thus you, perhaps, pertinently enough, in the belief that your statements are correct, ask: "What practical benefit does the Province derive from having 70 or 80 of its mining and smelting men members of the Canadian Mining Institute, and what use has the Institute for the Province other than as a contributor to its revenues?" At the same time you might equally as well have put the same enquiry concerning any half dozen other technical organisations with a British Columbian membership.

Now, sir, if I may call your attention to the charter under which the Institute was incorporated by Act of Parliament, you will observe that the objects for which the society was organised, are fourfold, and that the holding of meetings is explained as being but one means by which one of those objects, may be best carried into effect. Without in any way desiring to discount the importance and interest to members of the annual meeting, it may easily be said that inability to attend by no means implies that a member thus fails to derive the full value of his annual subscription. He, of course, misses the benefit and opportunity of meeting his fellow members, engaged in the same pursuit as himself, but on the other hand, he receives in due course through the mails a report of the meeting, papers read thereat and the discussions thereon, and has the opportunity if he so desires of expressing his own opinions for publication on any of the topics introduced. As you

with just pride boast, British Columbia is a great contributor to the mineral wealth of the Dominion, but it is still the far West: just as the maritime provinces, which are also rich in coal and iron, are the far East. Hence, without regard to the relative importance of the provinces as mineral producing areas, but having regard to the question where is it possible to get together the most representative gathering of mining men? the consensus of opinion in past years has been that the annual meetings should be held in one of the large central cities of the Dominion.

Referring you again to the charter, you will find that the Institute was incorporated in the year 1898, and that it is not, therefore, eighteen years old but nine. Even you, sir, hard worker though you be, would consider the critic unfair, who, doubling your age, computed the sum of your endeavours inadequate where spread over the longer period. To my personal knowledge the late secretary of the Institute, Mr. B. T. A. Bell, visited British Columbia at least three or four times in the interests of British Columbian members, and a very successful summer meeting was held in British Columbia in 1899, and again three years later. So that instead of one meeting in eighteen years, there have been two meetings in less than nine years: while the project of holding a meeting in the Province next year, when the Institute will in all probability have a British Columbian president, has been informally discussed for some time past, by members of this year's executive. Equally incorrect is your assertion that the British Columbia members of the council have no voice in the conduct of the business of the Institute. Par. XXXII., Sec. VI. of our by-laws reads as follows: "At all meetings of the council five shall be a quorum for the transaction of business, and as soon as possible after each meeting copies of the minutes shall be sent to each member of the council. In the event of a majority of the whole council signifying to the secretary a wish to reconsider any act of a council meeting, this shall be done at the regular council meeting, and letter ballots shall be accepted from such members as are unable to be present, and a majority of votes shall decide the point at issue." But, I may add, since I was elected to the secretaryship of the Institute in March, I have, acting under the instructions of the council, submitted every important matter that has arisen, to the consideration of the whole council by letter, and requested a vote by letter ballot.

Your complaint that notices and reports have not been sent to Western newspapers is, however, not unreasonable, and there is no reason why such information should not be supplied in future. Probably it was not considered necessary to do so in the past, as all notices have been and still are, of course, sent direct to those chiefly interested, namely, the members of the Institute, wherever residing. It should not be necessary for me to add that there has been no intentional discrimination in this respect on the part of the Institute against the Western technical press, whose goodwill is earnestly desired.

You refer elsewhere in your article to an alleged struggle for ascendancy and control of affairs between contending factions in Ontario and Quebec. Allow me to assure you that in this, you exaggerate the situation out of all proportion, and the ballots cast at the last two annual meetings clearly show the unanimity of sentiment on all matters of real significance. But when you talk of "sectionalism and provincialism," and deplore that these should have been "substituted for the national spirit that alone can build up to great influence and material success any institution having more than local aims." I am quite sure that it did not occur to you for a moment that your own article bore the interpretation of the narrower point of view, and that you were making a direct appeal to the "provincial" spirit. What, you ask, is the Institute doing for British Columbia? Nothing more and nothing less than it is doing for Ontario or Quebec or Nova Scotia. Its efforts are being directed to promoting the welfare and interests of the mining industry of Canada, and that knows no Provincial boundaries. If, however, these efforts are being misdirected to the detriment of any section of the mining community, then your ground is well taken, but neglect has yet to be proved.

H. MORTIMER LAMB,

Secretary Canadian Mining Institute.

Montreal, Quebec, August 15, 1906.

We willingly publish the foregoing letter. In reply we state that we believe we are in a position to show (1) that, prior to the appointment of the present secretary, very important matters were disposed of without Western members of the council having been given a voice in their disposal, in one instance involving serious financial results without even a quorum of members present; (2) that there most assuredly was a determined struggle for "ascendancy and control" between "contending factions in Ontario and Quebec," whether the present secretary is in ignorance of this fact or not; and (3) that, as previously stated by us, "in the report of the annual meeting published in one of the most important mining journals of the world there was mention of progress in Quebec and Ontario, and of the prospects of the Yukon, but never a word concerning the fact that British Columbia last year made a record in mineral production and that its prospects for the current year are distinctly favourable to still further progress"; but since we have the secretary's assurance that the mining interests of Western Canada have latterly been, and are, receiving their due share of attention we are content to let the matter rest at that, our object being not to endeavour to discredit the Institute for the sake of doing so, but to stir the council up to following the excellent example set by the American Institute of Mining Engineers which, we still think, has of late years shown far more active sympathy with the mining interests of the Canadian Northwest than has the Canadian Mining Institute. We trust, though, that before the *Journal*

of the Institute for 1905 shall be printed some means will be devised for rectifying the omission of reference to British Columbia's considerable increase in mineral production in 1905, so that simple justice may thus be done this Province in that important publication.

