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E. JACOBS,.....Managing Editor

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NOTES AND COMMENTS.

Grading for a railway line from Grand Forks up the North Fork of Kettle River towards Franklin camp is in active progress.

The machinery in the concentrating mill of the Le Roi No. 2 at Rossland is driven exclusively by Canadian Westinghouse induction motors.

A press despatch states that late in July some copper ore was sent to a smelter from Aspen Grove camp, Nicola district. It is described as ore that from its appearance should net a large return per ton.

An ore-sorting plant is to be installed at the Centre Star mine, Rossland, this to include a large Jenckes-Farrel crusher and a Link-Belt Co's picking belt, the latter to be about 150 ft. between centres.

A third centrifugal fire pump, having a capacity of 900 to 1,000 gal. per min. and equal to delivering four or five streams at 100 lb. pressure, has been ordered for installation at the Trail smelter.

It is stated that Mr. Geo. H. Aylard, who has been working the Standard mine, near Silverton, in the Slocan Lake district, has developed a body of ore sufficiently large to induce him to take up his bond on the property.

Official figures give the production of the Le Roi mine at Rossland for six months ended June 30 last, as 61,052 tons of ore, the metal contents of which were as follows: Gold, 24,827 oz.; silver, 36,878 oz.; copper, 1,419,256 lb.

The McKee Amalgamated Hydraulic Mining Co., Atlin, has already recovered 1,193 oz. of gold this season, valued at \$19,000. It is probable that its total results this year will constitute a record year for the company.

It has been suggested in England that the £5 shares of the Le Roi No. 2, Ltd., should be divided into £1 shares. The company's authorised capital is £600,000, in 120,000 shares of £5 each. All have been issued and are fully paid.

Says the London *Mining Journal*: Mr. W. R. Ingalls and Mr. Philip Argall have completed their investigations of the zinc resources of British Columbia for the Canadian Government, and their report will shortly be published by the Mines Branch of the Department of the Interior.

The *Mining Magazine* of New York is to be consolidated with *The Engineering and Mining Journal* of the same city. It is announced that the new and enlarged monthly issue of the latter journal will contain the "Mining Index" and all other desirable features of the former. All subscribers to the *Mining Magazine* will be added to the *Journal* list.

On July 8 the Northern Mines, Ltd., Atlin, started its steam shovel at work for the first time this season. Gravel was moved at the rate of about 36 skips per hour. The manager, Mr. R. D. Fetherstonhaugh, has since advised the directors of the company, the head office of which is in Vancouver, that he has made a partial clear-up of 300 oz. of gold for eight days' run.

A change has been made in connection with roasting the granulated copper matte made on first smelting at the Trail smelter. Instead of continuing the old practice of roasting in the O'Hara furnaces and briquetting for resmelting, it is now roasted by the Huntington-Heberlein process, one of the main features of which is that it gives a hard sintered product, thus doing away with any necessity for briquetting.

Between 18,000 and 19,000 tons of ore per month are being treated at the Dominion Copper Co's smelter at Boundary Falls. The bulk of this ore comes from the company's Brooklyn and Rawhide mines. From this ore about 450 tons of copper matte are produced and sent to the British Columbia Copper Co's works at Greenwood, where it is converted into blister copper and shipped thence to New York.

The Societe Miniere de la Colombie Britannique, engaged in hydraulic mining on Boulder Creek, Atlin, made its first clean-up this season at the close of June, with a recovery of about \$10,000 worth of gold. During previous seasons the company washed chiefly gravel from the bed of the creek; this season, under the direction of Mr. T. Obalski, M.E., operations were carried into one of the benches alongside the creek, with satisfactory results.

At Victoria on July 12 Chief Justice Hunter heard an application on behalf of the Slocan Star Mining Co., asking that a sale of the property of the Star Mining and Milling Co., of Sandon, be held for costs, in connection with long-protracted litigation between these companies. It was ordered that the title deeds to the property, the Rabbit Paw and Heber Fractional claims, be deposited with the registrar of the Supreme Court at Nelson.

Mr. E. A. Haggren, of Revelstoke, formerly editor of the *Kootenay Mail*, says: In view of the development in the Nicola district which is sure to follow the opening of that country by the railway now being constructed from Spence's Bridge to Princeton, there is considerable demand for land, coal, and other mineral investments, and I look for great activity not only in Nicola mines, but in stocks of all companies undertaking *bona fide* exploration in that section.

Sir Thos. Shaughnessy, president of the Canadian Pacific Railway Co., has notified the director of the exhibition to be held at Nelson next September of his intention to send them a handsome sterling silver cup made of silver mined, smelted, and refined in British Columbia. The cup will be a gift from Sir Thomas in his personal, not official, capacity, and the directors will be free to offer it as a prize at this year's fair in any class they shall designate.

Changes are being made at the Centre Star mine shaft, Rossland, which will provide for doing the main hoisting of both this mine and the adjoining War Eagle through this shaft. In a double skip-way 4-ton skips will be operated instead of those of 1½ tons capacity at present in the shaft. The larger skips are being made in the mine workshops. Above the skips are cages in which men working underground are to be lowered and raised. A 28 by 60 Nordberg hoisting engine, having double drums 10 ft. dia. and 5 ft. face, is to be put in to replace the hoist now in use.

At the smelting works of the Consolidated Mining and Smelting Co. of Canada, Trail, the lead sampling mill has been remodelled with the object of increasing its capacity and, as well, making it practicable to obtain a product crushed to a finer mesh, this being requisite in connection with the method of roasting by the Huntington-Heberlein process recently adopted here. An advantageous feature of this mill is that the first crusher can be operated quite separately from the remainder of the mill plant when required for crushing lime rock, etc.

The Dominion Copper Co. has arranged to place its main crushing plant at its smelter at Boundary Falls. This obviates what would otherwise be the necessity of installing crushing machinery at each of its several mines. The new plant will include a 36 by 42-in. Farrel crusher, manufactured by the Jenckes Machine Co., of Sherbrooke, Quebec, to have a crushing capacity of 1,000 to 1,200 tons per day of eight hours; conveying belts from the crusher pit to storage bins, etc. Additional bins for storage of coke and ore are being built at these works.

The Dominion Copper Co., which is working the Gloster claim in Franklin camp under bond and option of purchase, is putting up an incline raise from the 200-ft. prospecting tunnel with the object of finding ore below a big showing thought to be the sur

face outcrop of a large shoot of ore. The wagon road from Grand Forks to Franklin camp has been completed. The four or five miles lately constructed give an excellent road, and the provision of this means of transportation is greatly facilitating the opening up of properties in this, the newest, Boundary mining camp.

At the Porto Rico mine, Ymir district, No. 4 adit is being extended, working two shifts. It is now in about 220 ft. and the vein in the face is strong but is not yet carrying payable values. It is not expected that the pay shoot will be struck until after another 50 ft. shall have been driven. The shoot being driven for was worked on No. 3 level, about 142 ft. above on the dip of the vein, and thence up to the surface and it gave an average yield in gold recovered of \$20 per ton. The quartz is free milling and the total saving of gold is about 92 per cent. There is a 10-stamp mill on the property, which is being worked under lease by Mr. Geo. H. Barnhart, of Nelson, and associates.

The big shaft of the Le Roi mine, known as the Combination shaft, is now down 1,350 ft. at which depth a station is being cut and preparations in progress for handling the water prior to resuming sinking, which may be continued down to 2,000 ft. Development in a winze, started at 800 ft. south from the shaft on the 1,350-ft. and sunk to the 1,750-ft. level, have disclosed the occurrence of enough ore to make it worth while to deepen the main shaft. Present levels from the shaft are the Black Bear (300-ft.), 350-, 450-, 500-, 600-, 700-, 800-, 900-, 1,050-, 1,200-, and 1,350-ft levels respectively while stations have been cut and levels driven from the winze at each 100 ft. below the 1,350 ft.

The British Columbia Copper Co. has secured under an 18-months' working bond, the Lone Star and Washington group of mineral claims, situated about 10 miles from Greenwood and immediately south of the International boundary line, in Washington State. This property had a lot of development work done on it about six years ago, but owing to the absence of transportation facilities at that time operations were discontinued. Now a railway passes within four miles of it, so that the transportation is not now a formidable difficulty. The property is equipped with a small power plant, and possesses mine buildings, etc. Much ore of good grade has been exposed by the work already done.

The late Mr. Thomas Gibbs Blackstock who died at his home in Toronto, Ontario, on 24th inst., had been in ill health for years. The cause of his death was Bright's disease. He was a prominent member of the bar of Ontario, and, too, was largely interested in British Columbia mining enterprises. He was long associated with his father-in-law, the late Mr. George Gooderham, in connection with the Centre Star and War Eagle mines at Rossland, and the St. Eugene mine at Moyie, East Kootenay. An attack of typhoid,

stated to have been contracted while looking after his mining affairs in this Province, was the beginning of the illness which eventually resulted in his death. Mr. Blackstock was 54 years of age and leaves a widow and a large family.

During the six months ended June 30, last, the production of the St. Eugene mine, East Kootenay was as under:

	Tons.
Ore milled	84,066
Concentrates produced	14,008
Crude ore shipped to smelter	1,489

The gross value of the shipping product of this mine last year was \$52.93 per ton. After deducting all freight, smelter, refining and marketing charges, the net amount received by the company, including the bounty on metallic lead paid by the Dominion Government, was \$35.85 per ton. Mine and smelter are now owned by the same company, not by different companies as was the case last year.

Mr. H. H. Claudet has returned from London, England, where he has been investigating the Elmore Vacuum Oil process, described as a modification of, and a great improvement on, the old Elmore oil process which it is expected to quite outclass in every way—as regards simplicity, efficiency and economy. Already an experimental plant is in transit to Mexico whence Mr. Claudet will shortly proceed to supervise its installation. He is of opinion that there will be found a good field for the new process in British Columbia, and that it will prove suitable for the effective treatment of copper-gold, zinc, silver, and some lead ores. He has in his laboratory at Rossland an interesting variety of samples of pulp, concentrates, and tailings of copper-gold and zinc ores treated by the new process.

A press despatch from Ottawa, under date July 18, was as follows: Hon. Wm. Templeman to-day assumed control of the Geological Survey Department in addition to his duties as Minister of Inland Revenue, an order-in-council having been passed transferring that department to him. It was understood when Mr. Templeman was given the Inland Revenue Department in February last that he would also be given control of the Mining Department. Having in his hands the administration of the Geological Survey and the mining branch of the Interior Department for the time that will intervene before next session of Parliament, Mr. Templeman will be in a better position to advise in respect to the organisation of a Department of Mines, with a Minister of Mines at the head, for the creation of which legislation will be necessary. It is understood an act for this purpose will be passed at the next session.

The Consolidated Mining and Smelting Co. of Canada is preparing a general exhibit of ores and of products of its smelting works at Trail, the latter to include pig lead and lead pipe of various sizes and de-

grees of thickness of material used in its making. This display will form part of the Canadian Government exhibit at an International Exhibition to be held in New Zealand. It is a pity so little interest appears to be taken in the matter of having mining interests of this Province adequately represented at this exhibition, but seemingly no great importance is attached to the desirability of thus bringing the mineral resources of British Columbia to the attention of the outside world. Yet it is upon outside capital chief dependence must be placed to enable these enormous resources to be utilised to any considerable extent. A progressive policy in this direction would probably bring substantial results.

The provincial mineralogist is on another exploratory trip in the northeastern part of British Columbia. He left Victoria on July 12, proceeding by water to Hazelton on the Skeena River and going thence in the direction of the head waters of Peace River into country through which the Grand Trunk Pacific railway will probably be constructed. His route as planned was from Hazelton via Babine and Stuart Lakes to Fort St. James, thence to Fort McLeod and down Parsnip River to where it joins with Findlay River and forms Peace River, east of the Omineca placer mining section. If, owing to the lateness of the season, it appears advisable to return via Edmonton, Alberta, the divide will be crossed and the head of the railway, at that place, be made for rather than to hark back to the Skeena. It is believed that as a result of Mr. Robertson's examination of the country much valuable information will be obtained by the Provincial Government concerning this portion of the Province, of which heretofore little has been officially known.

During six months ended June 30, last, the Le Roi No. 2 mine at Rossland shipped 12,596 tons of ore to the Consolidated Mining and Smelting Co's smelting works at Trail, and crushed 5,344 tons of ore at its own mill, recovering from the latter 314 tons of concentrate. It is expected that production will be continued at the rate of about 2,100 tons per month of shipping ore of good grade and 1,000 tons of lower grade for milling. The chief work in progress in the mine is at the 300-, 500- and 600-ft. levels. The Josie shaft is now down 850 ft. on the incline, and leve's have been opened at the 100-, 200-, 300-, 500-, and 700-ft. levels and what is nominally the 900-ft. level, this last being actually at 850 ft. depth. There are also leve's at 400- and 600 ft., but these do not connect with the shaft, being reached by raises from other levels. Sufficient ore of payable grade has been opened up to assure the profitable operation of the mine for the next two or three years. Mr. Paul S. Couldrey is manager, and the company is an English incorporation, having its head office in London.

At a recent rock-drilling contest with machine drills, held at Phoenix, ten pairs of drill men entered.

It was stipulated that all contestants should use the same make of machine, starting with a 2½-in. drill and decreasing ⅛ in. to the foot. The drilling was done above ground, a platform on which to set up the drill having been constructed in advance. A Canadian Rand Drill Co's machine of standard make was used, and air was supplied at 95 lb. pressure. The test consisted of putting together the parts of the machine, mounting and connecting the drills, and drilling as deep a hole as practicable, all within the 15 minutes allowed. The first prize, \$150, was won by Matheson and McQuoid, of the Granby Co's Gold Drop mine, who drilled 9 ft. 1½ in.; McDonald and Rankin, of the Dominion Copper Co's Brooklyn mine, were second, with 8 ft. 6 in., winning second prize, \$75. Three other teams drilled holes deeper than 8 ft.; the shortest hole of the ten was 7 ft. 4 in. deep. The contest excited general interest among the large numbers of miners in the district. At a double hand-drilling contest at Rossland, Jas. and Geo. Foulds, the champion hand drillers of the Boundary district, lately drilled 35 in. in 15 minutes, beating their Slocan opponents by 3½ in.

The Snowshoe mine, in Phoenix camp, is to be operated again, after having been idle since the latter part of 1903. This mine is owned by the Snowshoe Gold and Copper mines, Ltd., of London, England, with which company the Consolidated Mining and Smelting Co., of Canada, Ltd., recently concluded arrangements for its acquirement and operation. The managing director of the latter company, W. H. Airdridge, of Trail, on July 27 met at Phoenix Geo. S. Waterlow, of London, vice-chairman and attorney of the Snowshoe company, to examine the property with him as far as could be done under the circumstances that the mine is full of water. It is intended to pump out the water and thereafter employ as many men as can be worked to advantage. It is expected that two to three months hence a daily output of 300 to 400 tons of ore will be practicable, and that this tonnage will be sent to one of the Boundary smelters, the railway haul to Trail, where is situated the Consolidated Co.'s smelting works, being too long—about 125 miles—for ore of the low average grade of Boundary district copper ores. The Snowshoe mine was first explored underground under the management of J. W. Astley, C.E., and afterwards large surface quarries were opened in ore, of which about 94,000 tons were shipped to district smelters prior to suspension of work. The power plant on the mine includes the high-pressure half of a 30-drill air compressor, and a 150-h.p. electric hoisting engine. The Phoenix branch of the Canadian Pacific Railway Co.'s Columbia and Western railway crosses the property. Mr. Chas. Biesel, for some time past at the Consolidated War Eagle and Centre Star mines, Rossland, will be resident superintendent of the Snowshoe under the new regime.

The output of ore from Boundary district mines for the six months ended June 30 was 631,936 tons, as under:

	Tons.
From Granby Co. M. S. & P. Co's mines	429,050
" Dominion Copper Co's mines	114,238
" B. C. Copper Co's mines	80,418
" Oro Denoro mine	6,404
" Big Copper mine	586
" sundry high-grade quartz mines	1,234
Total	631,936

All three companies shown in above table as producing a large tonnage of ore are increasing the capacity of their respective smelters, so that an even larger output for the latter half of the year may be expected, and this notwithstanding that the British Columbia Copper Co's works will not reduce much, if any, ore during the third quarter of the year, for the reason that its two blast furnaces, together having a treatment capacity of about 750 tons, have lately been removed to make room for three 500-ton furnaces now being erected to replace them. Concurrent with this enlargement of smelting plant is an extension of mining operations, all three companies having made provision for increased development work and production in their several mines. It would therefore appear that an increase of fully one-third over last year's production of approximately 935,000 tons may reasonably be looked for, especially as the Snowshoe mine has resumed operations. The Snowshoe's output in 1903 totalled about 71,000 tons; with its large available reserves of ore there should not be difficulty in maintaining a daily output of 300 to 400 tons. The Oro Denoro, which was recently acquired by the British Columbia Copper Co., should also add considerably to the year's production, as should the B. C. mine (now under bond to the same company), which prior to having been closed down in 1903 had shipped an aggregate of nearly 100,000 tons of ore, the great bulk of which averaged 4 to 5 per cent copper, with small gold and silver values.

The Cariboo Gold Mining Co. and the Bullion Hydraulic Mining Co., two recently incorporated Guggenheim companies, of which Mr. John B. Hobson is resident manager, the former having acquired the big hydraulic gold mining property long operated by the Consolidated Cariboo Hydraulic Mining Co. under Mr. Hobson's direction, are inaugurating a water supply system, the main feature of which will be the construction of about 50 miles of canal, 18 ft. wide by 5 ft. deep, with the object of maintaining a continuous supply of about 5,000 miners' inches of water to each of three groups of hydraulic claims possessed by these companies. A contract has been let for 15 miles of this canal system, this instalment being intended to supplement the existing supply available for the hydraulic mines of the first above named company. The contractors already have two

steam shovels on the way in from the East for excavation work, and expect to complete six miles of the canal this season. The mining companies will put in about 8,000 ft. of 40-in. steel pipe, this to include inverted syphons, where required to connect ditches. A bridge some 800 ft. in length has been constructed across the south fork of Quesnel River at the outlet of Quesnel Lake, and the companies have about 250 men employed in constructing roads between their mines at Bullion and the canal lines from Spanish Creek.



MR. A. A. COLE.

Recently appointed expert mining engineer to the Temiskaming and Northern Ontario Railway Commission. He was for several years chief assayer at the War Eagle and Centre Star mines, Rossland. Latterly he has been engaged as mining engineer and geologist in those mines. He was secretary to the British Columbia Assayers' Institute during the active life of that organization.

United States Consul G. N. Ifft, of Chatham, Ontario, reports that the new English process of making white lead by precipitation is being adopted in Canada. A five-ton plant will be in operation near Toronto in a few weeks by a company for whom machinery and appliances for a 50-ton plant are being made. Galena and zinc blende ore, from both of which white lead is made, are found in large quantities in Ontario and Quebec provinces.

MAPLE LEAF FUSE—AN UNJUST REFLECTION.