There are several other points upon which we are not in agreement with the secretary's presentment of the case, but for a like reason to that already given shall abstain from going into them. We must, however, express our regret that the secretary should seem to have attributed intentional unfairness to us in the matter of the length of time the Institute has been in existence, since we only look for such imputations from those who are in the habit of misrepresenting whomsoever they criticise. We think it, to say the least of it, ungenerous, to suggest intentional unfairness on the part of the editor of the *B. C. MINING RECORD* when he made the simple mistake of regarding the Canadian Mining Institute as having been incorporated 18 years instead of eight. Nevertheless we heartily wish the secretary substantial success in his efforts to greatly extend the usefulness of the Institute and in particular in his attention to the Canadian West.—Editor *B. C. MINING RECORD*.

According to a Washington correspondent of the *London Critic*, the United States Mint authorities look for an enormous increase in Alaska's gold production in the next few years. Alaska, they say, has been merely scratched on the surface. With improved machinery and abundant capital to work the mines, the output can be made second only to the Rand. Apart from its extensive alluvial deposits, Alaska possesses numerous low-grade ore properties, which, as the Alaska-Treadwell shows, can be made to pay handsomely when worked on a large scale.

The Slough Creek Gravel Gold, Ltd., reorganised and registered in London, England, as the Slough Creek, Ltd., is employing 36 men (including 12 Chinese on the surface, underground men all being white) at its deep-drift mine on Slough Creek. The *Ashcroft Journal* states that progress in retimbering the drain tunnel through caved ground is slow, but this work is being pushed ahead steadily. In the main workings a south drift is being run from near the head of the first incline; on August 17 the drift had gravel in the roof, but no trouble from water or pressure had been experienced. The purpose of driving this drift is to draw more water and to determine whether the material decrease that has lately taken place in the flow of water underground may be regarded as indicating that the problem of draining the deep gravels so long grappled with, has at length been successfully solved, after several years' work towards this end. The mine shaft-house is being enlarged, to house two more steam boilers ordered. Other additional equipment being obtained includes an engine with 16 by 36-in. cylinders and a direct-acting hoist with 7-ft. drum.

COMPANY MEETINGS AND REPORTS.

SECOND RELIEF MINING CO., LTD.

The annual general meeting of shareholders in the Second Relief Mining Co., Ltd., was held at Nelson on August 4. The following report of the meeting has been taken from the *Nelson Daily News*:

President A. B. Cooper of Nelson, was enabled to present to the shareholders a remarkably satisfactory statement, the details of which are appended.

The property is situated 13 miles southwest of Erie and was purchased from Finch & Campbell of Spokane, a year ago last March. The present company was formed and active work commenced a year ago last April. It will be noted that the subscribed capital was \$20,000 and that the net profits to June 30 last were \$23,036.52. The receipts from bullion and concentrates amounted to \$85,843.16, and the mine profit was \$21,033.16. The financial statement, which is an eminently satisfactory one, to June 30, 1906, is as follows:

Profit and Loss Account.

Cr.	
Receipts bullion and concentrates	\$85,843 16
Dr.	
Mine operation and surface labour	\$35,983 40
Mill operation, ore sorting, etc.	11,038 45
Tram, hauling, marketing, etc.	8,002 66
Maintenance	1,553 44
Management and general expenses	8,148 05
Nelson office expense	83 70
Mine profit for period	21,033 46
	\$85,843.16

Summary of Profits.

Mine profit, above	\$21,033 46
Boarding house profit	1,859 48
Stores acct. profit	143 61

Total profit \$23,036 55
Plus the net value of about 18 tons of concentrates at the mine awaiting shipment, estimated at \$7,000.

The officers and directors of the company, were all re-elected for the current year, as follows:

President, A. B. Cooper, Nelson; vice-president, O. E. McElfresh, Osage City, Kansas; directors, J. E. Hyde, Redding, Kansas, and Senator H. B. Miller, Osage City, Kansas.

PHOENIX AMALGAMATED COPPER MINES, LTD.

The *Phoenix Pioneer* recently gave the following particulars of this company and its properties:

Last spring the announcement was made that a consolidation of several well known mining claims in this camp would be made, including the War Eagle, Red Rock and Bald Eagle groups, the new corporation to be called the Phoenix Amalgamated Copper Mines, Ltd. Information has now been received that the consolidation has been carried into effect and that it takes in the War Eagle, Red Rock, Lulu, Bald Eagle, Dandy Fraction, Missing Link No. 2, Pinhook and World's Fair fraction, contiguous claims immediately adjoining the Granby Consolidated group on the south. The area of the properties is 210.30 acres.

The Phoenix Amalgamated Copper Mines, Ltd., has been incorporated under the laws of British Columbia, with a capital of \$5,000,000, having 500,000 shares of \$10 par value each. Of this number 200,000 shares have been placed in the treasury of the company, the executive office of which is at Sherbrooke, Quebec, and the mine office at Phoenix.

The first board of directors of the new company is as follows: F. P. Buck, C. H. Fletcher, and C. A. French, of Sherbrooke, Que.; George Vandyke, Boston, Mass.; H. P. Buck, New York, N.Y.; W. J. C. Wakefield, Spokane, Wash.; George R. Naden, Greenwood, B.C.; Charles Rior-den, St. Catharines, Ont.; R. Bence Jones, Lisselan, Clonakilty, Ireland. The officers are: President, F. P. Buck; vice-president, C. H. Fletcher; secretary, A. F. Fraser.

The work done is largely on the War Eagle, one of the original locations of Phoenix camp, which mine has good machinery, plant, and mine buildings, used when the property was being operated several years ago. It has a working shaft 100 ft. deep, with considerable drifting at this level. The location of the War Eagle is said to cover the Old Ironsides and Knob Hill veins, and what is supposed to be the Victoria vein, also of the Granby properties. The outcrops on the surface are large, and in appearance identical with the Granby outcrops. The values are low, like others in this camp, yielding from 0.5 to 3 per cent copper, and from \$1 to \$4 gold per ton. In the workings of the property, in the raise from the 100-ft., east cross-cut, some of the best values were encountered, assays giving \$21 in copper and \$1 in gold per ton. Less work has been done on the Red Rock, Lulu and Bald Eagle than on the War Eagle, but the veins are strong, and the claims, together with others of the group, are considered of great potential value, having a continuance of the large veins of the War Eagle, common to this camp.