WHEN in Greenwood this month the editor of the B. C. MINING RECORD had the pleasure of once again meeting Mr. Thos. R. Drummond, general manager for the Dominion Copper Co. which owns mines in Phoenix, Summit and Deadwood camps, and smelting works at Boundary Falls, all in the Boundary district. The mining and smelting operations of this company are on a large scale, second only in the district to those of the Granby Co. After an interesting talk concerning the company's mines and smelter, Mr. Drummond brought up the matter of an article, published in the *B. C. Mining Exchange* of Vancouver and reprinted in the *News-Advertiser* of the same city, alleging the use of "inferior and unguaranteed fuse" in one of the company's mines, and stating that one of the company's men lost his life through an explosion resulting from a defective fuse. The allegations to which Mr. Drummond took especial exception were those contained in the following excerpts from that article: "One may, perhaps, in view of the evidence, be permitted to wonder how long this sort of thing is to go on, and men's lives be endangered and lost for the sake of saving a paltry dollar or two per case." "It hardly seems that the trifling initial saving of a dollar or two per case on the purchase price is worth the additional heavy risk that the use of these inferior and unguaranteed fuses involves, and it is sincerely to be wished that the immediate future will see a change from this most criminally dangerous piece of false economy." Mr. Drummond gave a most positive and unequivocal denial to the charge that an alleged saving of money at all influenced him in the purchase of the Maple Leaf fuse which, he stated, is used in his company's mines solely on its merits. As a matter of fact, he asserted, it cost 50 cents per case more than other fuse in use in some mines of the district. The serious reflection on him and the suggestion of his criminality were, therefore, both entirely unwarranted, and should be withdrawn in as prominent a manner as they were made. Those familiar with Mr. Drummond need no assurance from him that he does not hold the lives of the men under him so cheaply as the *B. C. Mining Exchange* would have the public believe, but there are many others who do not know him or of his habitual care for the protection of those employed in his company's mines, so that the MINING RECORD has no hesitation in giving publicity to his unqualified contradiction of the unwarranted allegations above quoted. In this connection we are not concerned about the relative good or bad qualities of rival fuses. The several makers have opportunity in the ordinary course of business to bring these before those for whose patronage they cater. If the Maple Leaf fuse has come into favour it probably has done so on its merits. In any case its manufacturers can protect themselves in the ordinary manner. That they intend doing so seems evident

for, acting under their instructions, Messrs. Macdonald & Hall, barristers and solicitors of Nelson, B.C., have written the *B. C. Mining Exchange* as follows: "The whole article is a gross libel upon the Maple Leaf fuse which is used to a very great extent in Southern British Columbia. The statements are so unfounded that one would be led to believe that the article was malicious and that the author thereof intended to do harm thereby. It certainly was not published in good faith. Mr. C. D. Goepel, of this city, who is selling the Maple Leaf fuse, feels that he is likely to be greatly injured by the publication of such a libel, and we are instructed on his behalf to enter action. We ask you in the meantime to furnish us with the name of the author of the article and retraction of the statements contained therein. We request that you will make such retraction as prominent in your newspaper and as widely circulated as the libel of which we complain." In response to a letter to the same effect the *News-Advertiser* expressed regret "that statements which the agents of the Maple Leaf fuse say are incorrect and liable to do them injury, should have appeared in our columns."

The notes on a trip to several of the interior mining camps we publish this month indicate healthy activity in mining and smelting and give substantial evidence of the confidence of those directly interested that these industries are now established on a permanent basis in the Boundary and Kootenay districts. A convincing reply to those who, even in the face of the great progress made during the last year or two, express doubts as to the permanence and prosperity of these industries, may be found in the assertion that those chiefly interested—mining, smelting, railway and power companies—are not spending large sums of money in big additions and modern improvements for the mere sake of doing so. They must have first satisfied themselves that the outlook is so good as to make it reasonably certain that their extensive outlay will prove remunerative. It is certain the production of ore is now on a larger scale than at any previous time in the history of mining in the Province, and the prospects are that the ratio of increase that has marked the expired months of the current year, as compared with the production of last year, will for some time be maintained. Further, a number of the mining and smelting companies are making considerable profits, part of which is in some instances being divided among stockholders, while in others the excess of returns over working expenses is being used in making betterments to plant and otherwise placing the undertakings immediately concerned upon such a basis as will admit of even larger profits being earned in the future. While difficulty is experienced in obtaining all the labour needed and as a consequence progress is somewhat retarded, it is satisfactory to note that there are no labour disputes to interfere with operations. Altogether the position is decidedly encouraging and, since it is quite likely the prices of metals will remain high for many months, it may be expected to continue to be so.

COAL AND COKE PRODUCTION OF CROW'S NEST PASS COAL CO.

THE tonnage of coal produced at the three collieries in Southeast Kootenay, of the Crow's Nest Pass Coal Co. during seven months of the current year, to July 31, was as follows.

Month	Coal Creek. Tons.	Michel. Tons.	Carbonado. Tons.
January	41,723	26,973	7,265
February	36,775	24,781	7,402
March	44,311	29,667	7,911
April	44,795	29,275	
May	50,735	33,474	
June	54,772	36,306	
July	46,025	30,574	
	<u>319,136</u>	<u>211,050</u>	<u>22,578</u>

Total monthly production:

	Tons.
January	75,960
February	68,958
March	81,889
April	74,071
May	84,209
June	91,078
July	76,599
Total	<u>552,764</u>

The shipments of coke during the same period were as under:—

Month.	Fernie. Tons.	Michel. Tons.	Total. Tons.
January	10,132	11,432	21,563
February	11,047	10,676	21,723
March	12,581	12,871	25,452
April	10,117	8,099	18,216
May	10,426	11,764	22,190
June	11,043	10,543	21,587
July	8,868	10,030	18,898
	<u>74,214</u>	<u>75,415</u>	<u>149,629</u>

The average monthly production of coal this year has been 78,966 tons as compared with 69,271 tons, which latter was the average for the whole of 1905. These figures show an average monthly gain of 9,695 tons. On the other hand there has been a slight falling off in the average monthly shipments of coke, which have been 21,475 tons in 1905 against 21,376 tons for the expired seven months of 1906.

An International Geological Congress will be held in the City of Mexico from September 6 to 14, 1906. Before the Congress formally meets there will be a number of excursions, including visits to the Guana-juata silver mines, Mapini silver-lead mines, Conéjos sulphur mines, oilfields of Ebano, and an excursion to the Isthmus of Tehuantepec.

COPPER CONVERTER MELTING ITS OWN MATTE.

AT the British Columbia Copper Co's smelting works at Greenwood, Boundary district, a copper converter has been operated in an emergency under unusual conditions. The company is replacing the 700- to 800-ton plant it has been using since early in 1901 with a thoroughly up-to-date plant to have a treatment capacity of 1,500 to 1,800 tons per diem. The two smaller blast furnaces were removed some weeks ago and heavy excavation work and the building of substantial masonry foundations had to be completed before the three larger stacks could be installed. Meanwhile, though, in order to carry out a contract with another smelter, it became necessary to convert a quantity of copper matte notwithstanding that there was no blast furnace available in which to melt it.

The converters in use at Greenwood are of the ordinary horizontal trough type, 84 in. in diameter by 126 in. long, with about 4,500 cu. ft. of free air available at 10 lb. pressure. The method of procedure was as follows: A wood fire was first lighted in the bottom of the converter shell and when this was thoroughly alight about 1,500 lb of coke was dumped on it and a light blast of air admitted to hasten combustion. On the fuel becoming red hot all through some three tons of cold matte were placed on top of the brightly burning coke and the full pressure of air was turned on. The matte quickly melted and more matte was immediately added, to increase the volume of the charge. When this was also melted the slag was partially skimmed off and still more matte was added. This operation was repeated until there was sufficient molten matte in the converter to admit of the converting of the charge being properly finished. From the time of commencing to fire the cold shell until the blister copper was poured an average of 3½ hours elapsed. About 15 tons of 40 to 50 per cent matte were converted in one stand in one ordinary shift.

As a result of the experience gained it was found that a 45 per cent copper matte could easily be handled in the above described manner and finished hot. Matte of a higher grade, up to 55 per cent, was also successfully converted, but with this more care was needed to maintain the requisite heat and occasionally it was found necessary to add a few hundred pounds of coal to prevent the "freezing" of this charge. Operations have been extended over several weeks, so that the commercial practicability of thus running a copper converter has been amply demonstrated. Of course it should be understood that the operation of a converter under such conditions is not economical and would only be carried on temporarily, on account of the accumulation of slag which must be smelted in the blast furnace, but as an emergency operation in a case where there was a quantity of matte on hand which it was necessary to treat during the time the

blast furnace was shut down, was here proved decidedly successful.

The manager of the B. C. Copper Co. is Mr. J. E. McAllister, formerly with the Tennessee Copper Co. at Ducktown, Tenn. The carrying out of the operations above described fell to Mr. Geo. Williams, construction engineer at the Greenwood works, who after a few experiments found that he could convert the matte without the assistance of the blast furnace, and did so, as stated.

THE TYEE COPPER CO'S LAST ANNUAL FINANCIAL REPORT.

WE publish on pages 285-7 of this number of the B. C. MINING RECORD the accounts of the Tyee Copper Co. for its financial year to April 30, last, which, in view of the well known fact that the available ore in the Tyee mine has been insufficient to keep the company's smelter in operation more than about one-third of each month, make a creditable showing, inasmuch as net receipts for the period under review were £35,250 2s. 6d. in excess of all expenditure—at mine, smelter and London office. We take especial pleasure in directing attention to the comparatively good showing the company has made, first because it is always particularly pleasing to be warranted in chronicling information evidencing the profitable operation of mines and smelters, and next for the reason that during the year the accounts relate to we several times flatly contradicted the published mis-statements of Wm. Blakemore, who claims to be a competent authority on such matters, and showed them to be utterly untrue.

The following is a summary of the accounts:

	£	s.	d.
<i>Profit and Loss Account—</i>			
By net receipts.	91,359	17	7
To total expenditure.	56,109	15	1
	<hr/>		
Balance, to credit Revenue Act.	£35,250	2	6
<hr/>			
<i>Revenue Account—</i>			
	£	s.	d.
By balance from previous year.	28,306	11	6
“ balance from Profit and Loss Account.	35,250	2	6
“ interest received.	2,390	12	5
	<hr/>		
	£65,947	6	5
	<hr/>		
	£	s.	d.
To amount written off old accounts.	22,124	12	10
“ 25% do. do. Properties Act.	20,848	11	1
“ 25% do. do. plant, buildings, etc.	7,468	12	8
“ income tax	635	6	8
“ balance, to Balance Sheet.	14,870	3	2
	<hr/>		
	£65,947	6	5
	<hr/>		

Balance Sheet—

	Assets.		
	£	s.	d.
By Properties, plant, etc. (after writing off amounts shown in Revenue Account)	83,482	9	10
“ By sundry liquid assets—			
Reserve fund, invested as shown.	56,147	13	11
Investment Act. do. do.	33,589	7	10
Stocks on hand.	3,252	15	11
Ores on hand.	8,960	2	1
Cash on hand.	9,558	6	4
Sundry debtors	6,411	7	3
	<hr/>		
	117,919	13	4
	<hr/>		
	£201,402	3	2
	<hr/>		
	Liabilities.		
	£	s.	d.
To Capital account	180,000	0	0
“ Sundry creditors.	6,532	0	0
“ balance of Revenue Account	14,870	3	2
	<hr/>		
	£201,402	3	2
	<hr/>		

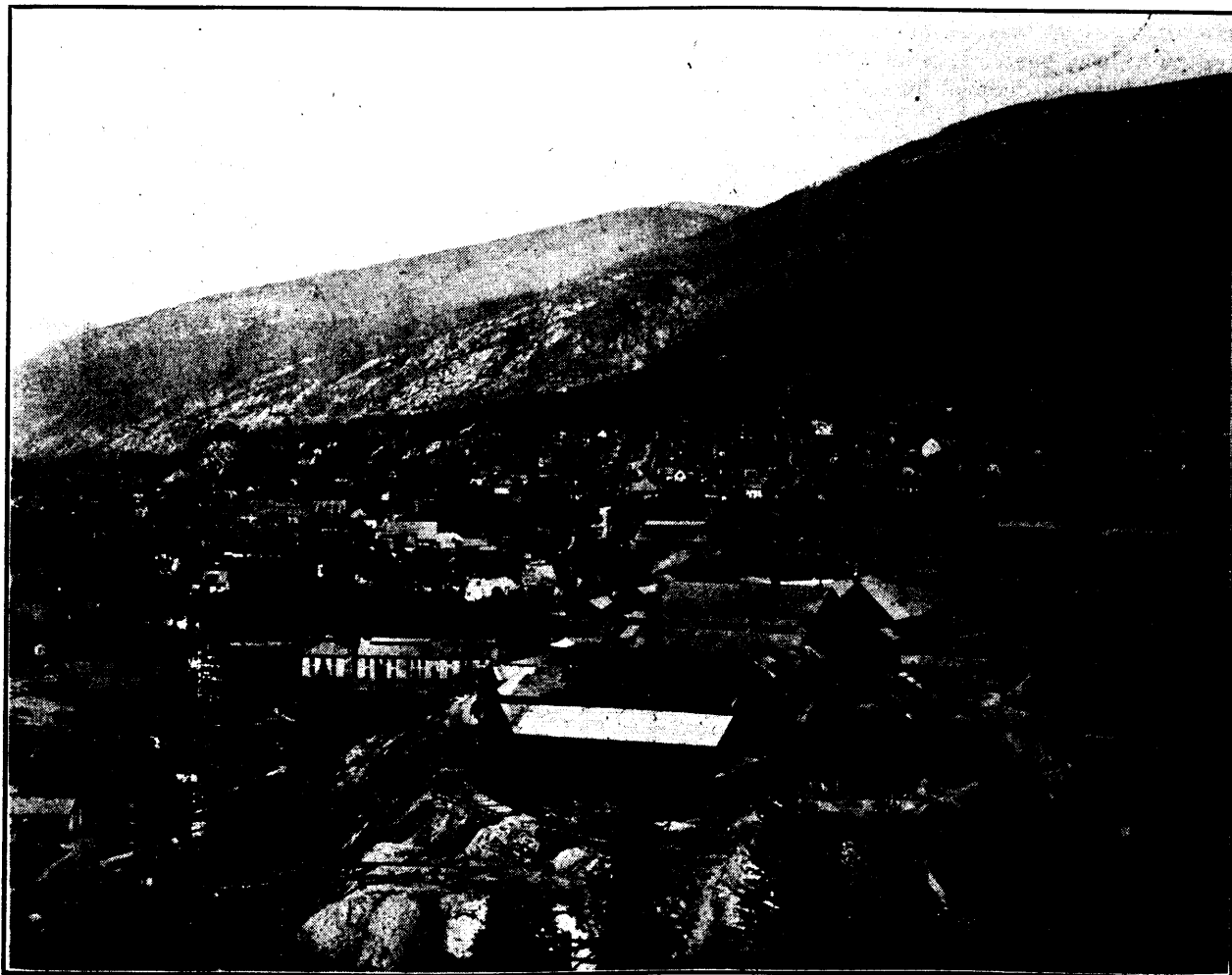
The above is the financial showing of a company that the traducer Blakemore less than a year ago stated that its last dividend “was paid out of capital, not a dollar of which was earned,” and that it had not followed expert advice to sink below the 200-ft. level; while only last January he published the false “news of the stoppage of all development work in the mines of the Tyee Copper Co.,” which he designated a “Prediction Realised,” adding “After all the recent report of the eminent American expert, and the hysterical efforts of a friendly press have failed to galvanise it into life.” But then the condemnation of the man whose reports were used to induce capitalists connected with the Canadian Pacific Railway Co. to pay a very large sum of money for iron claims in Kootenay, now considered of very problematical value, also to serve the purpose of that fakir “Windy” Young in his successful efforts to delude the unfortunate purchasers of Similkameen Valley Coal Co. stock, is regarded, by those who know the valuelessness of his pretensions, rather as a recommendation, so that, at any rate among leading mining men of British Columbia, his duplicity has become a by-word. And deservedly so, for here is an instance—a company having realisable assets conservatively valued at about \$590,000 (leaving entirely out of account its mining property, smelter, and plant) and a total liability other than to its stockholders on capital account of only \$32,660, has repeatedly been defamed by him. So much, or so little, for the published statements of such a notorious detractor.

IMPROVEMENTS AT THE HALL M. AND S. CO'S SMELTER AT NELSON, B.C.

By H. Harris.*

THE smelting works at Nelson, owned and operated by The Hall Mining and Smelting Co., Ltd., have, during the past few months, undergone such a complete transformation as to render them for their size and capacity almost the equal of any existing plant in America for the treatment of

As is probably well known, this process consists in partially roasting at a high temperature a mixture of finely crushed sulphide lead ores with carbonate of lime, and in subjecting the granular product to the action of a light air blast in a cast iron hemispherical pot called a converter. The result is the evolution of much heat and an almost total elimination of sulphur, and finally fusion and solidification of the mass, which, on the completion of the action, is dumped on to a floor beneath and is thence charged direct to the blast furnace, making an almost perfect material



Hall Mining and Smelting Co's Smelter at Nelson, B. C.—General View of Works, Looking Eastward. New Building for Huntington-Heberlein Process Compartment in the Foreground.

complex lead ores. These changes have been necessitated by the close competition of European smelters using one or other of new and improved processes. These have been under the close investigation of the management of the Hall Mines smelter, who ultimately decided to use the Huntington-Heberlein process of roasting ores entailing much handling. Consequently, to save labour in this respect, much valuable machinery has been installed.

*Superintendent of the Hall Mining and Smelting Co's smelting works at Nelson.

for smelting, with the formation of but little matte which, by the old American smelting practice, is freely produced and has to be crushed, roasted, and re-smelted at considerable expense. Also, with the new process, higher percentages of lead can be carried on the charge, leading to the production of cleaner slags in smaller quantity, which of course means a better saving of values.

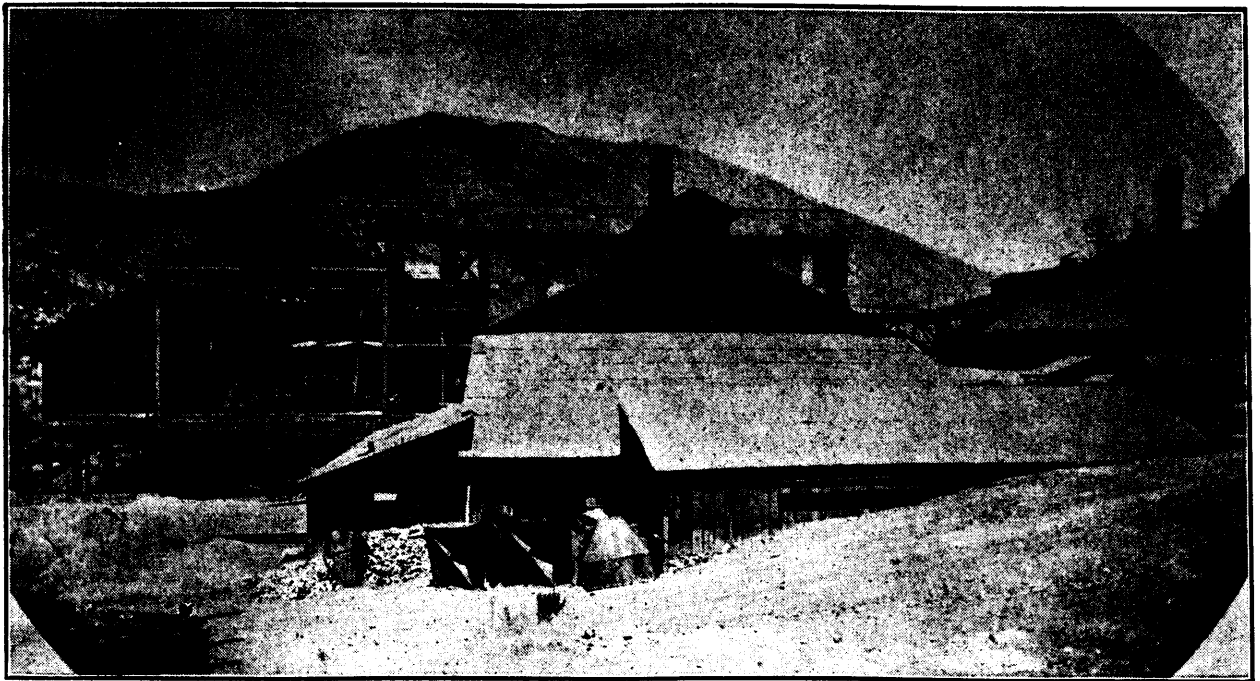
Hitherto these works were disadvantageously situated with respect to the economical handling of material, so in order to enable the company to reap the

full advantage of the installation of this new process, the management adopted the somewhat bold policy of spending a large sum of money in making the plant as perfect as practicable, in the hope and expectation of being able in some measure to compete with their more fortunately situated rivals across the Atlantic. This work has been greatly hampered by slow delivery of machinery by the manufacturers, by the dearth of competent and willing labour, and also the necessity of operation of the smelter during alterations.

Practically all the ore used in the new process has to be crushed to 6 mesh, and consequently an up-to-date crushing mill was installed. Most of the ore arrives in railway box cars, from which it is shovelled or wheeled out and dumped into a large Gates' gyra-

The mill is a model of compactness, the designer having been limited as to space. The bulk of the machinery, including the impact or vibratory screens, which have given great satisfaction, was supplied by The Colorado Iron Works, of Denver, Colorado, and the mill is fitted throughout with Chapman's double ball bearings, a Canadian invention of undoubted merit, saving, as these bearings do, very much waste of power and labour in attendance.

The ore, after bedding, is loaded into small cars and placed on an automatic switchback tramway, manufactured by the Link-Belt Machinery Co., of Chicago. A catch on an endless moving chain attaches itself to the axle of the car, moves it up an incline and, releasing it, allows the car to run by gravity 100 yards down a grade until it reaches a



Hall Mining and Smelting Co's Smelter at Nelson, B. C.—End View of new Building for Huntington-Heberlein Roaster and Converters.

tory crusher, the product from which is elevated to the top of a high building, where it is automatically sampled by means of three Vezin samplers, each of which takes one fifth of the stream of ore as a sample to be delivered to the feeder feeding the next sample. The rejected portions from each sampler are carried automatically through four large sets of rolls, so connected with vibratory screens that each set of rolls is supplied only with material properly sized to be conveniently handled by it, the oversize being returned to the rolls producing it. The final product of the crushing mill then falls on a conveyor belt running the length of the ore bins, this carrying the ore to an automatic bedder which distributes it equally the whole length of any bin desired. It is therefore manifest that the single handling necessary to remove the ore from the car is all the hand work necessary for its sampling, crushing, and bedding.

row of elevated bins, into the top of which it is dumped. The empty car then automatically switches itself on to a return track of considerable grade, down which it runs unattended until it reaches its original point of starting, and is there reloaded. Automatic feeders supplied at the base of these bins feed the ore on to a conveyor belt placed below and discharging into a cylindrical mixer, which in turn discharges into a bin from which the roasters or converters are charged.

The new roaster installation consists of one Merton furnace converted and enlarged to adapt it for use with the new process, and one 30-ft. Huntington-Heberlein circular roaster, with provision for a second. This machine has a capacity of 50 tons daily, and differs from most rabble-stirred automatic roasters in that the rabbles are fixed to the roof, and the circular bed 26 ft. in diameter, revolves, pushing the

ore against the rabbles.

The partially roasted ore from the mechanical roasters drops against a water spray into large bins, whence it is trammed to a powerful elevator especially designed for this company by the J. W. Reedy Co., of Chicago, and is conveyed thence into small bins over the converters.

The converters, six in number, are 9 ft. in diameter and hemispherical in form. They stand 17 ft. above the dumping level, and are supplied with air from a No. 7 Connersville blower. They are surmounted by hoods connected by telescopic pipes to a fan 7 ft. in diameter, designed and made on the works, resulting in an atmosphere free from acid fumes, so common about a plant of this nature. One

No recent change has been made in the blast furnace plant, but it is interesting to note that the patented distributors with which the furnaces were fitted last year still continue to give great satisfaction, and are the means of considerable saving—the small quantity of matte being continuously and automatically discharged from the furnace, whilst the continuous stream of slag, freer from values than with the use of the forehearth, flows into a granulating flume and thence to the Kootenay River.

The Elwood Tinworkers Gold Mining Co., of Elwood, Indiana, has let a contract to the Crawford Double Rope Aerial Tramway Co., of Nelson, for the construction of an aerial tramway at its Silver



Hall Mining and Smelting Co's Smelter at Nelson, B. C.—View of Works Looking Westward. New Sampling Mill Between Railway Tracks.

converter holds from 12 to 15 tons of charge, and the desulphurization of this takes from 8 to 12 hours. At the end of that time, by inverting the converter pot, the contents are dumped on to the floor below, where the mass is broken roughly by means of a drop weight operated by an electric hoist, and also by hand labour. The broken sintered product is pushed down a chute into a side-dump car, which automatically runs to and discharges its contents into storage bins situated on the railroad track, returning automatically. The material in these bins is in turn transferred, when necessary, by railroad dump cars into a large crusher connected with a long conveyor belt, which carries the material for its final treatment in the blast furnaces to gravity bins placed alongside them.

Dollar mine near Camborne. The right of way for the tramway has been cleared; construction work on the company's stamp mill and flume and pipe line is proceeding; the installation of an air compressor is in progress, and machinery and plant is being received at the mine. Stock in the Elwood Tinworkers G. M. Co. is held chiefly in Indiana and Ohio.

During June the Hall Mining and Smelting Co. received 1,494 tons of lead ore at its custom plant, Nelson, the lead production of which was 1,167,074 lb. Of the ore, 551 tons was from the Canadian Metal Co's Blue Bell mine, 206 tons from the La Plata, 169 tons from the Cork, 134 tons from the Arlington (Erie), 104 tons from the St. Eugene, and the remainder from 12 smaller shippers.

SILVERTON DISTRICT, SLOCAN.

By George Huston.*

ONE of the promising mining camps in the interior of the province is the Silverton district of the Slocan. Operations are being mainly conducted under lease, and in nearly every instance, the effort has been successful and profitable.

The old properties have been taken in hand by practical mining men, after having first been gutted under company management, and then closed down for lack of proper development. The latter has since been applied, with the result of showing conclusively that the veins and ore shoots are just as productive below as above. With operations conducted under the charge of the practical leesees, there is none of the waste of former company management, every dollar invested going to actual mining work and development. Leasing is, therefore, proving a means of regeneration for this part of the Slocan, as it eventually must, also, be for the remainder of the district.

There are many opportunities for investment of capital on a small scale in this district in legitimate mining operation. The small operator with some capital to support his efforts, invariably obtains profitable results. Practical experience is required, and with this success has, so far, been common. There are numbers of properties which can be taken in hand, on low royalties, provided the owners are assured they will be properly developed.

To the salaried man who has a small amount to invest, but with no practical experience in mining, when associated with others in the same ventures, there lies a chance for improving the return on his savings far ahead of investment in mining stocks. The average man generally wants more of a return on his money than he can get from a savings bank, and investing in a *bona-fide* mining lease is one of the surest and best methods that offers for giving a return of small capital. A plan is being put into effect which affords greater security to the small investor, and at the same time, utilises to the utmost the collective power of the capital invested. The plan is simple, gives security to the miner and investor, and supplies the incentive to the practical end of the venture. It is rapidly gaining in favour, and there will soon be seen a large extension of the scheme among people who earn fair salaries, but have no knowledge of mining. They will thus avoid being bitten sadly through the manipulations of stock boomers.

Leasing, as at present conducted throughout the Slocan, by the practical miner, although having been proved a success, still has been hampered by lack of capital, except in a few instances. It was generally a case of the miner working at some property until he had accumulated a small capital. Then a lease was secured, and operations were conducted until the capital was exhausted, or a return was secured from ore shipments. The confined nature of the operations

necessitated the taking hold of propositions where there was ore in sight, and consisted principally in removing the ore as quickly as possible in order to go ahead, and clear a profit on the capital invested. Many property owners were averse to leasing out under these conditions, and such propositions are growing scarce. Had the miner the necessary capital at the back of him to do development, properties could be secured under more favourable terms, and with more willingness. The necessity for capital rendered possible the giving of the opportunity to the small investor.

As at present conducted the plan is after the following description. Small groups of investors, generally men earning fair salaries, form a syndicate of 25 in number. Each subscribes \$100, and they assess themselves at the rate of \$10 each monthly. This gives a capital of \$2,500, with a monthly sum of \$250 for working expenses. The capital is managed solely by the group, and no payments are made out except for actual working expenses.

The other end of the scheme, the working miners', generally takes hold of a leasing proposition on shares with the investing group. Each receives half of the net profit, and the investing group pays for all tools and outfit, powder, provisions, etc., and also pays each miner \$1 per day. This brings the total expense to the group up to \$150 per month on an average, which includes supervision and the protection of the group's interest in the work. The miners are kept at development entirely, and if ore is found it is removed by hired labour. The bank receives all moneys to the account of the group, and all payments for ore are made through the bank, which divides between the parties.

This is a bare skeleton of the plan, but it is meeting with great favour as the particulars become known. The miner is supported, so that his work counts for the active development of the property, and the small sum paid per day spurs him to increased effort to improve his condition. With the members of the investing group, the small amount of the assessment is never felt, and they are sure of getting a square deal on the capital. Whatever is left over from the assessments is added to the capital for the future equipment of the property, and provides a medium that ensures the success of the venture. Great care is exercised in picking the working miners, and the investing group gives proper attention to the personnel of their membership. The writer is introducing the system throughout the Slocan, and is meeting with much success.

Aside from leasing operations in the Silverton district, there is a notable opportunity for investment in the gold mining belt on Eight-Mile Creek, about three miles back from Silverton. The formation and character of the ore appears to be similar to that of the Nickel Plate mine in the Similkameen district, on which the Daly estate of Butte, Montana, has invested nearly \$1,000,000. The ore is an arsenical iron, carrying values of from \$4 to \$100 in gold, 75 to 30% of which is free milling. Its closeness to

*Editor *Mining Standard*, Sandon, Slocan.

transportation is a feature in its favour, and the wonder is that it has lain so long dormant. It is an exceptionally easy ore to treat, and exists in large quantity, the veins ranging up to 15 ft. in width. On one group, a considerable amount of development work has been done, and the owners have thoroughly proved the values, by assaying samples from every foot of the work done. The assay office was considered the most important part of the mine equipment, and the results obtained show that the property has much merit. The bar to extended operations is the lack of capital. Water is plentiful for milling purposes, and short trams would give easy communication with milling sites. Good milling sites are available, and wagon roads to the lake at Silverton would be on easy grades suitable for hauling large tonnages.

The concentrates of arsenical iron will run from 30 to 45% arsenic, which would yield to the smelting plant a by-product sufficient to cover all the expense of treatment. The removal of the iron would give tailings containing so small a percentage of iron that the extraction should be high with cyanide and amalgamation of the tailings after concentration. The quartz gangue is exceptionally easy for crushing, breaking free from the ore. Treatment with the Hancock jig, and running the jig water over amalgam plates, with cyanidation of the tailings, should give a type of mill construction which would cheapen the cost greatly.

The Nickel Plate mine, in the Similkameen, is proving to be a large and profitable investment. There are reasons for believing that the gold belt on Eight-Mile Creek at Silverton will prove to be another such investment when the section shall have been thoroughly investigated. The owners of the property appear to be willing and reasonable in their efforts to induce suitable capitalists to take hold of it. The claims are so well situated as regards transportation, that the advantages are superior to the Nickel Plate section, which has no railway communication.

The Slocan as a whole has experienced a considerable period of depression, but the operations now being carried out in leasing will slowly but surely bring it to the notice of mining investors. The old order of things, such as extravagant stock company operations, wasteful methods of mining and milling, the erection of plants without the necessary amount of development to warrant steady working, have all taught their lessons. The work has been costly, but beneficial, and the new order of things will work for future advancement. Other mining districts have had a similar baptism, and today are prosperous, and the Slocan will yet see the day when it will be in the front rank among the mineral producing sections of Canada.

Diamond drills have frequently been used in making connection between tunnels and higher flooded old workings. By this means the water may sometimes be removed from old works with safety and under control, where to make direct connection by drift or raise would result in disaster.

BLUE BELL MINE AND PILOT BAY SMELTER, KOOTENAY LAKE.

By E. Jacobs.*

PROBABLY no other lode mine in British Columbia possesses so much historic interest as attaches to the Blue Bell, situated opposite Ainsworth on Kootenay Lake. It was visited lately by the writer, who found large quantities of lead-zinc-silver ore exposed both in the big open quarry and underground, and further development of the mine in active progress. The smelting works at Pilot Bay, on the other hand, were idle after a few months' operation, the new management of the Canadian Metal Co., which last year acquired from the Bank of Montreal both mine and smelter, having recently closed down the works and determined to erect a 200-ton concentrator at the mine, leaving for future decision the question of where the crude shipping ore and concentrates from the Blue Bell mine shall be smelted. At present the ore shipped is being treated at the Hall Mines' smelter at Nelson.

Both mine and smelter are easily reached from Nelson and other Kootenay Lake points, the Canadian Pacific Railway Co's S.S. "Moyie," which plies daily between Nelson and Kaslo, calling at both places whenever required. As there is no accommodation for visitors at the mine, the most convenient days to visit it are Mondays, Wednesdays, and Fridays, on which days the "Moyie" extends her run to Lardo, at the head of the lake, and so admits of about five hours being spent at the mine before calling on her return trip to Nelson in the afternoon of the same day. There is at the present time hotel accommodation at Pilot Bay, so that a return to Nelson or other starting point the same day is not necessary, should the smelter there be visited.

The object of this article is to gather together information concerning the early history of the Blue Bell mine and Pilot Bay smelter, which during seven or eight years—between 1888 and 1896—were prominent in connection with mining about Kootenay Lake. To this will be added some notes of these enterprises as they are today.

In January, 1896, the B. C. MINING RECORD published "West Kootenay Reminiscences," by G. O. Buchanan, who first visited Kootenay Lake in May, 1888, and who, ever since its early days, has been actively associated with the advancement of Kaslo and tributary country. In the course of these "reminiscences" Mr. Buchanan made brief references to the Blue Bell mine and Pilot Bay smelter industries, as follows: "In 1899, the renovated steamer 'Galena' appeared on Kootenay Lake, and made bi-weekly trips to Bonners Ferry. The 'Idaho,' 'Surprise,' and 'Midge,' small steam launches, were also running. . . . Steam power was put in at the Blue Bell mine by Dr. Hendryx. . . . In 1891, the site of the smelter at Pilot Bay was chosen and work upon it be-

*Editor BRITISH COLUMBIA MINING RECORD.

gun. . . . In 1894 Mr. A. B. Hendryx landed at Pilot Bay and promised to complete the smelter and put it in operation. . . . The record of 1895 is one of prosperity and progress. . . . The Pilot Bay smelter has been in operation almost continually, and has shipped some 3,000 tons of bullion. The Blue Bell mine, its principal feeder, has been developed into a vast quarry of ore, and has had heavy machinery and steam power put upon it."

Two months later—in March, 1896—this journal published the following:

"The Blue Bell mine on Kootenay Lake, almost directly opposite the town of Ainsworth, was the first mineral discovery in West Kootenay, having been discovered by Douglas years ago. The property is owned by the Kootenay Mining and Smelting Co., composed of the Messrs. Hendryx, Dr. Herrick, and other parties. In the autumn of 1884, Dr. W. A. Hendryx visited Kootenay Lake for recreation, and found the silver prospects around Galena Bay held partly by the Ainsworths and partly by a man named Sproule. The Ainsworths were represented by Thomas Hamill, and between him and Sproule altercations and threatenings passed about their conflicting claims on the property, until one day Hamill was found shot and Sproule missing. Sproule was afterwards found and subsequently tried and convicted of the murder.

"Some months, however, before the murder, which occurred in 1885, the Kootenay Mining and Smelting Co. had been formed, and to this company Sproule had sold the Blue Bell, retaining an interest. Obtaining a charter from the territory of Idaho, Dr. Hendryx put in a wagon road from the Kootenay railway station, on the Great Northern, to Bonners Ferry, and over this route for many years the whole output of mineral from West Kootenay was carried to the smelter. Until the close of the season of 1888, this road was maintained as a toll road, but has since been sold to Kootenay county. Dr. Hendryx also put a small steambot—the 'Surprise'—on Kootenay Lake in 1887. It was brought on wheels over the road already mentioned, and plied between Bonners Ferry and where the port of Nelson now is. That year he also put on the same waters the pioneer passenger boat, the 'Galena,' which was a twin-screw propeller, built at Bonners Ferry, and which is still in existence. This boat and Mr. Fry's 'Idaho' carried everyone into Kootenay from the south in the early days, and handled all the freight and ore of the whole district.

"From that time to the present, development has never ceased on the Blue Bell, and it is now much the largest single producer of ore, though of low grade, of all the mines in West Kootenay. The mine is situated on a bluff of 50 acres in area and washed in front by the waters of the lake. At its apex it is nearly 200 ft. above the water level and is surrounded by lower ground. Tunnels have been run into the bluff from all sides, and everywhere the mineral has been struck."

It may add to the interest taken in the early history of this property to supplement the foregoing with the

following account, kindly supplied by Mr. A. D. Wheeler, owner of the Krao mine at Ainsworth, and an old-time resident in that locality:

"The earliest account we have of the Blue Bell is that of David Douglas, a Scottish botanist, who in 1825 made an examination of the flora and fauna of Kootenay Lake and discovered the big mineral outcrop of what was afterwards called the Blue Bell. Later, Hudson's Bay trappers used the surface ore for making bullets, and on their departure left several old drills behind them. For about 25 years afterwards no one appeared to have visited the place nor communicated to the world anything concerning it.

"About 1864, receiving flattering reports from prospectors he had sent north, Geo. Hearst, of California, a mining man of wealth, afterward United States Senator from his State, father of the present owner of the *New York Journal* and numerous other newspapers, made a trip to the property. He encountered great hardships on the way, but persisted, and on reaching the place erected a small open-hearth furnace and proceeded to smelt out some bullion. The remains of this old furnace still exist on the property. The low grade of the bullion, the distance from transportation lines, and the supposed inability to market the product within his lifetime, decided Mr. Hearst on abandoning the project, and not until about 1878 do we hear of the mine again.

"In the last-mentioned year, R. E. Sproule located all the available ground on the Peninsula. The only law governing such cases then was the old placer law, and under its provisions the claim had to be represented by one day's work out of three during open season. The impossibility of one man's holding more than three claims hereunder without other workmen than himself led to Thomas Hamill relocating several of the claims, and a contest before the gold commissioner resulted in Hamill securing the claims north and south of the Blue Bell, Sproule retaining that claim, but having the costs of action taxed against him. Sproule being unable to pay the costs, the sheriff put the mine up for sale the following year, and Hamill, on behalf of the Ainsworths, of Portland, Oregon, bought one third of the property. This partnership the next year resulted in Hamill's death by shooting, and Sproule was subsequently convicted of murdering him, and was hanged at New Westminster.

"The neglect of the Ainsworths' attorneys afterwards led to their losing their interest in the claims. Dr. W. A. Hendryx, with a party of Minnesota and Connecticut capitalists, succeeded to the Sproule title, and the real development of the property was then begun. The company cut a "tote" road through from Sand Point, Idaho, to the Kootenay River, and brought in a small tow boat for its use, which boat was succeeded the following year by the now historic 'Galena', which transported hundreds of the prospectors of the early nineties to Kootenay Lake camps. The work at the mine was slowly advanced until the

necessity for a smelter was apparent, when the Pilot Bay smelting plant was erected. Later the property all passed to the Bank of Montreal. For about 12

From the "Report of the Minister of Mines" for 1894 is taken the following extract from Gold Commissioner N. Fitzstubs' report on Ainsworth dis-



Canadian Metal Co's Blue Bell Mine on Kootenay Lake.—Big "Glory Hole" and Entrance Therefrom to "Vaulted Chamber."

years it remained unworked, until last year, when the Canadian Metal Co. secured it and is now developing the mine on a large scale."

trict:

"The anticipated early completion of the Pilot Bay smelter, on the east side of Kootenay Lake, the pro-

perty of the Kootenay Mining and Smelting Co., has given a stimulus to mining in this section.

"This company owns the famous Blue Bell group, and several others in the Ainsworth and Toad Mountain camps, from most of which they will extract ore as early as possible. About the works at Pilot Bay nearly 100 men are now employed. The buildings are of brick, with corrugated iron roofs, and are of the following dimensions: Concentrator, 80 by 120 ft.; sampler, 33 by 50 ft.; roaster, 100 by 200 ft.; smelter, 60 by 100 ft.; engine-room, 50 by 50 ft.; boiler-room, 40 by 40 ft.; machine and blacksmith shop, 64 by 90 ft.; carpenter shop, 25 by 50 ft.; laboratory and assay office, 20 by 80 ft.; general office, 30 by 45 ft.

"The buildings are equipped with various machinery of the most modern type, and a battery of boilers of 200 h.p., smelter stack capable of handling 100 tons of ore daily, sampling works with a capacity of 150 tons per day, and concentrator of like capacity..

"A large and substantial wharf has been erected, also warehouses and ore bins. It is predicted that the opening of these works will prove of great benefit to the people of the district, and particularly those who are unable, from various causes, to send their ore to distant smelters.