The properties of the company are well situated for economic mining by the quarrying system, while tunnels and shafts will also be used. The two railways, it is stated, are ready to build spurs to the property, when shipments shall be ready.

COMPANY CABLES AND NOTES.

British Columbia.

Cariboo Consolidated.—The following cable has been received from the resident manager in British Columbia:—During the month of July washed 1,358 cu. yd. of gravel, yielding 209 oz. of gold.

Le Roi.—July: Shipments amount to 12,000 tons, containing 4,220 oz. gold, 5,470 oz. silver, 238,500 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realisation and depreciation, \$33,000. Expenditure on development work during the month, \$13,250.

Le Roi.—The following cable was received from the managing director at Rossland late in August:—Have arranged to cancel contract made by late directors with Trail smelting works last year; intend to start Northport smelter on or about October 15.—A. J. McMillan.

Le Roi No. 2.—July: shipped 2,100 tons. The net receipts are \$48,181, being payment for 1,905 tons shipped and \$1,700 being payment for 81 tons concentrates shipped, in all \$49,884.

Tyee.—July. Smelter ran 11 days and smelted—Tyee ore, 1,792 tons; custom ore, 395 tons; total, 2,187 tons. Matte produced, 220 tons. Gross value of contents (copper, silver and gold) after deducting costs of refining and purchase of custom ore, \$31,128.

U. S. A.

Alaska Mexican.—July: 120-stamp mill ran 28¾ days; crushed 19,882 tons ore; estimated realisable value of bullion, \$32,038. Saved 369 tons sulphurets; estimated realisable value, \$31,095. Working expenses, \$32,213.

Alaska Treadwell.—July: 240-stamp mill ran 28¼ days, 300-stamp mill ran 28½ days; crushed 84,924 tons ore; estimated realisable value of bullion, \$77,682. Saved 1,311 tons sulphurets; estimated realisable value, \$53,256. Working expenses, \$76,129.

Alaska United.—July: Ready Bullion claim—120-stamp mill ran 28½ days; crushed 19,139 tons ore; estimated realisable value of bullion, \$22,466. Saved 387 tons sulphurets; estimated realisable value, \$12,461. Working expenses, \$26,951.

DIVIDENDS.

The Providence Mining Co., of Greenwood, Boundary district, distributed \$16,000 among its stockholders at the close of August, prior to which month no dividend had been paid by this company for nearly two years.

At a meeting of directors of the Granby Consolidated Mining, Smelting and Power Co., Ltd., held in New York on August 7, inst., a dividend of three per cent upon the

par value of the stock outstanding was declared out of the net earnings of the company, payable September 15, prox., to all stockholders of record at close of business on August 29. There being 1,350,000 shares at \$10 each issued, making a total of outstanding capital, at par value, of \$13,500,000, amount of dividend is \$405,000, bringing total to date up to \$1,348,630, as under:

No. 1, Dec. 19, 1903	\$133,630
No. 2, January, 1906	405,000
No. 3, May, 1906	405,000
No. 4, September, 1906	405,000
Total declared	\$1,348,630

Of this total the sum of \$1,215,000 stands to credit of profits distributed during the current year.

NOTES.

The amount paid out in August at Moyie, East Kootenay, by the Consolidated Mining and Smelting Co. of Canada, on account of the July payroll of the St. Eugene mine was \$31,071.75.

July payrolls at the Crow's Nest Pass Coal Co.'s collieries showed the following totals: Coal Creek, \$88,873.45; Michel, \$53,534.45; Carbonado, \$1,206.80; grand total, \$143,614.70. This money was paid out during August at the several pay offices of the company.

The Phoenix Pioneer places the amount of money paid out in August on account of July payrolls by mines, smelters, and railways operating in the Boundary district at \$200,000, in the following proportions: Granby Consolidated M. S. and P. Co., \$70,000; British Columbia Copper Co., \$35,000; Dominion Copper Co., \$35,000; smaller mines, \$20,000; railway companies, \$40,000; total, \$200,000.

The annual general meetings of the Granby Consolidated Mining, Smelting and Power Co., and the Providence Mining Co., both operating in the Boundary district, will be held during October next. That of the first-named company will be held in New York city, and that of the other at Greenwood, B.C.

At a meeting of the Nicola Coal Mines, Ltd., held recently in Spokane, Washington, Mr. C. J. Orland, of Moscow, Idaho, was elected president of the company, and Mr. A. J. Davis, of Colfax, Wash., vice-president. The company holds coal lands situated in the Nicola district of British Columbia.

A press despatch from Golden states that the Laborers' Co-Operative Mining company is showing much activity. A road is being constructed to the Good Luck mine, near Golden. The company's engineer, Mr. F. N. Anderson, has set up an assaying plant in the company's building in that town. He is studying the problem of winter work, which is rendered difficult on account of the considerable altitude of some of the properties.

The Tyee Copper Co.'s smelter returns for August are as follows: Smelter at Ladysmith, Vancouver Island, ran 14 days and treated 2038 tons of Tyee ore, giving a return, after deduction of freight and refining charges, of \$37,203.

Derricks are now built strong enough to lift weights of 100 tons. They stand upon concrete foundations of great depth, and can swing their immense loads a distance of 63 ft.

Machines are now made which compress cement and cut it into blocks of all kinds for ornamental work, columns and cornices, and for use in the construction of apartment houses, factories, business blocks and churches. Many buildings made of concrete look as though built of stone, because the concrete is cut and pressed into blocks which look like stone.

CERTIFICATES OF INCORPORATION.

Pacific Slate Co., Ltd., with a capital of \$125,000, divided into 125,000 shares of \$1 each.

Empress Mining Co., Ltd., with a capital of \$250,000, divided into 2,500 shares of \$100 each.

Tulameen Coal and Coke Co., Ltd., with a capital of \$100,000, divided into 100,000 shares of \$1 each.

Northwest Power Co., Ltd., with a capital of \$10,000, divided into 10,000 shares of \$1 each.