"The Blue Bell mine, on the ore of which the company relies for much of its fluxes, has over 3,000 ft. of tunnels, shafts, upraises, etc., completed, and is in a position to turn out 150 tons of ore per day."

In 1895, *vide* "Report of the Minister of Mines," Gold Commissioner Fitzstubbbs reported:

"The Pilot Bay smelter is in the Ainsworth Recording Subdivision, and for the following notice in respect to it I am indebted to the courtesy of Mr. A. B. Hendryx, part owner and general manager:

"The first visit to the Kootenay Lake country by those owning and controlling the company's interests was made eleven years ago last October in a row-boat from Bonners Ferry, Idaho, for the purpose of examining and purchasing the Blue Bell properties. The purchase of the property was made, and a force of men immediately put to work on it, the stock interests being largely taken by our president, Edwin W. Herrick, of Minneapolis, Minn., and myself, who are still the principal owners of the company's stock.

"The Kootenay Mining and Smelting Co. at present own, upon a peninsula extending into Kootenay Lake, and called Hendryx Peninsula, ten claims and two water rights, which include the Blue Bell, Silver King, Golconda, Arcade, Calcium, and Hendryx Nos. 1, 2, 3, and 4. The company also owns several claims in Ainsworth camp, which is on the opposite side of the lake, a little south of Hendryx Peninsula. The principal ones are the Blue Bird and Siberia.

"The company's works for sampling, concentrating, roasting or calcining, and smelting are located on the east side of the Kootenay Lake, ten miles southerly from the Peninsula, and directly opposite the Kootenay Lake outlet, through which all incoming waters to the Kootenay Lake discharge. The outlet is the water communication between the works and Nelson,

a distance of about 20 miles. The works are so located as to command two good harbours, the neck of land between them being only a few hundred feet wide, being also midway between the north and south ends of Kootenay Lake.

"The machinery in the various departments is of the latest and most improved type, as shown by the results during the brief period the works have been completed and working, and consist of an automatic sampling works, capable of sampling 250 to 300 tons of ore per diem; a roasting department, consisting of five roasting or calcining furnaces; one 100-ton water-jacket furnace.

"The concentrating works, blower for smelting stack, and electrical plant are each run by a separate engine. The machine shop is completely equipped with lathe, planers, compound drilling machine, bolt and pipe-cutting machines, and there are blacksmith and carpenter shops, also supplied with up-to-date equipment.

"The works were complete enough to commence the treatment of ores in March last. The shipment of bullion was commenced March 16, since which time to December 30, 1895, there have been shipped 3,220 tons of silver-lead bullion, yet the furnace or smelting stack has not been in blast half the time. From January 1 to December 31, 1895, 52,000 tons of ore were mined from the Blue Bell claims and transported to the works, consisting of first or second class or concentrating ore, lime rock for fluxing, etc. A considerable percentage of this ore is yet in the works, and being submitted to the various necessary treatments before smelting.

"The company bought of neighbouring mines located on or near Kootenay Lake during the year 1895, 2,500 tons of ore, which contained a gold, silver, and lead value of \$156,404; and although it has been demonstrated the company can successfully run on the Blue Bell ores alone, it is and will be the policy of the company to purchase any and all ores produced in the Kootenay country, thus making the plant a custom smelter that is desirous of purchasing ores from neighbouring mine owners.

"Although this company is really but just entering upon the first stages of its possible developments, a review of some of the expenditures may be interesting. Since resuming operations on July 10, 1894, to finish the works, up to December 31, 1895, the Kootenay Mining and Smelting Co. has expended in cash for purchases of machinery, labour, ores, etc., a sum exceeding \$650,000. During the year 1895 the company has employed an average of more than 200 men daily, and has paid on labour account \$170,000; for supplies, \$85,622; for duties, \$70,000; for freights, \$92,500; for ores purchased, more than \$150,000."

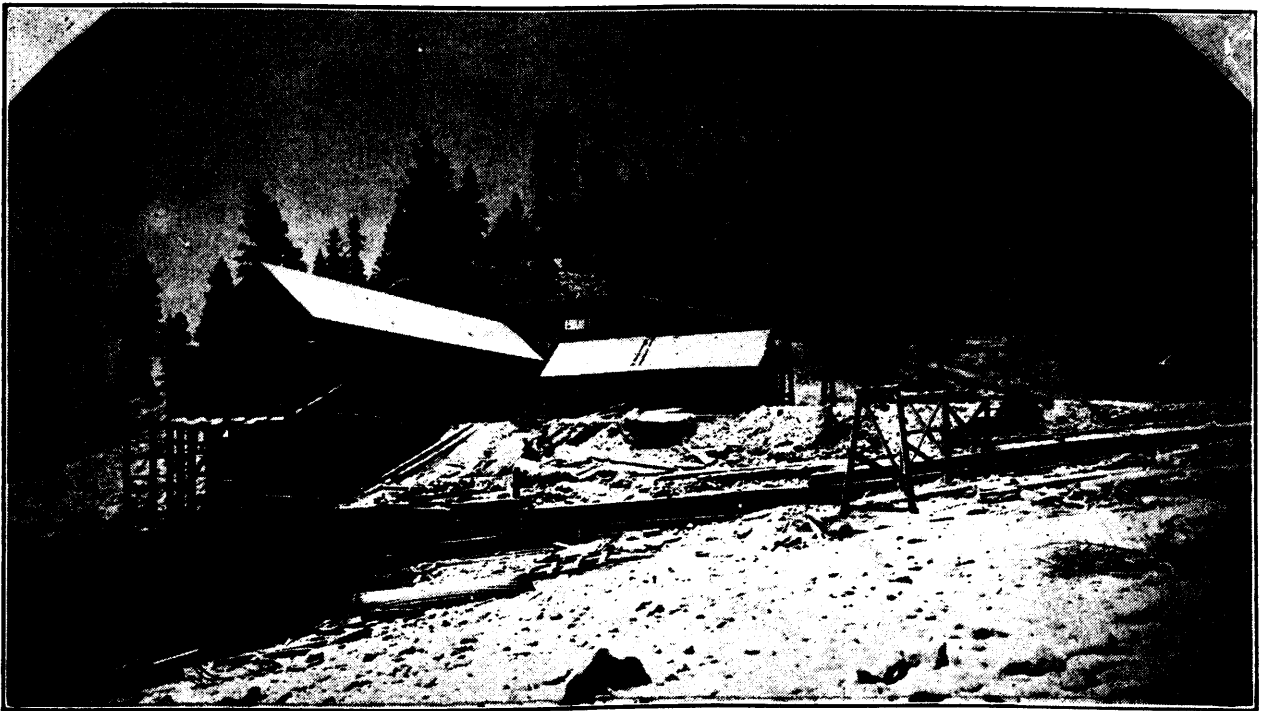
In his Bulletin No. 3, "Report on the Slocan, Nelson and Ainsworth Mining Districts," dated January 15, 1897, and afterwards included as part of the "Report of the Minister of Mines" for 1896, Mr. Wm. A. Carlyle, then provincial mineralogist, made the following reference: "Neither the Blue Bell mine nor the Pilot Bay smelter was visited, as mining operations

had been suspended, and the smelter was not in blast; however, the following information is given, as it may prove of interest to many. In the "Summary Report" for 1895, p. 33, Mr. R. G. McConnell, of the Geological Survey of Canada, states:

"At Hendryx the Blue Bell is in active operation. This mine is situated on a band of crystalline limestone, interbedded with the Shuswap schists, which has been fractured in various directions. The ore, consisting mostly of low-grade galena and pyrrhotite, with some blende, iron and copper pyrites, and their decomposition products, occurs either pure or disseminated through a calcareous and occasionally a silicious matrix. It occupies irregular chambers in the limestone, some of which are of huge dimensions. The ore body being worked at present, including some

one 100-ton water-jacketted blast furnace. In the engine room is a 150-h.p. Corliss engine for the concentrator and sampling works, an 85-h.p. engine for the blower, and a 30-h.p. engine for the dynamo for the electric lighting of the whole works.

"The ore is brought down from the mine on large scows and then hoisted up on an incline plane to a point whence it can be taken to any point desired. . . . The above-described Blue Bell property, consisting, in part, of the Blue Bell, Surprise, Black Hawk, and Silver King claims, and the smelter plant, equipment, etc., are the property of the Kootenay Mining and Smelting Co., Ltd.; capital stock, \$2,300,000; general manager, A. B. Hendryx, Pilot Bay, B.C."



Canadian Metal Co's Blue Bell Mine on Kootenay Lake.—Crushing and Sorting Building, Ore Shipping Bins, etc. on Waterfront.

large horses of limestone, measures approximately 70 ft. in width by 200 ft. in length and 150 ft. in height. Forty thousand tons of pure and concentrated ores have been shipped from this mine during the year, and prodigious quantities remain in sight.

"The Pilot Bay smelter plant is located on a small peninsula on the same side (or the east) of Kootenay Lake, as the mine, but about eight miles south. There are three main buildings, the roast house, smelter and concentrator, beside the smaller ones for offices, laboratories, workshops, etc. The concentrator contains two 9 by 15 in. Blake crushers, four 4-compartment jigs, two double Collom jigs, two 2-table slime tables, and two Frue vanners, and has a capacity of 200 tons of ore per 24 hours. There are in the roast house four 17 by 65-ft. reverberatory furnaces of 12 tons capacity each per 24 hours, while in the smelter is

In the "Annual Report of the Minister of Mines" for each of the three years 1897, 1898, and 1899, mention was made of the property under notice. In 1897 it was stated that the Pilot Bay smelter and concentrator had "passed into the control of Braden Bros., who are using the concentrator only for ore from their properties, the Tariff, Lucky Jim, etc., but it is understood that there is no intention of blowing in the furnace for some time at least." For 1898 Mr. John Keen, then mining recorder for Ainsworth division, reported: "Blue Bell camp was the first mining camp in West Kootenay district, the Blue Bell claim having been located in January, 1883, by R. E. Sproule, but it was known to the Hudson's Bay Co. long prior thereto. Since that date several other claims have been recorded surrounding the original claim and all were acquired by Dr. Wilbur A. Hen-

dry, and by him transferred to the Kootenay Mining and Smelting Co. For the treatment of the ores this company erected a concentrator and smelter at Pilot Bay, where the ores were, for a time, smelted and the matte sent to the United States, but owing to the cost of fuel and the low grade of the ores, and the then difficulty of obtaining fluxes, the business was not successful, and the concern was closed down pending the completion of the Crow's Nest railway, when cheap and plentiful fuel would enable them to work at a profit. Dry ores, lime rock, and iron ore are now to be had through the Duncan River camp, White-water Basin, and on the east and west sides of Kootenay Lake, within easy reach of the waterway, having been staked under the Mineral Act, or Land Act, as iron mines or lime quarries, respectively. The ore at the camp is high in lead but very low in silver. No work is now being done, and the property is simply in charge of a watchman."

In the Report for 1899 the provincial mineralogist, Mr. Wm. Fleet Robertson, who on June 1, 1898, succeeded Mr. Carlyle in that office, made mention of the Blue Bell, as follows: "The property is not now being worked and, together with the Pilot Bay smelter, previously owned by the same people, has passed into the hands of Mr. Campbell Sweeny, of the Bank of Montreal, Vancouver. The old workings are extensive; the plant, consisting of a splendid air compressor, boilers, pumps, etc., is very complete and in good repair. A large amount of ore has been taken out of the mine, and a very large quantity, which might almost be described as being 'in sight,' still remains. It consists of galena, zinc blende, and iron sulphides, occurring in huge masses and associated with white crystalline limestone. The ore carries only a few ounces of silver, said to be from 4 to 6 oz. per ton. This was found to be of too low grade to be worked at a profit; but I am told there is some likelihood of the property being taken up by other parties who hope, by saving the zinc values, to be able to run it to advantage."

For about six years thereafter little or nothing was published relative to the Blue Bell or the smelter, but the acquirement of these properties during 1905 by the Canadian Metal Co., and the employment of a number of men to further develop the mine and others to repair and make additions to the concentrator and smelting works, revived interest in them. Last December the MINING RECORD published an article on "The Canadian Metal Co.'s Works at Frank and Pilot Bay," which was prepared by the present writer from information obtained by him from Mr. J. J. Constant Fernau, then general manager of the company. After describing the company's zinc smelter at Frank, Southwest Alberta, the article continued as follows:

"The Smelter at Pilot Bay.—The industry the company is establishing at Pilot Bay is one that will be of almost, if not quite, as much importance to the Slocan and other districts chiefly concerned, as that of zinc smelting at Frank, for it will provide a local market for mixed ores, many of them of such nature as to make them, under conditions that have hereto-

fore obtained, quite unsaleable. The plant here includes a concentrator, which, when the smelter was operated in 1895-7, concentrated about 200 tons of ore per day. This plant is being thoroughly repaired and renovated, and in addition 12 magnetic separators are being installed. These separators are designed to extract the iron and dress the zinc content of the ore up to a percentage sufficiently high for the purposes of the zinc smelter.

"The company's lead smelting operations will be carried on at the Pilot Bay works. A supply of lead ores will be obtained partly from the concentrator and partly by the purchase of such ores. There is already one lead stack available for smelting lead whenever it shall be found advisable to commence operations in this connection. This is a 42 by 96 in. stack, with six 3½-in. tuyeres on each side. The hand roasters formerly in use here will be replaced by mechanical roasters.

"Slips are being constructed at the lake side to facilitate the delivery of ore and other materials. It is hoped the supply of ore will soon be large enough to warrant the addition of more lead stacks, for the erection of two or three of which provision has been made in the existing smelter buildings. It is intended to enlarge the plant in all departments whenever the quantity of ore received shall justify this being done. It is expected that such enlargement will be required specially in connection with the treatment of dry ores. Future developments will be in the direction of making provision for the treatment of ores at the lowest possible cost."

While it has been found advisable to modify the plan of operations, as outlined last December, as regards the treatment of lead ores and the magnetic separation of zinc ores at Pilot Bay, the new management intends to more extensively develop the Blue Bell mine, and, as already mentioned, to build at the mine a 200-ton concentrator, the equipment of which will probably include appliances for the magnetic separation of iron from the zinc ore. Preparations for putting in this plant are already in hand.

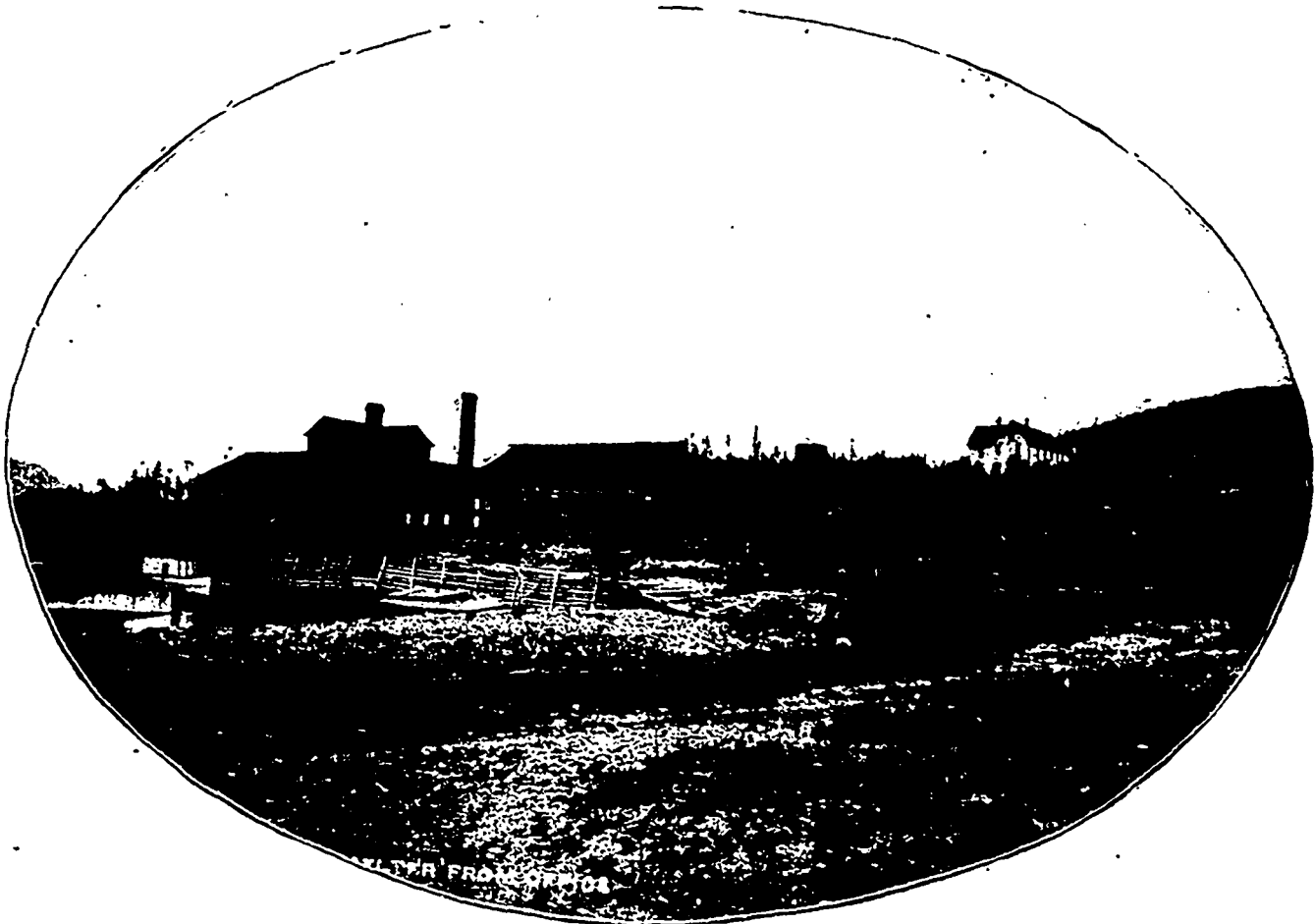
The Hendryx company's workings included (1) the big open quarry shown in the accompanying view, which is from a photograph taken years ago, and (2) extensive exploration at what is known as "the adit level," which was driven at a level corresponding with that of the foot of the incline tramway shown in the view of the buildings on the waterfront. Between the adit level and the open quarry are (3) big workings known as "the vaulted chamber," having large pillars left to support the roof, and between which and the adit level below and the quarry or "glory hole" above are connecting workings. The floor of the vaulted chamber is 25 ft. to 30 ft. above the adit level. From this big stope or chamber the old company took out a large quantity of ore, and the present company has in it broken down and ready for removal about 6,000 tons of ore. Ore from this chamber is passed down through chutes to the adit level, whence it is trammed to the crusher. The old company had but one chute, but since the new company

commenced work last September three more similar connections have been broken through. The Hudson's Bay Co's men drove a tunnel into the ore from the landward side of the big outcrop of ore, the remains of an old and primitive trestle being shown today as having been used by them for dumping purposes. This first tunnel passed out of existence when the Hendryx company's men, in excavating the big glory hole, removed all the rock through which it had been driven.

The ore bodies in the Blue Bell have been regarded as occurring in three big veins or shoots, but the further development done on them during the last nine

silica to make it a suitable flux, so shipments were discontinued. At about 500 ft. in the tunnel turns to the left and continues to a total length from its portal of about 900 ft., passing through what was called the centre vein, but which now appears to be connected with the big shoot of iron ore above mentioned, and entering what was designated the north vein, distant on the adit level some 200 ft. from the centre shoot of ore.

There are on the adit level two large chambers all in ore, with a wall of ore about 12 ft. in thickness between them. Together they give a width of about 80 ft. of ore in what has been referred to above as



Canadian Metal Co's Smelter at Pilot Bay, Kootenay Lake.—The First Smelter in Kootenay to Operate on a Commercial Basis

months makes it appear that there are not more than two so far met with, and these are more correctly described as big chimneys of ore occurring in the upper part of the limestone, which enclosing rock is probably here some 200 ft. in thickness.

The adit level driven by the old company passed through schist, underlying the limestone, for about 300 ft., when it ran into a big body of pyrrhotite about 70 ft. in width. This ore carries a little lead and silver and very small values in gold and copper. The old company shipped a large quantity of this ore to Pilot Bay and last spring the Canadian Metal Co. shipped 2,013 tons to an outside smelter, but the ore was found to contain too little excess of iron over

the centre vein. The new company's development work on this level has been extensive, and the quantity of ore opened up by it considerable. The old company put down a vertical winze about 30 ft. and from the bottom a cross-cut was driven 70 ft., encountering the centre shoot, in which it was continued. Drifts to right and left exposed galena and zinc ore, roughly about 40 ft. in width. Another winze, or shaft, starting from the adit level, is being sunk on the dip of the ore. When the mine was visited recently this incline winze was down 65 ft., in ore all the way, and the last 15 ft. in solid shipping ore the full size of the working. Not much water was coming in and the winze was easily kept dry by means of a

pump operated by compressed air.

What has been designated the north vein was first cut in a shallow tunnel from the old glory hole. The new company extended the adit level, reaching this shoot of ore and opening a big chamber in it, which has already been extended 50 ft. in a direction parallel with the wall, but which has not yet reached the northern limit of the ore body. This shoot, so far as opened, is solid galena and zinc ore of milling grade.

As indicating in some measure the extent of ore disclosed by the Blue Bell workings to date, it may be mentioned that from the surface down through the "glory hole," the "vaulted chamber," the "adit level," and to the bottom of the new shaft or winze, the depth is about 250 ft. As the ore is strong in the bottom of the shaft, it is evident it goes deeper still, but to what depth nothing but sinking or the diamond drill can tell. The prospects are so promising that a prosperous future may be confidently predicted for the Canadian Metal Co so long as prices of metals shall remain high and its management be in such capable hands as it now is.

Before passing on to give some particulars of the buildings, plant and machinery at the mine it may be noted that so far as can be ascertained the output of ore from the Blue Bell mine during the Hendryx company's time for 15 months ended March 31, 1896, was 67,185 tons. As work was continued beyond that date it is probably the aggregate was still larger. A record of 35,302 tons milled during nine months ended March 31, 1896, has also been found. The Canadian Metal Co. shipped to Pilot Bay between the middle of February and the end of May of the current year 8,341 tons of ore, which, with the 2,013 tons of fluxing ore shipped to the Boundary, made a total of 10,354 tons shipped by the present owners.

When work was resumed at the mine last September the compressor was found to be in good condition, notwithstanding that it had not been in use for nearly ten years. It is an E. P. Allis 5-drill straight-line engine, with Corliss movement in both steam and air ends. Steam is supplied by a type of boiler, about 100 h.p. capacity, in use on some of the lake steamboats at the time it was installed at the mine. There are four Ingersoll-Sergeant 3¼-in. machine drills, but all are not used simultaneously. The steam hoist is a double cylinder, double drum engine, and it serves to haul supplies up from the wharf as well as cars of ore up the incline tramway to the bin above the ore-crusher. The power house in which the above-mentioned machinery is installed is wood, with iron roof, dimensions about 40 by 60 ft. The crushing and sorting building and the shipping bins are on the water front, as shown in the accompanying view. The structure is of wood with iron roof, dimensions about 30 by 100 ft. The ore from the receiving bin passes over a grizzly to a 10 by 20 Giant Blake crusher. The crushed ore falls on to a Robins 30-in. picking belt, 60 ft. centres. The pure lead, zinc, or iron ore and lime, picked out, is thrown into bins, whence it is trammed along a trestle to scows for shipment

separately. The bulk of the ore is delivered by the belt into a shipping bin having a capacity of about 150 tons. The crushing and sorting plant is operated by a small steam engine. When the concentrating mill shall be in operation there will not be any necessity to use this plant. The blacksmith and general repair shop is well equipped for all ordinary requirements of the mine.

The main bunkhouse provides accommodation for 50 men, and there are two small houses, with room for 24 more. In the boarding house there are tables for 60 men. The food served is good both as to quality and variety, and all the surroundings of the men's quarters are clean and healthful. There is a separate building for office and foreman's house, and there are other necessary buildings about the mine. The resident foreman is Mr. Chas. Sherwin, who has for years been mining at Ainsworth and about Kaslo. Mr. S. S. Fowler is general manager of the Canadian Metal Co., with offices at Nelson. The company consists chiefly of French capitalists, who deserve to succeed in the above described important undertakings.

FIELD WORK OF STAFF OF GEOLOGICAL SURVEY OF CANADA.

COMMUNICATIONS received by the Director from several of the field parties of the Geological Survey show that the work is everywhere progressing favourably.

Information concerning the work of these parties is contained in the last issued *Press Bulletin* of the Survey. The following notes relate to that in progress in British Columbia and other Western parts:

From Dawson word has come that the work of estimating the volume and value of the gold-bearing bench gravels is well under way.

In British Columbia Mr. O. E. LeRoy has finished the examination of the coast section from the International boundary to Burrard Inlet and is now continuing it in Howe Sound. He has traced out the rocks on the coast containing economic minerals, and will carefully study the more important areas of Howe Sound.

Mr. Chas. Camsell in the Similkameen has finished the mapping of the Princeton coal basin, and has left to examine the Roche River, Kennedy and Copper Mountain camps along the South Similkameen from the International boundary northward.

Mr. R. W. Brock reports good progress in the detailed study and mapping of Rossland camp, and sees no difficulty in completing the work before the end of the season. He has sent for analysis specimens of sands from Little Sheep Creek, which he suspects contain platinum, along with a considerable amount of gold.

No word has been received from Mr. W. W. Leach, in the Bulkley Valley, nor from Mr. D. B. Dowling, who is tracing northward the anthracite coal area on the eastern slopes of the Rocky Mountains.

NOTES ON A TRIP TO BOUNDARY, ROSSLAND, AND NELSON DISTRICTS.

MINING was never before on such a satisfactory basis as at present in the Boundary and Rossland districts, while about Nelson, Ymir, Slo-can Lake, East Kootenay, and other interior mining sections there is also much that is encouraging to those who are of opinion that lode mining is now a permanent industry in the districts above mentioned. The editor of the B. C. MINING RECORD, after having been occupied during three recent weeks in seeking information at first hand in the Boundary, and at Rossland and Nelson, has returned to Victoria strongly impressed with the generally favourable nature of conditions at the larger mines and smelters of the districts visited, and satisfied that substantial progress has been, and is being, made in the several mining camps concerning which he sought particular information.

IN THE BOUNDARY.

In this important ore-producing district there was found existing a confident feeling regarding the future of mining. At all three copper smelters extensive additions and improvements were being made, and at the mines their producing capacity was being enlarged, in preparation for an early considerable increase in the tonnage requirements of the smelters. The plant and machinery being installed is modern and designed to give thorough efficiency and at the same time to still further reduce costs of mining and smelting.

B. C. Copper Co.—At Greenwood the British Columbia Copper Co., of New York, is substituting a thoroughly up-to-date smelting plant at its works, this to have a treatment capacity of 1,500 to 1,800 tons per diem, for the 700 to 800-ton plant the company has been operating since early in 1901, and with which an aggregate of about 933,000 tons of ore and been smelted. All the heavy excavation work and building of substantial masonry foundations are practically completed; the erection of new buildings and the extension of existing structures for housing the plant are also well forward, and some of the new machinery has been received, while more of it is in transit. Construction and installation are under the direct supervision of Mr. Geo. Williams, who was construction engineer at both the Ladysmith and Crofton smelters built on Vancouver Island several years ago. Some difficulty was experienced in getting lumber from district mills for the new ore bins, which are to have a storage capacity of about 10,000 tons, but the company's manager, Mr. J. E. McAllister, met the situation by arranging for a supply from the coast, so as to tide over this difficulty. It is expected that smelting will be resumed at these works in September or October.

The B. C. Copper Co's mining engineer, Mr. Frederic Keffer, is kept very busy directing mining operations at the company's various mines. At its Mother Lode mine, Supt. S. C. Holman has about 130 men employed. The main working shaft here

has been deepened to 475 ft., and a station opened at the 400 ft. level, with a big ore pocket below. By the time the smelter shall be ready to treat ore the mine will be in a position to supply 800 to 1,000 tons per diem. Then some 250 tons daily will be obtainable from the company's Oro Denoro mine, 150 tons from the Emma, 100 tons from the Napoleon, near Marcus, and custom ores will make up more than enough to keep the works going at their full capacity. Electric power will be used almost altogether at both mine and smelter, this to be obtained from the British Columbia Construction and Distributing Co., which takes from the West Kootenay Power and Light Co. electric current generated at Bonnington Falls, on Kootenay River. The B. C. Copper Co. recently bonded several mining properties, including the Ruby at Boundary Falls, and the Lone Star and Washington on the Colville Indian reservation immediately south of the International boundary line.

Dominion Copper Co.—At Boundary Falls, the Dominion Copper Co. is enlarging its assay office, and adding to its laboratory equipment, erecting additional bins for both coke and ore, putting in a Jenckes-Farrel crusher with a capacity of 1,000 to 1,200 tons per day (one 8-hour shift), building a new furnace 255 by 44 in., with 22 3½-in. tuyeres and provided with Giroux hot blast (the first of its kind in British Columbia), adding a No. 9 Connersville blower to be run by two 100-h-p. Allis-Chalmers-Bullock induction motors, and providing for requisite increases in sampling mill capacity, railway trackage, water supply, etc.

At this company's several mines development and production are both increasing. The main ore supply has been coming from the Brooklyn, from which a tonnage of 10,000 to 12,000 tons per month has been obtained, with a record of 14,000 tons for one month. The Stenwinder is sending down 1,500 tons, the Rawhide about 2,000 tons, and the Sunset about 3,500 tons, and the Mountain Rose is contributing a little. The Idaho will soon have railway connections that will admit of its joining the ore shippers. An air compressor has been ordered from the Canadian Rand Drill Co. for this mine, to be operated by a 400-h-p. Canadian Westinghouse motor. Other plant is being put in where needed. The company is employing about 400 men in all at its mines and smelter.

Granby Consolidated M. S. and P. Co., Ltd.—The Granby Co. is sinking a 3-compartment shaft at its mines at Phoenix. Sinking is in progress from the surface and at the 200 and 400-ft. levels. For the time sinking will not be continued below the 500-ft. level. The shaft is inclined at 60 deg. Over it will be erected a 90-ft. head frame. A double conical drum hoisting engine, operated by a 250-h.p. type S Canadian Westinghouse variable speed induction motor, 2,000 volts, and equal to sinking to a depth of 2,000 ft., will hoist ore in two 5-ton skips in balance, the skips automatically dumping into two 400-ton receiving bins. About one quarter of the work of sinking the new shaft is completed, and the hoist ma-

chinery is on the ground. Other main workings of the mines for getting out ore are two shafts and three double-tracked tunnels.

A Jenckes-Farrel crusher, of the Blake type, having a jaw opening of 42 by 36 in., and a capacity of 150 tons per hour crushed to a 6-in. cube, is being obtained to crush the ore from the above-mentioned bins. The ore will be conveyed thence to the railway bins for shipment to the smelter. This crusher will make the third of this make and size in use at these mines.

It is intended during the ensuing fall to install on the 400-ft. level of these mines an electric haulage system to deliver ore from the various workings on this level to the new shaft. Machinery and cars for this system are being designed, and plans are in course of development.

Ore is being obtained at all levels of the mines, from the big open quarries down to the 500-ft. level, inclusive.

At the Granby Co's big smelting works at Grand Forks two of the old furnaces have been rebuilt and enlarged to a daily capacity of 500 tons, making, with the two last-built stacks, four furnaces each having a treatment capacity of 500 tons. The remaining four furnaces are to be similarly enlarged, so that a total daily capacity of nearly 4,000 tons will soon have been provided for. Two more large "Jumbo" blowers have been ordered, and, for driving these blowers, four 150-h.p. Canadian Westinghouse induction motors, two for each blower, have also been ordered. The installation of a third converter stand is just about completed. An automatic converter-slag conveyor and elevator is being installed, similar in design and construction to those in use at the big smelting works at Anaconda, Montana. The conveyor consists of a number of half-inch thick pressed steel moulds running over small rollers or wheels. The converter-slag is poured hot into these moulds, but during the time taken to convey it to a receiving bin it solidifies. From this bin it is taken in railway dump cars to the regular furnace charging bins, and thence charged into the blast furnaces. This method of dealing with the converter-slag results in a considerable saving of labour. The wood framing of the entire furnace building is being replaced by structural steel. The dimensions of the building are about 71 by 400 ft. An extension of the blowing engine room, 70 ft. long by 56 ft. wide, forming an L, is being made, thus about doubling the size of this building. For the water power house another pump has been ordered, and it has been shipped—a triplex double-acting power plunger pump, made by the Pratt Iron Works (late Stillwell-Bierce & Smith-Vale Co.) of Drayton, Ohio, and having a capacity of 750,000 gal. per diem. This will be the fifth pump of this class in the power house, beside one centrifugal pump. A 100,000-gal. steel watertank is being substituted for the 90,000-gal. wood tank that has done service for several years, giving pressure for furnace water jackets and other uses about the works.

The tonnage of ore smelted at the company's

works during the financial year ended June 30 last was about 800,000 tons, this including a small quantity of custom ore, but the great bulk was from its own mines. From this some 20,000,000 lb. of copper were produced. The company employs about 450 men at its mines and 350 at its smelting works. Labour is reported to be scarce in the Boundary, and mines and smelters are all experiencing difficulty in keeping up full forces of men.

Snowshoe Gold and Copper Mines, Ltd.—On May 26 last the deputy chairman, Mr. Geo. S. Waterlow, left England for Canada for the purpose of completing the details of an agreement for leasing the Snowshoe mine and all its appurtenances to the Consolidated Mining and Smelting Co. of Canada, Ltd. The lease, upon royalty, which has now been signed, is for a period of two years, or until 125,000 tons of ore shall have been extracted. The agreement provides, *inter alia*, that the lessees shall carry out all work in a proper minerlike manner, that they shall well and sufficiently timber the mine at all points where proper in accordance with good mining, and that they shall perform a reasonable amount of development work. Mr. Geo. H. Barnhart, of Nelson, formerly manager of the Ymir mine, has been appointed agent of the Snowshoe company to inspect weighings of ore and smelter assays, and generally to safeguard its interests. Mr. Chas. R. Hamilton is attorney in British Columbia for the company. At the termination of the lease, the lessees will have (provided they shall have given three months' previous notice in writing of their desire to do so) the first option to purchase the mine and equipment at a price to be then mutually agreed upon. Mr. Chas. Biesel, formerly with the War Eagle and Centre Star mines at Rossland, has been appointed superintendent of the mine, which has been pumped out and the shipment of ore resumed. During the years 1901, 1902, and 1903, the Snowshoe shipped about 94,000 tons of ore to Boundary smelters. It is understood to have large quantities of ore still available.

High-grade Silver-gold Mines—Several of the smaller mines about Greenwood—those producing high-grade silver-gold ore, are doing well. The Providence continues to lead, having shipped this year about 800 tons of ore, bringing its total output to date up to about 3,500 tons. The Skylark has shipped more than 400 tons this year; its last car, containing about 25 tons of sorted ore, brought a smelter return of \$5,220, or about \$209 per ton. Monthly shipments consist of one car of first class and two cars of second class ore, or thereabouts. The second-class ore returns about \$1,000 a carload. The shaft is below the 200-ft. level, and will probably be down to 250 ft. in September. Other promising high-grade properties are the Elkhorn, Strathmore, Prince Henry, and several more.

THE ROSSLAND MINES.

Rossland mines are believed to now be in a better condition for the production of ore on a large scale than at any previous time in their history. Further development down to 2,000 feet depth has been au-

thorised and is being taken in hand, the occurrence of shoots of ore down to 1,750 ft. having already been proved.

Le Roi.—During six months ended June 30 the Le Roi mine shipped 61,052 tons of ore, and an output of 2,000 to 3,000 tons per week is being regularly maintained. Development work on the lower levels of the mine has proved the existence at depth of ore in sufficient quantity to warrant the deepening of the big main shaft, consequently sinking has been resumed. It is probable this shaft will be sunk to the 2,000-ft. level. Beside proving the occurrence of much ore in the bottom of the mine, an important discovery has been made on the 800-ft. level, at which the Josie dyke has been crossed and ore found in considerable quantity in the Black Bear claim, but as yet the development work done here is insufficient to demonstrate the full value of this discovery.

Le Roi No. 2.—At the Le Roi No. 2 a large amount of development work has been done, much more in proportion to the quantity of ore produced than in most mines. As a result there is a comparatively large tonnage of ore in sight and, the grade being good, the profitable operation of this mine for several years seems to be assured. Most of the development work has been done west of the main working shaft, and by far the larger portion of shipping ore produced during the last three years has come from this part of the company's property. This fact is considered a most hopeful thing for Rossland camp, indicating the occurrence of ore of a payable grade and in quantity in ground west of the area to which practically all ore production had previously been restricted. The Le Roi No. 2 shipped during six months ended June 30 last 12,596 tons of ore, and crushed at its mill 5,344 tons of too low a grade for shipping to the smelter, the latter yielding 314 tons of concentrate. The company is shipping about 2,100 tons per month and milling 1,000 tons.

War Eagle and Centre Star.—The Consolidated Mining & Smelting Company of Canada is carrying out an active policy of development and increasing the producing capacity of its War Eagle and Centre Star mines. At the latter electric power is being substituted for steam and a 650-h.p. Canadian Westinghouse induction motor is to be installed to drive the Centre Star 40-drill compressor. This motor is due to arrive in September. The War Eagle 25-drill compressor is to be changed to a two-stage engine and will be removed to the Centre Star compressor house, to concentrate the power plant, heretofore located at different parts of the mines. The main shaft is down 1,600 ft. on the incline, and a level—known as the twelfth level—is being opened at this depth. This shaft is to serve for hoisting purposes, with four-ton skips, for both Centre Star and War Eagle mines, connection between them having been made at several levels. The War Eagle shaft is also down 1,600 ft., but having been started higher up the hill, its eleventh level only corresponds to the ninth level of the Centre Star. These mines together employ 30

to 450 men, and ship between 2,000 and 3,000 tons of ore per month. Shipments during six months ended June 30, 1906, totalled 81,267 tons.

Other Mines.—Among other mines in Rossland camp there are the White Bear, Jumbo and Spitzee, but only the first-named of these is now at work. Recent reports state that good ore has been found in the White Bear, but no definite information was obtained as to the actual position at this mine. The Jumbo appears to have got to the end of the ore in sight, so, in the absence of development work ahead to find and open up more ore, there seems to be no prospect of an early resumption of production. The Spitzee is without sufficient money to admit of its being developed to an extent that would admit of its being operated to advantage. Intermittent work has been done on other properties, but with no substantial result in the direction of maintaining for long an output of ore.

Geological Survey Work.—The members of the staff of the Geological Survey engaged on a structural survey of Rossland camp—Messrs. R. W. Brook, W. H. Boyd, and G. A. Young—were found to be very deeply engrossed in their respective departments of this important work, and bent upon completing it by the close of the present field-work season. There was noted in and about Rossland a general appreciation of the value of this work, and much favourable comment was heard relative to the "Preliminary Report" on the camp prepared by Mr. Brock and published recently by the survey. It will be remembered that this report was reprinted in the June number of the B. C. MINING RECORD.

SMELTING WORKS AT TRAIL.

The smelting works at Trail, formerly known as the Canadian Smelting Works, but now owned by the Consolidated Mining and Smelting Co. of Canada, are being considerably enlarged and improved. Big receiving and storage bins and a copper sampling mill are being constructed. In connection with the latter, a No. 8 McCully ore crusher having a crushing capacity of 200 tons per hour is being installed, and a gravity system, with electric haulage of ore to the blast furnace bins, is among the labour-saving improvements. There are five copper blast furnaces, the largest only just completed. The four smaller ones are to be enlarged, so that the treatment capacity of the copper department of the works will hereafter be much greater. One of the lead furnaces has just been rebuilt and its capacity increased by 50 tons (to about 200 tons of charge), and the other is to be similarly treated shortly. The addition of a third lead stack is contemplated. The improvements already made have raised the capacity of the works to a production of 75 tons of metallic lead per day.

The Huntington-Heberlein process of roasting and desulphurising ores has proved so successful here that six additional converters are being put in, making twelve in all, while six more may be added ere long. The increase made in the smelting capacity of the works necessitates more blowing power, so another large Root's blower to have a capacity of about 200

cu. ft. of air per min., has been ordered, also a 300-h.p. induction motor to drive it.