Pacific Pulp and Power Co., Ltd., with a capital of \$250,000, divided into 5,000 shares of \$50 each.

Recobond Mining Co., Ltd., with a capital of \$10,000, divided into 10,000 shares of \$1 each.

Elk Valley Coal Co., Ltd., with a capital of \$200,000, divided into 200,000 shares of \$1 each.

Kootenay Amalgamated Oil & Coal Co., Ltd., with a capital of \$1,000,000 shares of \$1 each.

NOTES OF MINERAL PRODUCTION.

By September 1 the tonnage of ore shipped by Boundary district mines this year will have reached a total of about 820,000 tons, as compared with 935,000 tons for the whole of 1905. In round figures the proportions of this year's total are as under:

	Tons.
Copper-gold ores—	
From Granby Co.'s mines	570,000
“ Dominion Copper Co.'s do.	150,000
“ British Columbia Copper Co.'s do.	95,600
“ Snowshoe Co.'s mine	2,000
“ Big Copper do.	600
Silver-gold ores—	
From Providence mine	900
“ Skylark do.	500
“ sundry small shippers	400
	820,000

The production of Rossland mines during eight months to the end of August was, approximately, 210,000 tons. The figures for the several mines are about as follows:

Mine.	Tons.
Centre Star and War Eagle	92,000
Le Roi	86,000
Le Roi No. 2	18,000
Le Roi No. (2 milled)	11,000
Jumbo	2,600
Miscellaneous	400
	210,000

CROW'S NEST PASS COAL CO., LTD.

The production of coal and coke at this company's collieries and coke ovens during the month of August was as under:

Coal—	
Coal Creek colliery	58,853
Michel do.	34,149
	93,002
Coke—	
Fernie ovens	10,039
Michel do.	10,742
	20,781

August production of coal was the largest in the history of the company. The previous record month was last June, when the output of Coal Creek colliery was 54,772 tons, and of Michel 36,306 tons, total 91,078 tons. A shortage of railway cars to some extent interfered with the shipment

of coke and made this month's total a little below the average tonnage for earlier months of the year.

Production of coal for the eight expired months of 1906 has been: Coal Creek 377,989 tons; Michel, 245,199 tons; Carbonado, 22,578 tons; total, 645,766 tons. The coke figures for the same period are: Fernie, 84,253 tons; Michel, 86,157 tons; total, 170,410 tons.

CONSOLIDATED MINING AND SMELTING CO. OF CANADA, LTD.

Ore receipts at this company's smelting works at Trail during seven months, January to July, 1906 (inclusive), were:

Mine.	Tons.
American Boy	61
Ben Hur	969
Central	52
Centre Star	90,909
Crown Point	369
Eureka	310
Hunter V.	1,218
Iron Mask	2,439
Kootenay Belle	282
La Plata	74
Le Roi No. 2	15,685
Le Roi	72,926
Lone Bachelor	274
Mother Lode	56
North Star	2,546
Providence	730
Rambler	55
Sally	87
St. Eugene	12,695
Silver King	789
Snowstorm	1,445
Sundry small lots	248
Total	204,719

HALL MINING AND SMELTING CO., LTD.

The receipts of ore at this company's smelter at Nelson during August from various mines, and the lead contents of the ore, were as under:

Mine.	Ore. Lb.	Lead. Lb.
Arlington (Slocan)	214,739	15,295
Arlington (Erie)	226,318	8,957
Blue Bell	114,643	20,437
Buffalo	44,944	18,337
Cork	140,490	84,856
Duluth	9,128	5,148
Krao	107,019	3,241
La Plata	408,324	48,131
Lorna Doone	46,545	745
Lucky Boy	39,476	7,867
Mascot	2,825	975
Monitor & Ajax Fraction	118,951	49,119
Mountain Con.	33,267	2,927
No. 1	63,494	1,587
Payne	73,080	45,692
R. E. Lee	34,509	15,840
Ruby Silver	20,956	9,053
Ruth	169,350	89,102
St. Eugene	4,453,521	2,425,956
Silver Cup	274,836	83,615
United	42,095	6,062
Vancouver	43,730	20,509
Wakefield	48,252	23,064
Whitewater	335,012	164,975
Whitewater Deep	83,347	37,711
Wonderful	11,970	8,918
Ymir	392,913	34,102
Totals	7,553,734	3,232,221

COAL NOTES.

The steamers "Duneric" and "Elleric" both loaded coal for Cape Nome at Ladysmith in August. This is the shipping port for the Wellington Colliery Co.'s Extension mines on Vancouver Island. The "Edith" took coal from Nanaimo, also for Nome.

Mr. G. R. Hunt, foreman of the Elk River Coal and Oil Co., states that the company is making progress with development work on its coal lands on Elk River, about 65 miles from Michel, South-east Kootenay.

The Alberta Coal and Coke Co., operating the Howley mine near Lundbreck, has completed a prospect shaft on its property and struck a fine seam of excellent domestic coal. A main working shaft is to be started at once and Manager Metcalf expects to have a complete plant installed and running this autumn.

Mr. B. L. Thorne, superintendent of the Pacific Coal Co., states that the work of building a wagon road to the coal camps on the Upper Elk River, is making good progress, about three miles having been completed. The work is being rushed before the autumn weather shall set in. He is taking out men to the coal camp, where active operations will be commenced at once.

Development work at the Canadian Pacific Railway Co.'s coal property at Hosmer, Crow's Nest Pass, is being proceeded with satisfactorily to the local management. A big cut at the mine, preparatory to commencing to drive the tunnel, has been completed. This cut is 450 ft. long, 150 ft. wide, and 16 ft. deep. The main tunnel, says the *Fernie Free Press*, is to be driven 5,000 ft.; it will be 22 ft. wide and 10 ft. high. Everything is now in readiness for the installation of the big boilers, which have been on the ground for a year, and for placing the compressed air machinery in position to supply power for drilling. When this machinery shall have been installed development work will proceed rapidly and systematically. Already there are 75 men on the payroll. The sawmill will be in operation shortly to cut mine timbers, which will be required in large quantities for the main tunnel. It is said the timbers will be placed only 2½ ft. apart.