In the lead refinery larger melting kettles—three each of 50 tons capacity—are being installed, and the number of electrolytic refining tanks is being increased to 240, of which 132 are new. A 5-ton Nile electric crane, for handling anodes and cathodes and other material, has been installed in the tank room. The slime treatment process is being changed so as to save the antimony. Laboratory tests have been successful, so this change is being made to put the experience gained by them to a practical use and bring the antimony saving down to a commercial basis. Appliances for the manufacture of hydrofluosilicic acid for the electrolyte are being installed in a separate building 30 by 70 ft. These include two acid pans 10 ft. diameter and 18 in. deep, six condensing towers, two copper pumps, storage tanks for about two cars of acid, etc.

In the electrical department of the works, the installation of a new set of transformers—three 1,250-kw. oil-insulated water-cooled Westinghouse transformers—has lately been completed, these making available about 5,000 h.p. To operate the electrolytic lead refinery, a large motor-generator set 4,000 amperes at 110 volts, capable of depositing more than 100 tons of lead if required, is being put in.

Speaking generally, so much construction work is in progress throughout the smelting works and lead refinery that the visitor is impressed with the growing importance of the industries established here, and leaves with a conviction that the costly extensions being made indicate profitable operation and permanence.

NEW HYDRO-ELECTRIC POWER PLANT AT BONNINGTON FALLS.

The West Kootenay Power and Light Co., Ltd., is developing at Upper Bonnington Falls a hydro-electric plant to have a capacity of 32,000 h.p. Two 8,000-h.p. generators are being installed, and the additional power above the 4,000-h.p., being generated by the present plant, will provide the increased power required for operating the Trail smelter and the mines at Rossland; and in addition to this the British Columbia Construction and Distributing Co., Ltd., is to take from the West Kootenay Power and Light Co., Ltd., 10,000 h.p. for use in the Boundary district.

The new installation consists of two 8,000 h.p. vertical settings manufactured by the I. P. Morris Co., of Philadelphia. These are much the same type of setting as used by the Niagara Power Co. on the American side at Niagara Falls, New York. The generators are supplied by the Canadian General Electric Co., Ltd., and also all switchboard apparatus. The transformers for the complete installation are supplied by the Canadian Westinghouse Co., of Hamilton, Ontario.

From Bonnington to Greenwood, a distance of 78 miles, there have been erected two 60,000-volt transmission lines, each line capable of delivering 7,000

h.p. The generators are wound for 2,000 volts and the transformers are wound to step up from 2,000 to 60,000 volts. The power at Rossland will be stepped down from 60,000 to 2,000 volts.

The B. C. Construction and Distributing Co., Ltd., is erecting at Grand Forks, Phoenix and Greenwood, respectively, distributing stations, each station having an output of 4,000 h.p. The power at Grand Forks will be used for operating the smelter of the Granby Consolidated Mining Smelting, and Power Co., Ltd.; at Phoenix it will be used at the mines of the Granby Co. and those of the Dominion Copper Co.; at Greenwood the British Columbia Co's smelter, and its Mother Lode mine, situated 2½ miles distant from the town, will obtain their power from this system, while the Dominion Copper Co's smelter at Boundary Falls, situated 2½ miles distant from Greenwood, will also be operated by it.

IN AND ABOUT NELSON.

Hall Mining and Smelting Co.—This company has made extensive and substantial improvements at its lead-smelting works at Nelson, including a new sampling mill, a labour-saving system for handling ores, the installation of the Huntington-Heberlein roasting and converting process, and other changes and betterments, particulars of which are printed elsewhere in this issue.

At the company's Silver King mine on Toad Mountain, near Nelson, which mine is being operated by the company and Mr. M. S. Davys, conjointly, under the management of the latter, some 200 tons of silver-copper ore are being produced every month. The ore is of excellent grade, and is all being taken from the upper workings. No deadwork has been done during the last four months, but arrangements are being made for unwatering the mine down to the seventh level, when development will be undertaken simultaneously with ore production.

Canadian Metal Co.—A change in the management of this company having just taken place, the time was not opportune for obtaining details of the company's zinc smelting works additional to those published in the B. C. MINING RECORD last December (p. 481, 1905), but the Blue Bell mine was visited and the Pilot Bay smelter was seen *en route*. A history of mine and smelter, together with some recent information relative to the former, appear on another page.

La Plata Mine—This property, formerly known as the Molly Gibson, situated near Kokanee Creek, which flows into Kootenay Lake a few miles above Nelson, was not visited, the superintendent, Capt. T. H. Trethewey, having just left for the East to attend a meeting of shareholders in the La Plata Mines company. A 75-ton concentrating mill at the mine has recently been completed. The mill is operated by water power, and its equipment includes a Blake crusher, two sets of 36 by 14-in. rolls, and a battery of five stamps for fine crushing. The concentrating plant consists of trommels, six jigs with from two to five compartments, three Overstrom tables, six Fru-

vanners, etc. Two products, lead and zinc concentrates, are being made. Only the lower grade ore is being treated, that of higher grade being shipped as crude ore to the Hall Mines' smelter. Developments are being pushed at the mine, but these are somewhat retarded owing to the difficulty of getting good men. Some 55 men are employed at mine and mill. There are two veins, only a few feet apart, and a third on another part of the property. The ore varies from one foot to four or five feet in width, and averages about $17\frac{1}{2}$ oz. silver and 2 to 4 per cent lead, with a little zinc. More than 4,000 tons have been mined this year. An air compressor and an electric light plant have been ordered, and these will be installed as soon as practicable.

Arlington Mine, Eric.—The following is a general statement of the operations at the Arlington mine, Eric, Ymir district, owned by the Hastings (British Columbia) Exploration Syndicate, of London, England, during the financial year ended May 31, 1906: Tons of ore shipped, 1,231.943; net smelter returns, \$52,735.33; cost of mining and shipping, including development, \$38,508.74; gross profit, \$14,226.59, being 27.11 per cent of net returns; average value of ore per ton, net, \$42.81; gross, \$51.12; number of mine cars of ore mined, 1,370, and of waste 12,327; total development work done, 1,470 ft. In one level there is 4 ft. of ore in the face of the drive. The mine is managed by Mr. Leslie Hill, consulting mining engineer, Nelson, who kindly supplied the foregoing information.

Vancouver Group, Slocan.—Mr. M. S. Davys has been operating this property, which is situated in the vicinity of Slocan Lake, since last December, under lease. One of the conditions of the lease was that No. 4 tunnel was to be continued, and it was also to be connected with No. 3 above. No. 4 was driven towards what was concluded as the position of the vein at that depth, allowing for the average dip, as calculated by Mr. Leslie Hill and marked by him on the plan. The vein was found in about 80 ft. and within a few feet of the calculated position. No. 4 had been driven on a parallel vein, which contained no mineral a few feet beyond where it was struck in the cross-cut tunnel. The vein opened up by Mr. Davys is about 7 ft. in width, widening in places to 14 ft. It contains two streaks, 12 to 14 in. in width, of clean shipping ore running about 100 oz. silver per ton and 45 per cent lead. The remainder of the vein is mixed lead and zinc ore, all good concentrating material. Mr. Davys shipped five carloads of marketable ore and there are about six cars more on the dump, making 11 cars taken out in the course of running this development drift, known as No. 4 tunnel and in which the ore is exposed along a length of 180 ft. The same shoot of ore has been opened in No. 3 level above, in which it has been drifted on for about 50 ft., and shows ore of similar character and grade. A winze farther in No. 3 is down 65 ft. in good ore—galena and dry ore. When connection shall have been made between Nos. 3 and 4 and ven-

tilation secured, it will be practicable to put out two cars of shipping ore per week from these levels. A Riblet aerial tramway from the mine to the Wakefield mill, a distance of about 4,000 ft., is under construction, and it is expected that it will be completed by the end of September. A transfer of Mr. Davys' lease to the Le Roi No. 2, Ltd., of Rossland, has been made, and Mr. Paul S. Couldrey, manager of that company, has taken charge of the Vancouver group.

Argenta Mine, Hamill Creek.—From Mr. A. C. Garde, manager of the Argenta mine, who was met at Nelson, it was learned that the wagon road from the head of Kootenay Lake to the Argenta mine, owned by the Argenta Mines Co., of Boston, Mass., has been completed, and 125,000 ft. of lumber and about 50 tons of machinery have been hauled over it to the mine. The high-pressure half of a 10-drill air compressor has been installed. This engine is direct-connected to a 9-ft. Pelton water wheel, having a spindle nozzle—a new type of nozzle. Some 300 h.p. is obtained from Hamill Creek, with much more available. The water is conveyed in half a mile of 36 by 30-in. wood flume and thence through a 30-in. steel penstock to the power plant, having about 120 ft. head.

Whitewater.—The Whitewater and Whitewater Deep are being worked under lease by Messrs. S. S. Fowler and J. L. Retallack. Attention has been given chiefly to development work and the property is looking well. Most of the ore mined is concentrated at the Whitewater mill. The year's results are regarded as satisfactory, some 400 tons of sorted ore and concentrates having been shipped to the smelter, this quantity including about 40 tons from the Whitewater Deep.

Kootenay Ore Co's Works at Kaslo.—The question of magnetic separation of iron from zinc in the ore is of great importance to the Slocan district, for upon its successful solution largely depends the removal of one of the chief difficulties experienced by mine owners in that district. Mr. Geo. Alexander, of Kaslo, manager of the Kootenay Ore Co., Ltd., has given careful and persistent attention to this matter. He has visited plants in Europe and in other directions, and has made exhaustive enquiries with a view to removing what has for years been a serious obstacle to success in mining the lead-zinc ores so generally met with in the Slocan district. As a result of prolonged experiments he has succeeded in attaining a remarkable efficiency, representing a recovery of at least 88 to 89 per cent of the total zinc in the feed. The works at Kaslo are now making a 51 and 52 per cent zinc. Some 400 tons of 51 per cent zinc have lately been shipped from Kaslo to the Canadian Metal Co's zinc smelter at Frank, Southwest Alberta, and a similar quantity of 52 per cent zinc to Europe. The Ruth mine, at Sandon, at which ore is being mined and milled, is making separate lead and zinc concentrates, and the latter product is shipped to the Kaslo works for dressing up to the required percentage of

zinc by magnetic separation. Similar material is also being received from other mines.

Silver Cup, Ferguson.—From Mr. Geo. Alexander, who is general manager of the Ferguson Mines, Ltd., owning the Silver Cup group and other mining properties in the Ferguson section of the Northern Lardau, it was ascertained that at the Silver Cup mine the lowest tunnel, which was driven 1,600 ft. without encountering any ore, after having been extended met with several very good showings of ore. Connection has been made with the upper workings of the mine by a 300-ft. raise which is in ore almost its whole height. The vein is strong and the ore of good grade. About 100 tons per month are being extracted in the course of development, and this is shipped to the Hall Mines' smelter at Nelson. The exploratory policy which has been carried out for some time past will be continued until development shall be considerably ahead. The company's mill at Five-Mile, near Ferguson, will not be again operated for some time—not until there shall be plenty of ore available. The capacity of the air compressor at the Silver Cup has been increased, so that there is now sufficient power for running four big machine drills. Water power has been substituted for steam for operating the compressor, a large Pelton wheel having been installed for this purpose.

THE LATE GEORGE H. ROBINSON.*

GEORGE H. Robinson, who died in New York on July 4, was one of the most widely known and highly respected mining engineers in the United States. A somewhat extended sketch of his life seems fitting at this time, and having enjoyed personal acquaintance with him for nearly 28 years, I feel qualified to speak intelligently.

Born in a small town near Cleveland, Ohio, George Robinson enjoyed only the benefits of a common school education, mainly at Akron, Ohio, and at the early age of 15 he went into the office of Paul Bros., civil engineers, as an assistant, with the determination of learning the profession of a civil engineer. He climbed from the bottom round; a detail of surveying once mastered was never forgotten; every formula commonly used by engineers was always "on tap" for ready use. During these years he gained valuable experience on railroad and municipal surveys and among others was employed on the Wheeling, Lake Erie, and Western Railroad, and by the city engineer of Cleveland. It was during this time that Robinson was appointed by the governor an officer in the Ohio National Guard and took part in the Pittsburg riots. He undoubtedly acquired in these stirring times a faculty for handling men which stood him in good stead at a later date and under more trying circumstances in Leadville.

In his twenty-third year, he set out for the West as a locating engineer on the Atchison, Topeka, &

Santa Fe Railroad. He pushed the earliest survey of that line into Colorado. After the abandonment of further surveys in the Grand Canyon of the Arkansas he naturally drifted into Leadville in the summer of 1878, where I first became acquainted with him. Recognising the immense possibilities of this new and booming mining camp, he definitely decided to take up mining engineering as his specialty, which he did with marked success.

As a member of the firm of Chapman & Robinson, he was employed on underground surveys of the Iron Silver mine, the Chrysolite, the Little Chief, and many other properties of less note, and was called upon for some of the most intricate and responsible work. During the miners' strike in Leadville, Robinson had entire charge of the Little Chief mine, and successfully withstood the attempt of armed rioters to capture the main shaft, which he had barricaded. Shortly after this he became assistant manager of the Chrysolite, and the early-day history of mining in Leadville is linked with his name in all its engineering features. He prepared and consolidated a large part of the maps of mine workings upon which were based the United States Geological Survey of that district, and acquired a knowledge of all underground conditions, perhaps more intimately than any other one engineer up to the date at which he left Leadville, viz., the summer of 1882. He then went to Montana for the purpose of engaging in government contract surveying, and followed this line of business for two seasons. Finding it unprofitable, he returned to Wheeling, W. Va., and took up coal-mine surveys and a general engineering practice. This looked "slow" to him, after being in the West, and with the additional objection that his health was not nearly so good as it had been in the Rocky Mountains he determined to return to Montana.

In Helena, in 1885, he became a member of the firm of Sizer & Robinson, but in the spring of 1886 gave up general practice to accept a position as engineer for the Montana Co., operating the Drumlummon mine, and took up his residence at Marysville. Soon afterward, he became assistant manager, and about 1890 was made manager of the property. In these years he developed a talent for the direction of mining litigation, and became a recognised expert authority in the famous St. Louis-Drumlummon law suits. This class of mining engineering greatly interested him, and he was highly resourceful in the preparation and trial of a case. Always a student, with his practical knowledge of mining geology he was able to utilise every scrap of information which came under his eye (and he was a keen observer) and turned to the best account in court the secrets of the rocks.

In 1892 he left Montana for Utah, and from that time onward called Salt Lake City his home. He was manager for the Mammoth Mining Co., later of all the mining interests of Captain De Lamar, and then the Utah mining properties of Franklin Farrell. During this time he began to acquire some of the interests which were later his main care. A prominent

*By F. L. Sizer, in the *Engineering and Mining Journal*, New York, N.Y., U.S.A.

figure in the mining development of the Tintic and the Bingham districts, he gathered about him both capitalists and an effective working force for the operation of the mines. He was ever ready to give the younger engineers valuable advice and effective assistance in getting a start, and many a man can point to George Robinson, with grateful remembrance, as his first employer.

In 1898, he was tempted to return to Montana by the offer of the position of chief engineer to the Montana Ore Purchasing Company, and while this employment was at first looked upon by him as only temporary, it resulted in his taking charge of what is known as the Heinze-Amalgamated law suits, and he became the life and soul of that stirring mining litigation. Eminent mining lawyers took his advice most cheerfully, and in these complicated law suits, Robinson was chief expert witness for Mr. Heinze, and also for Senator W. A. Clark in the latter's suit against the Anaconda Copper Co. For fully four years the legal battles were waged with all the skill and science at the command of both sides, and Robinson developed a wonderful faculty for the command of the situation underground as bearing upon the apex and extra-lateral rights of his clients. He was a dreaded antagonist and a resourceful fighter, largely because of his thorough familiarity with the Butte mines, and his wonderful facility for clearly putting, before judge or jury, his view of the mining conditions.

His scientific reading ever made professional capital for him, for coupled with his wonderful memory, his tireless energy and a remarkable power of absorption, it enabled him to do more and accomplish greater practical results than any other engineer I have ever known. When engaged in his work he possessed the happy faculty of making light of the discomforts and dangers of underground examinations, and his persistent and irrepressible fund of humour made him a most agreeable working companion.

For the last four years he devoted his energies to the development and equipment of the Yampa mine at Bingham, and the Britannia copper mine on Howe Sound, British Columbia, being managing director of the latter property, and having a large interest in both.

Exposure to physical difficulties was to him highly interesting, and no matter what the natural obstacles it was his delight to work out a perfect engineering solution for the problem in hand. During the last three years he suffered from several seemingly unavoidable operations, which he bore heroically, but it was only within the last 12 months that even his intimate friends knew the serious nature of his malady, and up to six months ago he successfully concealed from his nearest and dearest his worst fears, and made light of the predictions of eminent surgeons and specialists, whom he consulted.

George H. Robinson will long be remembered as a marked example of what a man may attain by persistent self-education and practical assimilation of mining detail without the aid of previous technical

training. I have written this short sketch of the life of a successful engineer, and now would add a word for his charming personality. He was a polished gentleman, a brilliant and entertaining conversationalist, and a man of undaunted courage, carrying always with him a fine cheerfulness, which flooded the very atmosphere around him. His loss will be deeply felt by his brother engineers, and by all those who were associated with him.

DAWSON, YUKON TERRITORY.

OTTAWA advices are to the effect that the Miners' Lien ordinance has been gazetted. This has been adopted by the Government of Canada in response to a memorial of the Yukon council respecting the enactment of a law to give wage earners of Yukon Territory adequate and proper security and protection for payment of their wages, and providing for collection of same as expeditiously as possible. Prior lien against both the products of the labour of the wage earner and the mining claim on which his work has been done, is granted under this law.

Changes have been made in the regulations governing the deposit of gold and charges thereon in the Dominion assay office. Among these is the following: "On gold on which royalty has been paid: First charge—Assaying and stamping charge, 1-8th of 1 per cent. on the gross value of the gold and silver contained in the deposit. Second charge—Parting and refining charge, 4 cents per oz. on the weight after melt. Third charge—Toughening the alloy, 2 cents per oz. on 1-11th of the standard weight of gold contained in the deposit." On gold on which no royalty has been paid, an additional charge of \$1 is to be exacted.

Mr. Chester A. Thomas, manager of the two Guggenheim incorporations recently licensed to transact business in Yukon Territory, and known as the Northwest Hydraulic Mining Co., and the Yukon Consolidated Gold Fields Co., respectively, has been quoted by the *Yukon World* as authority for the following statements: The latter company intends to this season build three dredges, all to be operated on Bonanza Creek. Thirty-eight carpenters, for dredge-building work, have been engaged at Vancouver, B.C. Much of the timber to be used in the construction of these dredges, and some of the machinery, had already been received. It is not doubted that these dredges will be ready for operation by the opening of next season. As to the Anglo-Klondike and other groups already having hydraulic plants on them, purchased by the companies above named, work on these will be continued as in the past until such time as the big ditch to increase the water supply shall be completed, when operations will be on a larger scale. Ditch construction is being pushed as rapidly as practicable under existing conditions, but after receipt of additional equipment that has been ordered, including two steam shovels, greater progress will be made. There are already more than 200 men employed on this work, which is as many as can be employed to advan-

tage at present, and the company will put on more as fast as room can be made for them to work.

It has been announced that as a result of representations made from Dawson relative to rates charged by the White Pass and Yukon Railway Co. on freight sent over its railway from Skagway to White Horse and thence by water, the chairman of the Canadian Government railway commission, accompanied by a traffic expert, will this summer visit Dawson and other Yukon points affected for the purpose of investigating the charges made that rates are excessive.

President S. H. Graves, of the White Pass and Yukon Railway Co., is expected to shortly reach Dawson on his annual visit of inspection. While in the Yukon he will look into conditions bearing upon the proposed construction of a branch railway to Windy Arm, where it is believed mineral development will shortly warrant the provision of railway transportation facilities.