CONSTRUCTION NEWS.

British Columbia Copper Co.'s Smelter, Greenwood.—Included in the new plant and equipment the British Columbia Copper Co., Ltd., of New York, is installing at its smelting works, Greenwood, Boundary district, are five 25-ton cars carrying bowls or pots for dumping the slag hot. These cars are standard railway gauge, equipped with air brakes, etc., and two of them have already made the trip from the manufactory in New Jersey to Greenwood, a distance of nearly 3,000 miles, on their own wheels. On each car is an electric motor for operating the worm gear for tilting the pot and dumping its molten contents. Two 15-ton Baldwin-Westinghouse electric locomotives, for hauling the slag cars, have also been received at the Greenwood smelting works.

Montezuma Concentrator, Kaslo.—What will practically be a new concentrating mill is being prepared for operation on the south fork of Kaslo Creek, in Ainsworth mining division. The mill built by the Kaslo-Montezuma Mining and Milling Co. in 1897 was dismantled years ago, and the aerial tramway connecting mine and mill was nearly destroyed by snowslides. The mill building is being repaired preparatory to installing modern concentrating plant to have a capacity of 100 tons of crude ore per diem. Tramways will be built to connect the Montezuma and Province mines with the mill, and a wagon road constructed over which to haul the silver lead and zinc concentrates the 2¼ miles to the Kaslo & Slocan railway for shipment thence to smelters.

Eva Gold Mine, Camborne.—The high-pressure half of a Canadian Rand Drill Co.'s compound duplex Corliss-valve 15-drill air compressor has been ordered for this mine, situated in Fish River district, Northern Lardeau; delivery to be made during September. The compressor is to be direct connected to a Pelton water wheel, 13 ft. 2 in. in diameter. Four or five machine drills are also being obtained, and 5,500 ft. of 4-in. well-casing steel pipe for an air line from the company's 10-stamp mill in the valley, where the compressor will be installed, up the mountain to the mine. It is intended to shortly increase the capacity of the stamp mill to about 100 tons per diem, and an eventual increase to 40 stamps is contemplated.

Dominion Copper Co.'s Smelter, Boundary Falls.—At the Dominion Copper Co.'s smelter at Boundary Falls, Boundary district, a second smoke stack is being built. It is to be self-supporting, 8 ft. diameter and 100 ft. high on a 10-ft. high concrete base. From the new furnace in course of installation there will be a balloon flue of steel about 100 ft. in length, and between this and the smoke stack a brick dust chamber 50 by 30 ft. The furnace is being supplied by the Traylor Engineering Co., of New York. It is 44 by 255 in. at the tuyeres, of which there are 22 of 3½ in. on each side, these being set at 10-in. centres. The furnace will have the Giroux hot blast, to be used here for the first time in British Columbia.

Consolidated Mining and Smelting Co.'s Smelter, Trail.—Among extensive improvements being made at the smelting works of the Consolidated Mining and Smelting Co. of Canada, situated at Trail, Rossland district, are large receiving bins and new sampling mill for copper ores. Three bins 28 ft. high—two 18 by 16 ft. and one 12 by 16 ft.—feed directly into a No. 8 McCully crusher, built by the Power and Mining Machinery Co. of Cudahy, Wisconsin, U.S.A., and having a capacity of approximately 200 tons per hour. Other bins, eight or ten in number and 16 by 16 ft. and 30 ft. high, discharge into cars drawn by an electric motor to the crusher. Other plant in the sampling mill includes Vezin automatic samplers, two more crushers and three sets of rolls. Elevators are Hadfield's New Era manganese steel crane with 32-in. buckets. From the sampling mill the ore passes into bins under which run trains of ore cars drawn by electric motors to the blast furnace bins. Ore trips consist of three to four cars, each containing about six tons. Handling from the time the ore is dumped from the railway cars into the receiving bins until it reaches the furnace bins is thus reduced to a minimum. An electric haulage system between the furnace bins and the blast furnaces is being arranged for. Beside the trestle over the receiving bins, which is about 40 ft. high at its far end, a trestle runs from the sampling mill to a stock yard where ore not to be smelted immediately after sampling can be stored. The company's lead sampling mill has been remodelled with the object of increasing its capacity, and, as well, making it possible to obtain a product crushed to a finer mesh, this being required for the newly-adopted method of roasting the lead ores by the Huntington-Heberlein process, in connection with which two roasters and 12 converter pots have been installed, with a proposed addition of more of the latter under consideration.

TRADE NOTES AND CATALOGUES.

Bulletin No. 34 from the Hydraulic Department of the Canada Foundry Co., Ltd., with head office and works at Toronto, Ontario, gives much information relative to "Single and Duplex Steam Pumps for General Purposes." Various types of steam pumps are illustrated and described in detail, while accompanying tables show sizes and capacities. This bulletin contains much useful information for those who require steam pumps.

The following have been received from the Wellman-Seaver-Morgan Co., of Cleveland, Ohio, U.S.A.: Circulars No. HO-7, "High-Grade Geared Hoisting Engines" and

HO-9, "High Grade First Motion Winding Engines"; Bulletins M-101, "Akron Crushing Rolls"; M-103, "Stamp Mills and Equipment," and M-104, "Copper Converters and Equipment."

The Canadian Westinghouse Co., Ltd., of Hamilton, Ontario, has issued Bulletins 1035, "Westinghouse No. 12A Railway Motor," and No. 1133, "Westinghouse Revolving Field Alternators," both illustrated with half-tones and diagrams and giving full particulars of their respective subjects. The same company has also published recently a 46-page pamphlet (Special Publication No. 7045) entitled "Electricity in Heavy Railway Service," containing information showing the advantages of electrical methods and equipment as compared with steam; tables of operating costs of the two services, respectively; descriptions of electrical installations and equipment, and of electric rolling stock on a number of railway systems, together with much information relating to these matters.

The Sturtevant Mill Co., of Boston, Mass., has published an illustrated booklet on "Crushing and Grinding Machinery." "The Economical Lighting of Industrial Plants" is the title of a booklet received from the Cooper-Hewitt Lamp Co., of Pittsburg, Pa.

The Nernst Lamp Co.'s "Series Alternating Vertical Glower Street Lighting System" is the subject of a pamphlet sent from Pittsburg, Pa. The Canadian Westinghouse Co. is the manufacturer for Canada of lamps and equipment for this system.

A small booklet received from the Steel City Electric Co. of Pittsburg, Pa., gives particulars of "Star Bushings and other Contractors' Supplies."

W. H. C. Mussen & Co. of Montreal, Quebec, have had printed a "Reference List of Machinery and Supplies for Railways, Mines, Contractors, and Municipalities." This list has been compiled as a guide to intending purchasers. Contractors and others will find it helpful as a reminder of many things which might be overlooked if ordering without such a list at hand, while purchasing agents may find it useful when desirous of obtaining prices on material for which they are not sure where to look. The list will be supplied gratis on application.

The Westinghouse Electric and Manufacturing Co. of Pittsburg, Pa., has had printed in Spanish an attractive looking booklet entitled "Industrias Y Productos de Westinghouse." It contains particulars of its leading lines of manufactures and is freely illustrated with half-tone views of its works, plants and machinery it has supplied to its customers in various parts of North and South America, etc. It is an attractive looking specimen of well-finished printing, and will no doubt be in much demand, especially in Mexico and South America. Another publication from the office of this company is its Special Publication 7049, "Westinghouse Alternating and Direct-Current Motors for all Classes of Service."

North America's coal deposits are estimated by the German periodical *Stahl und Eisen* at 681,000,000,000 tons. The total for all Europe is placed at 700,000,000,000. But these gigantic figures are said to be dwarfed by Asia's deposits, which cannot at present be even approximately estimated. China is supposed to possess inexhaustible supplies of coal. Indeed, a German scientist is credited with estimating the deposits of the Province of Shansi alone at 1,200,000,000,000 tons. Siberia and the island of Sakhalin are also credited with vast deposits, of unestimated extent.

The methods of mining zinc are radically different in various sections. In the Joplin district there are large pocket deposits, from which ore can be removed cheaply and in a crude manner. The Wisconsin miners handle their zinc in the same manner as the Joplin producers. In the Rocky Mountains conditions are entirely different, as they are also in New Hampshire and other Eastern states, necessitating still different methods of handling and shipping the ore.

GOLD RECEIPTS AT UNITED STATES ASSAY OFFICE, SEATTLE, WASH.

The following tables show the total gold received at the United States Assay Office at Seattle, Washington, and the gold bullion received from the different districts of Alaska, respectively, during the fiscal year ended June 30, 1902:

TOTAL GOLD RECEIVED.

Locality.	Gold		Silver.	
	Standard oz.	Coinage val. \$	St'nd'rd oz.	Coin. val. \$
Alaska	561,229.395	10,441,477.11	75,780.	88,181.12
California	291.271	5,419.00	85.86	99.91
Colorado	78.253	1,455.87	39.82	46.34
Idaho	2,196.921	40,872.95	367.01	427.07
Montana	140.448	2,612.99	39.46	45.92
Nevada	23.511	437.41	1.49	1.73
Oregon	1,830.800	34,061.40	377.63	439.42
Washington	2,190.934	40,761.56	251.23	292.34
Wyoming	11.012	204.87	0.07	0.08
British Columbia	74,772.618	1,391,118.48	11,802.06	13,733.31
Yukon Territory	321,250.597	5,976,753.62	77,641.61	90,346.60
Masbate Island	7.986	148.53	3.55	4.13
U.S. Gold received over counter.	8.950	166.51	109.03	126.86
Jewelry bars	467.051	8,689.32
Foreign coin	60.899	1,133.00	0.78	0.91
Total	964,560.646	17,945,312.67	166,500.25	193,745.74

GOLD BULLION RECEIVED.

Locality.	Gold.		Silver.	
	Stand'rd oz.	Coinage val. \$	St'nd'rd oz.	Coin. val. \$
Copper River	784.327	14,592.13	156.42	182.02
Council	1,881.672	35,007.85	187.44	213.11
Eagle	3,564.075	66,308.37	573.64	667.51
Koyukuk	5,104.627	94,969.80	201.82	231.85
Nome	208,243.462	3,874,296.97	21,965.49	25,559.84
Tanana	310,230.188	5,771,724.43	47,644.64	55,447.03
Valdez	12,787.412	237,905.34	1,301.50	1,514.47
White Horse	2,709.976	50,418.16	456.14	530.78
Unclassified	15,923.656	296,254.06	3,293.56	3,832.51
Total	561,229.395	10,441,477.11	75,780.65	88,181.12

MINING MEN AND AFFAIRS.

Mr. E. C. Thurston was at Revelstoke about the middle of August.

Mr. C. Hungerford Pollen has returned to East Kootenay from a visit to England.

Mr. Wm. M. Brewer is back from Alaska, where he has been representing the Tyee Copper Co.

Mr. C. L. Constant, of New York, is making an examination of the Nickel Plate mine on Twenty-Mile creek, Similkameen.

Mr. Geo. L. Fraser is now superintendent of the International Coal and Coke Co.'s colliery at Coleman, Southwest Alberta.

Mr. Donald G. Forbes has returned to Victoria from making an examination of the Similkameen Mining Co.'s mining property at Bear Creek, Similkameen.

Mr. George Williams, of Greenwood, has resigned as construction engineer at the British Columbia Copper Co's works.

Mr. J. K. Crom has succeeded Mr. A. A. Cole as geologist and engineer at the Centre Star and War Eagle mines, Rossland.

Mr. George McKenzie McLeod of Van Anda, Texada Island, has been appointed a deputy mining recorder for the Nanaimo mining division, with sub-recording office at Van Anda.

Mr. James William Bryant, manager of the Tyee Copper Co's mines, Mount Sicker, Vancouver Island, has been appointed a justice of the peace in and for the Province of British Columbia.