The outlook for the season in the Kluane district, in the southwest part of Yukon Territory, is reported as being more favourable than at any time during three seasons last past. This report relates to Bullion, Sheep, Burwash, Fourth of July, and other district creeks. The Bullion Hydraulic Co. is stated to be doing fairly well, but is handicapped by shortage of men. It is claimed that the gravel being washed yields gold to the value of \$3 per cu. yd., consequently a good clean-up is looked for.

WINDY ARM DISTRICT, YUKON TERRITORY.

PRESS BULLETIN No. 3, issued by the Geological Survey of Canada, contains the following information relative to the Windy Arm district of Yukon Territory:

A few months ago, Mr. R. G. McConnell, of the Geological Survey, wrote a short report on the Windy Arm district just north of the British Columbia boundary, where rich strikes of silver and copper are being worked. This season, Mr. D. D. Cairnes, of the same department, has been commissioned to survey the district, and his preliminary notes make interesting reading.

Mr. Cairnes says: "In the district north of the boundary, south of Carcross and between Windy Arm and Lake Bennett (an area of about 14 by 8 or 9 miles), more than 260 claims are being held, and a great deal of development is going on. The Conrad Consolidated Co. owns a great many of these properties, and is pushing forward operations at seven of its camps. Machine drills are used at the Venus mine. The power is generated by a 50-h.p. gasoline engine. But, as there is enormous water-power on many of the creeks, piping, etc., has arrived to establish water-power to replace gasoline engines. A double-cable tramway is in operation from the Montana mine to the beach at Conrad City, 3,400 ft. below. Four other tramways, it is reported, are to be erected.

Conrad City was practically started this spring and is quite a little town; it is built on the west shore of Windy Arm and already possesses three hotels, three stores, a drug store, restaurant, etc.

The Anglo-American Consolidated Co. has a number of promising-looking properties working to the south of Conrad, on Windy Arm. The leads are quartz, carrying high gold and silver values, and can, in most cases, be traced for considerable distances. Though the leads are generally narrow, from a few inches up to two feet, they are high grade.

The mineralised rock of the Venus mine is exceptionally wide, sometimes as much as 32 ft., and averaging, for considerable distances, more than 20 ft.; it can be traced along 3,000 ft. It is interbanded quartz and porphyrite and will average about \$25 per ton.

A tunnel more than 700 ft. long has been driven on the Montana lead, proving it to be from 2 to 4½ ft. wide. About 14 in. will average \$80 and the rest will go over \$20 per ton. Wherever galena is present in these quartz veins, the returns are invariably high on account of associated minerals—silver chloride, ruby silver, silver glance, stephanite, etc. Assays running into the hundreds and even thousands of dollars per ton are rather common from picked samples, rich stringers, etc. On the whole the camp looks quite promising, and, no doubt, will continue to go ahead rapidly.

Native copper is found in a number of places on the east side of Windy Arm, distributed through the rock, which is a slate and chert series, near contact with old peridotite intrusions. No leads have, as yet, been found, but scarcely any work or prospecting has been done.

Some rich copper ores carrying nickel and cobalt values, as yet rather low, have been, however found on Marsh Lake, and I am thinking of taking two or three days to look at the properties, as they are quite close, and are very interesting.

A recent free-gold strike has been made up the Wheaton River, about 15 miles west of Robson. As this has just started, reports vary, but some very rich rock is coming down. This is in my district, and I will see it soon.

All interested parties are very anxious to have more work done than I can possibly do this season, but I will work as late as possible, and can cover a good-sized area.

The three larger companies operating in the Boundary district have shortened the hours of labour of all men employed at their mines and not affected by the previously existing rule to work certain classes of labour, chiefly underground men, eight hours a day. Surface men, including mechanics, teamsters, etc., have been working nine and a half to ten hours; now the Granby Consolidated, British Columbia Copper, and Dominion Copper companies, have put into force a rule that all these men shall work nine hours a day, receiving for this time similar pay to that heretofore given for the longer day.

COMPANY MEETINGS AND REPORTS.

PHOENIX AMALGAMATED COPPER MINES, LTD.

A meeting of the shareholders of the Phoenix Amalgamated Copper Mines, Ltd., was called for July 17, for the purpose of electing directors and officers. All other preliminaries to the amalgamation having been practically completed, says the *Phoenix Pioneer*, it is expected that the new concern will shortly begin operations on its properties in this camp, adjoining the Granby Consolidated mines on the south.

METROPOLITAN GOLD AND SILVER MINING CO., LTD.

A meeting of the Metropolitan Gold and Silver Mining Co., Ltd., was held at Ferguson, Northern Lardeau, on July 18, and was largely attended by local and outside stockholders. The following were elected directors: D. D. Forbes, Geo. Fox, C. F. Massey, T. N. Weaver, N. H. Winchell, C. P. Banning and D. N. Richards. These in addition to John Morton and Wm. White whose term of office has not expired, now form the directorate of the company. It, however, was decided to increase the number of directors from seven to nine.

PRINCE MINING AND DEVELOPMENT CO., LTD.

The annual meeting of the Prince Mining and Development Co., Ltd., was held at the company's office Wednesday July 18. It was the largest attended meeting in the history of the company, states the *Revelstoke Mail-Herald*, 730,000 shares having been represented. The following officers were elected: J. T. Laing, Pendleton, Oregon, president; J. A. Stone, Revelstoke, vice-president; J. M. Scott, Revelstoke, secretary-treasurer and manager; C. J. Rumens, superintendent; Dr. C. Smyth, Collins, Mo., J. M. McCracken, Springfield, Mo., A. M. Smith, Spokane, Wash., directors.

TYEE COPPER CO., LTD.

The seventh ordinary general meeting of shareholders in the Tyee Copper Co., Ltd., was held in London, England, where is situated the company's head office, on Thursday, July 12, inst. The chairman of the company presided, and the Directors' Report and Statement of Accounts for the year ended April 30, 1906, were submitted, as follows:

Directors' Report.—"The directors herewith submit the audited statement of accounts from May 1, 1905, to April 30, 1906.

"The prospecting and developing at the mines have been carried on with vigour during the past year, but so far without striking fresh ore-bodies, although the indications are more favourable than when we last addressed you. This remark applies both to the Tyee and X. L. mines.

"You will be asked to approve of a recommendation by the board to pay a dividend for the year at the rate of 5 per cent per annum. This dividend will be payable to all names standing on the Register of Members of the company on July 12, 1906. Although this payment of a dividend is contrary to the policy indicated at the last general meeting, the directors feel that the profits accrued during the past year are such as to justify them in modifying their decision to this extent.

"When we do discover fresh ore-bodies a considerable amount of money and time will be required in opening them up and providing fresh machinery to work them.

"On reference to the Revenue Account, it will be seen that the balance of the Commission and Mines Development accounts has been added to the Reserve Fund and duly invested. Although under the resolution passed July 2, 1903, in reference to this matter only one-fifth was agreed to, the directors will ask you to pass a special resolution empowering them to write off two-fifths instead of one-fifth.

"The retiring directors at this time are Mr. A. Straube and Mr. H. von Berg, the latter gentleman having succeeded to the seat vacated by Mr. J. A. D. Hancke. These gentlemen are eligible and offer themselves for re-election.

"The retiring auditors, Messrs Everett, Morgan & Grundy, also offer themselves for re-election."

The reports of the general manager, mine superintendent, and smelter manager, which give details and represent the

opinions of these officials in their respective departments, follow:

General Managers' Report.—"I beg leave to enclose annual reports from the mine superintendent and smelter manager for the financial year ended April 30, which I confirm.

"Operations for the past year have been successful. It is true that shipments have been restricted, and only 24,483 tons of ore have been shipped to the smelter, as against 49,744 tons in the previous year. I am, however, pleased to say that even these comparatively small shipments of 2,000 tons per month have yielded such good results that, beside paying for all the heavy development work we are continuously doing, fair profits have been made.

"The report of Mr. E. C. Musgrave, your mine superintendent, has gone so fully into all details connected with the mine that I need only deal with the future prospects of your large property.

"In my opinion the prospects for future success were never brighter than they are to-day. It is true that ore-bodies of commercial value have not as yet been discovered in the deep levels of your mine, but there is every reason to believe that we are on the right track for such discoveries. It has always been our contention that an ore-body of such size, strength and unique combination of minerals as we have on Mount Sicker, could not possibly be a surface deposit. We have through a number of years been working to solve this riddle in the only possible way, viz., by persistent and careful development, which work has been laid out from the experience gained through our long and intimate knowledge of the ground. These facts, which have been gradually accumulated, all point to the probable solution that the ore in the upper levels of the mine has been faulted from a deep-seated ore-bearing formation, and the results obtained during the past few months tend to prove the correctness of this view.

"Mr. Musgrave and I have told you in past reports how the formation on this hill has been masked and hidden by flows and dykes of volcanic rock. At the 1,000-ft. level of the Tyee mine we are apparently getting once more into an ore-bearing country. The occurrence of low grade barytic ore at this depth is an indication of the greatest importance, as we had previously passed through a vertical depth of 700 ft. of ground in which not a particle of barytic ore had been found. As the Tyee ore carries on an average 38 per cent. of BaSo₄, the very finding of barium associated with copper, gold and silver (although low grade at the point where it was intersected) gives the greatest encouragement for vigorous sinking to still greater depths. The wall and selvage are as strong and well defined at the 1,000-ft. level as they were near the surface, but the inclination of the wall has changed, and is now dipping at an angle of 70° south. During the past few years we have secured ground to the south that gives the most ample cover in that direction. At the depth now attained this dip will probably be permanent, and, if so, should link the Tyee to the X. L. with ore-bearing ground right through. Sinking to the 1,200-ft. level is now in rapid progress, and I hope that a still greater depth will be reached before the wet weather sets in. Mr. Musgrave's report will inform you that the developments at the X.L. are looking well. At the depth of 350 ft. we have the same strong wall and selvage, the latter carrying a small percentage of barium and identical with that found at the Tyee.

"On the floor of this level, what is apparently the apex of a belt of graphitic schists has also been uncovered. The X. L. shaft is now being sunk by three shifts (that is, continuously night and day), and when the 550-ft. level shall have reached exploratory work will be carried on simultaneously from both the 450- and 550-ft. levels.

"Mr. Musgrave's report gives total tonnage and values of ore that has been shipped from the Tyee from the commencement. If to this is added the tonnage shipped from the neighbouring mine, and what is still standing in our upper levels, there would be a grand total of over 250,000 tons contained in a strip of ground 2,500 ft. in length. We do not believe that this ore terminates abruptly either vertically or

in extension, and we are only passing through a phase similar to what has been encountered in almost every other copper mine. In most instances this has been successfully overcome, and what other mines have done will be done by the Tye.

"I have dealt with this subject more fully than with any other, as it is one of such vital importance that everything connected with it should be made as clear as possible, so as to be thoroughly grasped by those interested in the company.

"Everything connected with the plant and workings at the mine has run smoothly and well throughout the year.

"I cannot conclude the portion of my report that deals with the mine without saying how much I regret that Mr. Musgrave will shortly be leaving the service of the company, as the faithful and good work he has done during the past six years has contributed in a great measure to its success.

"The report of Mr. W. J. Watson, your smelter manager, deals fully with the operations at the smelter during the past year. The resignation of Mr. Thomas Kiddie, who left the employ of the Tye Co. to take another position, took place last September. I have much pleasure in stating that Mr. W. J. Watson, who accepted the post made vacant by the resignation of Mr. Kiddie, has most ably carried out the duties entrusted to his charge. I can safely say that it would be difficult to find a better smelter manager than Mr. Watson has proved himself to be. Several improvements have been made with the plant that have effected savings for your company. The slags have been reduced to 0.375 per cent copper, and these will possibly be brought still lower during the current year. Mr. Watson and I have discussed further additions to the existing plant which we believe will greatly add to the profits of the company. Of course we shall not advise further expenditure on these lines until ore in depth is actually discovered, but from what I have written you will have gathered that before long I trust to be able to advise you that this is an accomplished fact.

"The custom ore business is improving, but, as I told you in my last report, it takes time to develop mines in the far north. Development works on a large scale are being carried on in Alaska, and prospects on the Portland Canal in Northern British Columbia are reported to be opening up well. The geographical position of our smelting works is so good, and we have got such a good name from mine owners, that we are sure to get a fair share of any new trade that is developed.

"I am pleased to acknowledge, as I have done in my previous reports, that my best thanks are due to Mr. Musgrave at the mine, Mr. Watson at the smelter, and Mr. Hearn, your accountant at the Duncans office, for the able way in which they have assisted me in carrying out the business of the company."

Mine Superintendent's Report.—"I beg to submit my report of the work done at the Tye and X. L. mines during the year ended April 30, 1906.

"Tye—Work was continuous throughout the year, and consisted of winning ore from that part of ore-body which had hitherto not been worked, and carrying on development work in the upper and lower levels.

"Plant—The only additions made to the plant were two pumps to assist in keeping the mine clear of water. The remainder of the plant, which has now been continuously worked for a long period, is in a good state of repair, and there was not a single breakdown of any importance during the year, while every part of it worked satisfactorily.

"While this plant has been sufficiently powerful to work out the ore in the upper levels, and will be to sink the shaft to a greater depth than has at present been attained, its limit has nearly been reached, and when new ore-bodies shall have been discovered in the lower levels a radical change will have to be made, and proper machinery for working the deep levels will have to be provided.

"As it is only a question of time when the fuel near the mine will have been used up, and as ample power can be taken from the Chemainus River, it would appear that elec-

trical power would be the cheapest to use, and that the present steam plant should be thrown out of commission, when a larger plant shall have been installed.

"Development Work—Considerably less development work has been done this year than last, in the way of drifting and cross-cutting, but the shaft has been sunk from a point 60 ft. below the 700-ft. level, to 20 ft. below the 1,000-ft. level.

"A raise was put up from the eastern end of No. 6 stope (100-ft. level) to the surface, a distance of 357 ft., to get proper ventilation for the stope, and as it passed through soft, grey schists for the greater part of the distance, similar to those in which the ore-body lies, a level has been started from the raise, above the ore-body, to explore this part of the ground. Very little work has been done in this to date, and no discoveries have been made.

"At the 800 and 1,000-ft. levels considerable cross-cutting has been done, and at the latter level a drift to the east has been driven a distance of 191 ft.; but most of the exploratory work from the 600-ft. level down has been done with the small diamond drill which was purchased at the end of last year.

"I mentioned in my report for last year that it was my opinion no ore-bodies would be met with until the workings had reached a point below the silicious zone met with at and below the 600-ft. level. Explorations at the 600- and 800-ft. levels showed that there was very little of the soft, talcose schists at these horizons, but at the 1,000-ft. level, conditions have begun to improve. It will be remembered that south of the selvage, which runs through the mine to the south of the ore, we had always met with a smooth, hard wall of porphyrite, but at the 1,000-ft. level conditions were found to be entirely changed, as although the selvage exists, to the south of it soft schists occur, and in these there is what seems to be a small body of low-grade ore carrying a high percentage of barytes.

"The workings now appear to have got below the silicious zone, which exists to the north of the ore-body in the upper levels of the mine, and which came over to the south wall, under the ore-body; and the whole formation, which in the upper levels dips strongly to the north, now dips to the south, and shows a wide band of soft schists between the points at which the northern diabase and the porphyrite were met with in the north and south cross-cuts respectively.

"The conditions are not yet exactly the same as those in which the large ore-body of the upper levels was found, but they are becoming more like them, and I feel certain that when a greater depth shall have been attained they will be found to be practically the same as higher up, and that careful explorations will prove the existence of commercial bodies of ore.

"Stopes—The only stopes which had not been exhausted, viz., No. 6 stope (100-ft. level), Nos. 2 and 4 stopes (165-ft. level) and the stope at the intermediate level between the 165-ft. and 300-ft. levels, were all worked during the year, and of these No. 4 stope (165-ft. level) and the stope at the intermediate level were worked out. The amount of ore left in the two stopes which have not yet been exhausted cannot be large, and at our present rate of shipments (2,000 tons a month), I do not think it would be safe to calculate on having more than three or four months' ore left.

"No. 6 Stope (100-ft. level) has been worked to a height of 100 ft. above the level, and all signs go to show that we have nearly reached the top of the ore-body, and that there is not likely to be a large tonnage left in this portion of it. In No. 2 stope (165-ft. level) there is only a small part of the ground left unworked.

"The following table shows the tonnage taken from the different stopes during the year:—

No. 6 stope (100-ft. level)	16,272 tons.
No. 2 stope (165-ft. level)	958 "
No. 4 stope (165-ft. level)	218 "
Stope (intermediate level)	7,035 "

Total 24,483 tons.

"Aerial Tramway—This has worked satisfactorily during the year, and there has not been a single breakdown on it. The large track cable put in in January, 1904, and the traction cable put in in August, 1904, are still in good condition; but before undertaking to ship a large tonnage of ore over it, a considerable amount of repairing would have to be done to the tramway. The track cable on the light side has been in use ever since the tramway was built, and is showing great signs of wear; one of the tension stations has become very much distorted, owing to the heavy strains it has had to bear, and would have to be entirely renewed, and the other tension station would have to be repaired and strengthened.

"Costs of Work.—These are considerably higher than last year, owing to the lesser tonnage of ore shipped. They amount to an average of \$3.19 per ton for winning and delivering the ore at the E. & N. railway. They are in the following proportions:

	Per Ton.
Stopping	\$1.508
Ore dressing	0.040
Proportion for development	0.850
Re-timbering old workings	0.080
Fuel	0.087
Freight and hauling	0.041
Transporting to railway	0.135
Pumping (river)	0.084
Pumping (mine)	0.044
General charges	0.321
Total	<u>\$3.190</u>

"The amount of development work done during the year was: Drifting, 361 ft.; cross-cutting, 789 ft.; sinking, 289 ft.; and raising, 508 ft.; and the average costs of these were: Drifting, \$9.07 per ft.; cross-cutting, \$7.19 per ft.; sinking, \$33.14 per ft.; and raising, \$12.94 per ft. Beside this 213 ft. of station work were done at an average cost of \$35.88 per ft., and 3,116 ft. of diamond drilling, of which details are given below.

"Tonnage delivered to Smelter.—The total amount of ore shipped to the smelter during the year was 24,493 tons, having an average assay value of, copper 4.9 per cent; silver 2.77 oz., and gold 0.149 oz. This brings the total tonnage since shipping was begun to 144,416 tons, and the gross contents to: Copper 13,218,000 lb., silver 411,445 oz., and gold 21,254 oz.

"Diamond Drilling.—As previously mentioned, a small diamond drill was purchased at the end of last year, and with this 2,705 ft. of boring has been done, at an average cost of \$1.89 per ft. The drill has proved extremely useful, as although no new discoveries of ore have been made with it, it has saved a lot of drifting and cross-cutting which would have had to be done had the drill not been used. Its capacity is 300 ft., it only takes a small amount of power to operate it, and as it can be moved quickly and easily from one place to another, it has been used underground on the various levels for boring from drifts and cross-cuts. So far, its range has been sufficient for all purposes required of it, and as only shallow bores are made with it the work can be done cheaply.

"Towards the end of this year a larger drill, having a capacity of 3,000 ft., was purchased, and is being used on the surface for exploratory work. It only began to work on March 12, and from then to the end of the year it drilled 411 ft. at an average cost of \$5.64 per ft., but as in this is included the cost of setting up the drill, and building a derrick for lifting the rods, it is possible that when the bore has been finished the average cost per ft. will be less. Personally, I greatly doubt the success or economy of deep bores with this drill, especially when using it underground, but only experience can prove this definitely.

"X. L. Mineral Claim.—Work was continuous throughout the year on this claim, but no discoveries of ore were made. At the 150-ft. level the drift was continued for a distance of 425 ft., making its total length 1,202 ft., but no change of ground was met with. The shaft was then sunk to the

350-ft level, and drifts were started at this and the 250-ft. levels. At the 250-ft level a drift was carried for a distance of 20 ft. west and 222 ft. east of the shaft, and cross-cuts were driven from the east drift, north and south, for distances of 15 ft. and 80 ft., respectively.

"All these workings, with the exception of the south cross-cut, were in green schists (crushed diabase), but the south cross-cut, after having been driven for a distance of 26 ft., passed into greenish-grey schists, in which it remained to the end. When the workings had reached this point instructions arrived to confine the work to the 350-ft. level, so they were stopped.