Mr. Wm. Thibadeau, for years territorial engineer in Yukon Territory, left Halifax, N.S., recently for Fort Churchill, Hudson's Bay, to do survey work in that outlying country.

Mr. Oscar V. White of Sandon, Slocan, manager of the Byron N. White Co.'s Slocan Star group of important mines, went up to Trout Lake during the month to see some mining property in that district.

Mr. E. C. Musgrave, of Victoria, has been examining the Carmi mine, situated in the West Fork of Kettle River part of the Boundary district. He will shortly again visit the Boundary on professional business.

Col. J. H. Conrad, of Windy Arm, Yukon Territory, was in Victoria during August to meet Mr. Wm. McKenzie, of Toronto, Ontario, who is largely interested in some of the Conrad mining properties in Southern Yukon.

Mr. John Daly, formerly secretary-treasurer of the Rambler-Cariboo Mines, Ltd., at Kaslo, and lately accountant at the St. Eugene mine, Moyie, has accepted a position at Mullen, Idaho, U.S.A., with the Federal Mining Co.

Mr. G. G. S. Lindsey, general manager of the Crow's Nest Pass Coal Co., Ltd., was in Victoria recently, having accompanied some personal friends on a brief visit to the coast. He afterwards returned to Fernie, East Kootenay.

Mr. E. Drayton Grimke-Drayton, of London, Eng., chairman of the board of directors of the Le Roi Mining Co., of Rossland, and Mr. A. J. McMillan, the company's general manager, were recently at Victoria and Vancouver for several days.

Mr. Arthur Hickling, of London, England, managing director of the Vermilion Forks Mining and Development Co., Ltd., is on one of his periodical visits to Princeton, Similkameen, in which locality the company's chief land and mining properties are situated.

Mr. A. P. Low, of Ottawa, director of the Geological Survey of Canada, spent two or three days in Victoria, when en route to Mexico to attend the Geological Congress. Before reaching the coast he visited some of the more important mining camps in Kootenay and Boundary districts.

Mr. Elias Rogers, of Toronto, Ontario, who several years ago was managing director of the Crow's Nest Pass Coal Co., Ltd., was at the company's collieries lately, noting the very considerable developments and substantial improvements made since his official connection with them ceased.

Mr. Chas. Chesnut, late superintendent of the Hillcrest coal mine, near Frank, Southwest Alberta, expects to leave shortly for the Big Horn Basin, Wyoming, U.S.A., to take a position with Mr. S. W. Gebo, formerly manager of the Canadian-American Coal and Coke Co.'s colliery at Frank.

Mr. Alexander Sharp, of Nelson, for two or three years past consulting mining engineer to Mr. P. Burns of Calgary, Alberta, has been in Southern Yukon and neighbouring country for several weeks, in the capacity, it is stated, of mining expert for Mr. Wm. McKenzie, of Toronto, Ontario.

Mr. Randall H. Kemp, a newspaper correspondent and mining man well known in the Ainsworth and Slocan mining districts in their early days, was a recent visitor to Kaslo, having just returned from Seward, Alaska, where he had for more than a year published a newspaper named *The Gateway*.

Mr. Francis A. Thomson has resigned his position as superintendent of the New Western Reduction Co., Goldfields, Nevada, and consulting engineer to the Round Mountain Antelope Mining Co., and will shortly enter upon the duties of his new appointment as professor of mining and metallurgy at the university at Pullman, Washington.

Mr. A. R. Wilson, for the last five years superintendent of the Crow's Nest Pass Coal Co's colliery at Michel, Southeast Kootenay, has been appointed superintendent of the Lundbreck coal mines in Southwest Alberta.

Mr. S. Herbert Cox, of the firm of Bainbridge, Seymour & Co., mining engineers, London, England, is looking over the gold-mining sections of the Cariboo district.

Mr. Paul Johnson, manager of the Alaska Smelting and Refining Co's smelting works at Hadley, Prince of Wales Island, was in Seattle, Wash., the last week in August.

Mr. Herbert Carmichael, assistant provincial mineralogist, this month visited the Big Interior group of mineral claims, in the Great Central Lake district of Vancouver Island.

Mr. Lawrence M. Lambe, assistant paleontologist to the Geological Survey of Canada, has been collecting fossils in the Cariboo and Similkameen districts for departmental purposes.

Mr. W. L. Austin, of New York, recently visited the Boundary district, and again examined the Granby Co's mines. He made an examination of these properties in 1904, on his last visit to that district.

Prof. Milnor Roberts, dean of the school of mines at Washington State University, has returned to Seattle, Wash., from examining copper properties at Prince William Sound, Alaska, for their Eastern owners.

Mr. R. D. Fetherstonhaugh has retired from the management of the hydraulic gold property at Atlin, owned by the Northern Mines, Ltd., of Vancouver. Mr. H. B. Warren is now in charge of operations.

Mr. Wm. Yolen Williams, of Spokane, Washington, formerly superintendent of the Granby Co's mines at Phoenix,

Boundary district, has been looking over mining properties in the Similkameen district.

Capt. T. H. Trelhewey, manager of the La Plata mine, near Nelson, West Kootenay, has returned from Sherbrooke, Quebec, whence he went to attend the annual meeting of shareholders in the La Plata Mines Co., Ltd.

Mr. W. R. Wilson, general manager of the Imperial Coal and Coke Co., having coal lands in the Upper Elk River section of East Kootenay, has gone to Toronto and other eastern Canadian points on company's business.

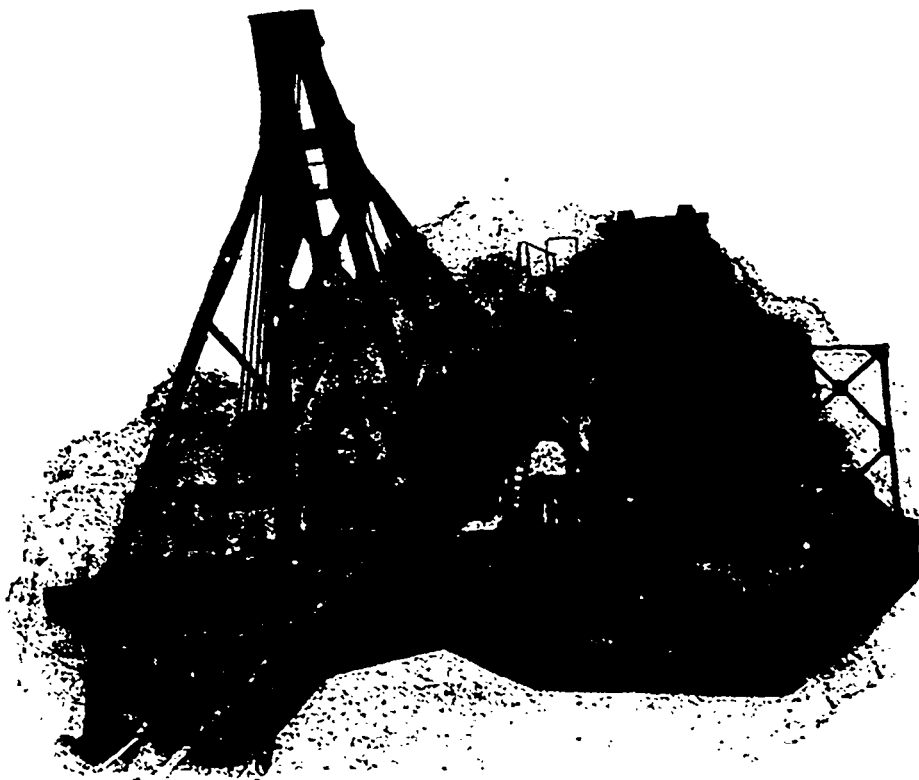
Mr. George E. Bent, general manager of the Alaska Metals Co., has returned to Bruce, Prince of Wales Island, Southeast Alaska, from a visit to Seattle, Washington, U.S.A.

Mr. Samuel W. Traylor, of the Traylor Engineering Works, New York, visited Republic camp, Washington, early in August. He investigated conditions at the Quilp mine and obtained samples of ore for test purposes.

Mr. W. J. Elmendorf, of Spokane, Wash, has gone to Whitehorse, Yukon Territory, on a visit of inspection of mining properties for clients. Before returning to Spokane he will make a trip up the Skeena River, Northern British Columbia, on similar business.

Mr. Howard W. DuBois, of Philadelphia, U.S.A., who is investigating the hydraulic gold-mining resources of 20-Mile Creek, Quesnel River district, was at Barkerville and La Fontaine, Cariboo, recently, enquiring for platinum, osmiridium, and other rare precious metals.

Mr. Newton W. Emmens has returned to Pittsburg, Pa., after having spent several weeks examining the Silver Dot-



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lar and other mining properties in Northern Lardeau. Mr. Fumens is expected to return to that district shortly to supervise the work of opening up and equipping the Silver Dollar and Broadview mines.

Mr. James McEvoy, formerly of the Geological Survey of Canada, now chief engineer for the Crow's Nest Pass Coal Co., has returned to Fernie, Crow's Nest Pass, East Kootenay, from a business visit to Winnipeg, Manitoba.

Mr. Anthony J. McMillan, general manager of the Le Roi Mining Co., will leave Rosland, British Columbia, before the end of September, for London, England, to attend the annual meeting of shareholders that will be held there later in the year.

Mr. David Boyle, superintendent of the Ontario provincial museum, whilst on a visit to Phoenix, became so impressed with the importance of the mines of the Boundary district that he took steps to obtain a representative collection of specimens of ores of that section to place on permanent exhibition in the museum.

Mr. W. C. Thomas, superintendent of the Dominion Copper Co.'s smelter at Boundary Falls, has gone to New York on a business visit. While in the East he will endeavour to prevent further delay in the delivery of new plant and machinery ordered for installation at his company's smelting works.

Capt. Henry Stern, of New York, who succeeded the late Mr. George H. Robinson as president and managing director of the Britannia Copper Syndicate and allied mining and smelting companies operating in British Columbia and Southeast Alaska, lately made a tour of inspection of the several mines and the smelter of those companies.

Mr. Myron K. Rodgers, late general manager of the Yale Mining Co. and Daly Reduction Co., operating in the Similkameen district, has gone to Alaska for capitalists who are interested in the Copper River and Northwestern railroad project. He was accompanied by an engineering party of 16 and will make a survey of the harbour at Katella, Controller Bay, near the mouth of Copper River.

Mr. Chas. T. Arks, of the Seattle, Wash., office of the Allis-Chalmers Co., has been at Dawson, Yukon, assisting in an investigation the Canadian Government is having made relative to the extent and value of, and the best method of treating, the "White Channel" gravels, occurring in large quantity on several gold-bearing streams of the Yukon country.

Dr. Otto J. Klotz, chief clerk and astronomer of the Astronomical branch of the Canadian Department of the Interior, is on the coast, working in conjunction with Mr. F. A. McDiarmid, one of the observers of the Dominion Astronomical Observatory, Ottawa, Ontario, and Mr. Edward Smith, of Washington, D.C., determining the location of the 141st meridian, which, by treaty, forms the boundary between Alaska and the Yukon to within a short distance of the Pacific coast.

Mr. A. Chester Beatty, assistant general manager and consulting engineer of the Guggenheim Exploration Co., after accompanying the Guggenheim party on its recent visit to British Columbia and Yukon Territory, went to Bullion, Cariboo district, with Mr. John B. Hobson, manager of the two Guggenheim companies, which a few months ago acquired possession of valuable placer gold properties in that district, on which preparations for hydraulicking on a large scale are in progress.

Professor R. W. Brock, of the Geological Survey of Canada, has been authorised by the director of the survey, Mr. A. P. Low, with whom he has been visiting the Boundary district, to at once proceed to Franklin camp in that district to look over mining conditions there. Mr. Brock made a brief visit to that camp in 1900, but at that time very little work had been done. Recently much prospecting has disclosed the occurrence there of large bodies of copper ore.