"The shaft, which had been in green schists practically all the way since leaving the 150-ft. level, passed into diabase a little below the 250-ft. level. The diabase made a lot of water, which gave a good deal of trouble during the sinking operations, and necessitated putting in pumps to keep the mine clear.

"At the 350-ft. level, a drift was started to the east, and after it had been run for a distance of nearly 200 ft., passed out of the diabase into soft clayey schists similar to those found at the 150-ft level. A selvage similar to that found at the 150-ft. level was also found, and the drift was run alongside this for a distance of about 500 ft., making its total length 710 ft. A cross-cut was driven south near the shaft for a distance of 68 ft., but was in diabase for the whole distance, while further to the east, cross-cuts were driven north and south. That to the north encountered diabase after having been driven for a distance of 17 ft., so was stopped, but the south cross-cut was driven for a distance of 223 ft., and was in greenish-grey schists until just at its end, when diabase was met. A bore with the small drill was started in this and is now in 85 ft., at which point a flow of water, sufficient to fill a one-inch pipe, was encountered, but it has been in diabase for the whole distance.

"While digging a ditch alongside the drift near the selvage, a small band of graphitic schists was found. This ditch was dug for a length of about 100 ft., and the graphitic schist was found along the whole distance. Small, water-worn stones composed of diabase were found in this, and as the selvage shows the continuity of the fissure or fault-line in which the Tye ore body lies, and the graphitic schist found in the ditch was first discovered in the X. L. workings, preparation are being made for sinking the shaft to greater depth in the hope that what we have found is the apex of a body of graphitic schists, near which it is hoped ore will be found. The total amount of work done at the X. L. during the year was: Sinking 230 ft. at \$22.92 per ft., drifting 1,377 ft. at \$9.23 per ft., and cross-cutting 425 ft. at \$10.10 per ft.

"As I shall be leaving the service of the company in the near future, and as this will be my last annual report for the company, I wish, before closing, to thank Mr. Clermont Livingston, our general manager, not only on my own behalf, but on that of every employee of the company on Mount Sicker, for the unfailing kindness and consideration with which he has treated us. On the date of my leaving, I shall have been in the service of the company for six years, and there are several others at the mine who have been nearly as long as I have, and during all this time the general manager's treatment of us has been such that we have all taken the keenest interest in our work and in the welfare of the mine. I have no hesitation in saying that much more efficient and economical work has been done than would have been the case had not so much thought and attention been paid by him to our comfort and welfare. It has always been my experience that when men know that their interests are considered and their safety provided for, they will do far better and more faithful work than when they feel that the only idea of the management is to get as much work out of them as possible, and that it takes no interest in them or their affairs."

Smelter Manager's Report.—"Herewith I submit the fourth annual report, covering the smelting operations for the year ending April 30, 1906.

"Ore Receipts.—The receipts of ore for the year ending April 30, 1906, were as follows:—

	Wet Weight. Tons.	Moisture. Per cent.	Dry Weight. Tons.
Tyee ore	24,482.885	2,056	23,979.537
(Of which 12.69 per cent was made into bricks.)			
Custom ore			6,580.0225
Total ore receipts, dry weight			30,559.5595
Plus—Ore in stock, May 1, 1905 .. 848 tons			
Minus—Ore in stock, May 1, 1906..3,432 tons			
			<u>2,584.000</u>
Total tons of ore smelted, dry weight			27,975.5595
Custom flux ore			730.037
Plus—Flux in stock, May 1, 1905 ..1,290 tons			
Minus—Flux in stock, May 1, 1906. 309 tons			
			<u>981.000</u>
Total tons of flux smelted, dry weight			1,711.037

"The Tyee ore assayed as follows:—

Copper (wet) (Per cent)	4.85
Silver (Oz.)	2.80
Gold (Oz.)	0.145
Iron (Per cent)	12.16
Zinc (Per cent)	7.34
Silica (Per cent)	13.82
Barium sulphate (Per cent)	37.57

"Roasting.—During the year we roasted and trammed to the smelter 10,291.81 tons of ore, being 35.88 per cent of the total ore smelted, the balance, 64.12 per cent., being smelted raw. The roasting operations were carried on under similar conditions to those prevailing during the previous year, the sulphur as sulphides in the ore averaging 6 per cent as against 5.95 per cent in the previous year. The bricking and roasting of the raw ore fines and concentrates has been carried on throughout the year and gave entire satisfaction, both as regards the thoroughness of the roasting and the condition of the product for smelting. The amount of ore made into bricks was 3,106.602 tons, being 30.18 per cent of the ore roasted.

"Smelting.—During the year the furnace has been in blast 143 $\frac{3}{4}$ days of 24 hours each, an average of 11.98 days per month, and smelted as follows:—

Tyee raw ore	14,135.77 tons =	42.50 per cent
Tyee roasted ore	7,185.21 " =	21.60 "
Tyee roasted brick	3,106.60 " =	9.34 "
Custom ore	4,256.67 " =	12.80 "
Total ore smelted	28,684.25	
Flux	1,447.79 " =	4.35 "
Flue dust	990.54 " =	2.98 "
Slag and barrings	554.69 " =	1.67 "
Low-grade matte	1,581.27 " =	4.76 "

Total mixture smelted .. 33,258.54 " of 2,000 lb.
Coke used 2,886.25 " of 2,240 lb.
being an average of 199.54 tons of ore, and 231.36 tons of mixture smelted per day. The ratio of coke to ore was 1 ton of coke to 9.93 tons of ore, and 1 ton of coke to 11.52 tons of mixture, as against 8.04 tons of ore, and 8.63 tons of mixture, in the previous year. The concentration was 9.04 tons of ore to 1 ton of matte. Of the ore smelted it will be noted that 49.28 per cent of Tyee ore was smelted raw, 35.88 per cent being roasted, and 14.84 per cent custom ore smelted raw, a total of 64.12 smelted raw and 35.88 per cent roasted. The flue dust produced and re-smelted amounted to 2.98 per cent., and slag and furnace barrings to 1.67 per cent on the total smelted. The smelting operations of the past year have been continued under satisfactory conditions. The receipts of custom ore for fluxing purposes have been about equal to our requirements. It will be noted

that the quantity of raw ore smelted has been considerably increased, being 27.74 per cent greater than in the previous year.

"The following is an analysis of an average sample of coke:—

Volatile hydrocarbons	6.15 per cent
Fixed carbon	76.61 "
Ash	17.24 "

"Slags.—The average assay of the slags for the year is as follows:—

Copper	0.375 per cent
Silver	0.130 oz.
Gold	Trace.
Iron oxide	19.24 per cent
Silica	32.34 "
Barium oxide	27.89 "
Calcium oxide	4.9 "
Zinc oxide	5.89 "
Alumina	9.78 "
Magnesium oxide	Trace.

"Flue Dust.—The following is an average analysis of the flue dust:—

Copper	3.77 per cent
Silver	2.74 oz.
Gold	0.14 "
Iron	11.77 per cent
Silica	18.56 "
Barium sulphate	28.30 "
Lime	1.5 "
Zinc	6.79 "
Alumina	5.49 "
Magnesium oxide	Trace
Sulphur as sulphides	5.82 per cent

"Product.—During the year we shipped 3,171.038 tons of copper matte, containing 2,465,034 lb. fine copper, 81,693.62 oz. fine silver and 4,280,549 oz. fine gold; total value, less refining charges only, \$494,417.25. An average matte of copper (dry) 38.87 per cent, silver 25.579 oz. per ton, gold 1.35 oz. per ton; equivalent to a yield of, copper 4.40 per cent, silver 2.92 oz., gold 0.153 oz., and a realised value of \$17.67 per ton of ore smelted.

(N.B.—These figures are not absolute, as the final settlements of the last shipments of matte are not yet made.)

"Plant.—The additions made to the plant during the year were as follows: A hot blast system was installed so as to utilise the heat of the furnace gases passing through the dust chamber. The average temperature of the blast for the eleven months since its installation was 240 deg. F. This, of course, is not nearly as high as Mr. Kiddie expected, but it is almost as high as is possible under the circumstances, as the temperature of the furnace gases depends a great deal on the method of running the furnace and the material smelted.

"A sample bin, having a capacity of 30 tons, was built on to the south side of the sampling mill. The top of this bin is on the same level as the roast ore bin, so that the sample is hauled direct from the roast yard and dumped into the bin, from which it falls through a steel chute direct into the No. 4 Gates crusher, the quantity dropped into the crusher being controlled by two steel gates.

"Three of the roast ore bins adjoining the sampling mill were raised 11 ft., thus trebling their capacity.

"In addition, there was installed in the smelter building a matte bin of about 30 tons capacity, together with an elevator. This bin is for the storing of low grade matte, barrings, etc.

"In conclusion I would say that the machinery and plant have been kept in thorough repair and that many minor improvements have been made."

The following are the accounts submitted:

Profit and Loss Account for Year ended April 30, 1906.
Dr.

	£	s.	d.	£	s.	d.
To Mine Expenses—						
Maintenance, repairs and depreciation of plant, buildings and permanent works, aerial tramway, etc	5,596	18	0			
Live stock account, cost of fodder, etc	417	7	10			
Timber	748	11	0			
Stores	1,514	9	9			
Transport and freight	2,733	15	5			
Hauling	629	19	1			
Salaries and wages	11,619	11	0			
Legal expenses	51	2	11			
Stationery and office supplies	66	7	10			
Telegrams and postages	220	5	6			
Travelling expenses	141	3	9			
Petty expenses	256	13	0			
Assay office	23	11	10			
Prospecting and developing	7,703	13	8			
Insurance	905	6	11			
				32,628	17	6
 " Smelter Expenses—						
Maintenance, repairs and depreciation of plant, buildings and permanent works, etc	3,765	11	8			
Live stock account, cost of fodder, etc	94	3	4			
Coal and coke	3,775	6	11			
Fluxes	306	11	3			
Timber	46	9	2			
Stores	603	5	1			
Salaries and wages	7,223	14	10			
Stationery and office expenses	52	17	8			
Telegrams and postages	104	14	4			
Travelling expenses	54	17	1			
Advertising	297	16	3			
Petty expenses	223	9	11			
Insurance	971	3	7			
Assay office	634	17	2			
Transport and freight	676	13	1			
Brickmaking	238	19	9			
				19,070	11	1
 " London Expenses—						
Office rent	100	0	0			
Petty expenses	147	8	1			
Salaries and wages (including fee for inspection of mine)	802	10	8			
Stationery	129	15	3			
Cables	27	5	8			
Directors' fees	800	0	0			
Legal expenses	5	18	10			
Travelling expenses	19	7	10			
Audit fee	52	10	0			
Assays	3	3	0			
				2,037	19	4
" Revenue taxes paid to Canadian Government	1,701	7	4			
" Difference in exchange	620	19	10			
				2,322	7	2
				56,109	15	1
" Balance to Revenue Account				35,250	2	6
				£91,359	17	7
Cr.						
	£	s.	d.	£	s.	d.
By Net proceeds of matte sales				102,083	11	1
Ores on dump and at smelter at cost of labour and mining charges	2,091	7	1			
Less amount taken into accounts April 30, 1905.	1,739	5	5			
				352	1	8
				102,435	12	9
Less purchase of custom ores				11,309	17	5
				91,125	15	4
" Rents				163	3	6
" Transfer fees, etc.				44	2	0
" Discounts at mine and smelter				26	16	9
				234	2	3
				£91,359	17	7

Revenue Account, April 30, 1906.

Dr.		£	s.	d.	£	s.	d.
To Mine development, being balance of £23,311 12s. 1d. (the total expenditure to April 30, 1903), written off in accordance with resolution passed in general meeting held on July 2, 1903		9,324	12	10			
" Commission, being balance of £32,000 (paid to subscribers of second issue of shares, as per prospectus dated October 17, 1901), written off in accordance with resolution passed in general meeting held on July 2, 1903		12,800	0	0			
					22,124	12	10
" Amount written off properties and concessions, being 25 per cent off £83,394 4s. 3d.					20,848	11	1
" amount written off plant, buildings and permanent works, etc., at the mine and smelter, being the additions made during the year					7,468	12	8
" Income tax					635	6	8
" Balance to balance sheet					14,870	3	2
					<u>£65,947</u>	<u>6</u>	<u>5</u>
Cr.							
		£	s.	d.	£	s.	d.
By Balance as per last account					28,306	11	6
" Balance from Profit and Loss account					35,250	2	6
" Interest received on investments		2,238	4	11			
" Interest received on deposits		152	7	6			
					<u>2,390</u>	<u>12</u>	<u>5</u>
					<u>£65,947</u>	<u>6</u>	<u>5</u>

Balance Sheet, as on April 30, 1906.

Dr.		£	s.	d.	£	s.	d.
To Capital—Authorised, £180,000.							
Issued and subscribed, 180,000 ordinary shares of £1 each, fully paid		180,000	0	0			
" Sundry creditors					6,532	0	0
" Revenue account					14,870	3	2
					<u>£201,402</u>	<u>3</u>	<u>2</u>
Cr.							
		£	s.	d.	£	s.	d.
By Properties, concessions, etc., as per last balance sheet		83,378	11	9			
" Properties acquired, during year, Margaret fraction		15	12	6			
		<u>83,394</u>	<u>4</u>	<u>3</u>			
Less written off, 25 per cent as per Revenue account		20,848	11	1			
					62,545	13	2
" Mine—		£	s.	d.			
Plant, machinery, tools, etc., as per last balance sheet		5,796	4	0			
Less depreciation, 25 per cent		1,449	1	0			
		<u>4,347</u>	<u>3</u>	<u>0</u>			
Buildings and permanent works, as per last balance sheet		3,302	3	5			
Less depreciation, 25 per cent		825	10	10			
		<u>2,476</u>	<u>12</u>	<u>7</u>			
Live stock, as per last balance sheet		421	13	7			
Less depreciation, 25 per cent		105	8	5			
		<u>316</u>	<u>5</u>	<u>2</u>			
Wagons, as per last balance sheet		150	7	5			
Less depreciation, 25 per cent		37	11	10			
		<u>112</u>	<u>15</u>	<u>7</u>			
Furniture, as per last balance sheet		380	3	4			
Less depreciation, 25 per cent		95	0	10			
		<u>285</u>	<u>2</u>	<u>6</u>			
					7,537	18	10
" Smelter—							
Plant, machinery, tools, etc., as per last balance sheet		5,713	9	2			
Less depreciation, 25 per cent		1,428	7	3			
		<u>4,285</u>	<u>1</u>	<u>11</u>			
Buildings and permanent works, as per last balance sheet		6,488	3	2			
Less depreciation, 25 per cent		1,622	0	10			
		<u>4,866</u>	<u>2</u>	<u>4</u>			
Live stock, as per last balance sheet		161	15	1			
Less depreciation, 25 per cent		40	8	9			
		<u>121</u>	<u>6</u>	<u>4</u>			
Furniture, as per last balance sheet		99	18	9			
Less depreciation, 25 per cent		24	19	8			
		<u>74</u>	<u>19</u>	<u>1</u>			
					9,347	9	8

" Aerial tramway, as per last balance sheet	5,401	17	6			
Less depreciation, 25 per cent	1,350	9	4			
				4,051	8	2
" Stocks on hand—						
Cordwood	843	8	4			
Fluxes	96	11	3			
Coal and coke	397	5	10			
Mine stores	1,555	12	0			
Smelter stores	301	17	6			
Fodder	58	1	0			
				3,252	15	11
" Reserve fund—						
Being the amount of mine development and commission written off						
to April 30, 1906	55,311	12	1			
Add dividends on the investments thereof to April 30, 1905 ..	836	1	10			
				56,147	13	11
Invested as follows—						
	£	s.	d.			
2¾% Irish Land Loan	11,350	2	1			
2¾% War Loan	10,321	0	4			
3% Transvaal Govt. Stock	3,063	3	7			
3% L. & N. W. Ry. Pref. Debs.	8,000	0	0			
3% Lanc. & Yorks. Ry. Debs.	8,400	0	0			
3% L. & S. W. Ry. Con. Debs.	6,200	0	0			
	£59,850	10	7	at cost	56,027	6 2
Deposit Account No. 1					120	7 9
					£56,147	13 11
" Investment account—						
2½% Midland Ry. Deb. Stock	8,700	0	0			
3% East India Ry. New Debs.	5,000	0	0			
2½% India (1931) Stock	6,000	0	0			
2¾% Irish Land Loan	8,000	0	0			
3% Indian Gov. Inscribed Stock ..	5,000	0	0			
2½% Consolidated Stock	3,000	0	0			
3½% Great Central & Midland Ry.						
Guaranteed Stock £25 per cent						
paid on £3,000	750	0	0			
	£36,450	0	0	at cost	33,589	7 10
					89,737	1 9
" Cash at mine	5,006	16	11			
" " at office	3	3	9			
" " at bank	548	5	8			
" " at Deposit No. 2 account	4,000	0	0			
					9,558	6 4
" Sundry debtors					6,411	7 3
" Ores on dump and at smelter at cost of labour and mining charges. ..	2,091	7	1			
" Custom ores	6,868	15	0			
					8,960	2 1
					£201,402	3 2

The following report of the meeting is from the London *Financial News*:

The secretary (Mr. W. Gardner) having read the notice convening the meeting and the report of the auditors,

The chairman said: The balance-sheet having been in your possession some days, I presume that it is your wish that it be taken as read. (Agreed.) Before moving the adoption of same I think it right to make some few remarks in explanation of the several amounts. I will take the accounts in the order they appear in the report. Profit and Loss account—The maintenance, repairs, and depreciation at the mine (£5,596 18s.) and at smelter (£3,765 11s. 8d.) amount to £9,362 9s. 8d. The directors, after due consideration, and under the circumstances, having no certainty as to the future supply of ore, have thought it proper to write off 25 per cent of these items. On the credit side the figures explain themselves. Revenue Account—The amount of £22,124 12s. 10d. has been placed to reserve; this is the bal-

ance of two-fifths of the mine development and commission accounts, as per resolution passed at the general meeting, held July 2, 1903, the exception being that the board deem it expedient to write off two-fifths instead of one-fifth, and I will later on move a resolution to that effect. The whole of the increase in plant, etc., both at mine and smelter, has been paid out of revenue. I now wish to draw your attention to the balance sheet. On the debtor side the item sundry creditors comprises the usual monthly accounts, which have all been discharged with the exception of income tax. On the credit side everything is stated so clearly that to take each item separately would be wasting your valuable time. The item sundry debtors is rather heavy; but this is owing chiefly to some matte being in a steamer that was wrecked (although fully insured), and not being realised at the end of the financial year. I shall have much pleasure in asking you to confirm a recommendation of the board to pay a dividend of 5 per cent. Although I stated at the last

general meeting that, until a fresh ore body be found and proved, no further dividends would be paid, it was understood that the ore body on which we were then working would, in all probability, be exhausted in about six months. It has lasted much longer; hence our decision to pay the dividend named, as the profits made during the last year justify us in departing from that decision. I regret that up to the present we have not been fortunate in finding another ore body, though, from information received, our prospects are now a little more hopeful than when I last addressed you. We are sinking both shafts (main shaft at Tyee and shaft at X. L. claim) a further 200 ft., and intend cross-cutting with all possible speed. I have now much pleasure in moving: "That the report and accounts, as now presented, be, and they are hereby, received and adopted"; but, before I put this resolution to the meeting, I shall be very pleased to hear any questions that any shareholder may wish to ask, and I will answer them to the best of my ability.

Mr. L. Loeffler seconded the motion.

Mr. Jackson said that he would like to ask why it was necessary to write off so much, especially as the smelter was a going concern, and could not depreciate 25 per cent. As a matter of fact, their houses, their plant and machinery, and their permanent buildings, could not depreciate 25 per cent, and therefore he could not understand why the directors should write off such an immense sum.

The chairman: Our reason is just this. It may be that many of our shareholders think that this is a very conservative policy, but it is far wiser for us in our present uncertain state, not yet having got another ore-body, to write these items down as we have done. Of course, if we are fortunate, which we hope we shall be this year, in getting another ore-body—and there are signs of it—we shall then deal with the matter next year in a different manner. But I cannot pledge myself as to how we will do it. It must be a wise thing in matters connected with mining to write down our stock; it is far better to keep our money in hand, and therefore I think if you look at the matter coolly you will consider that your money is being taken care of and well invested. Immediately we get an ore-body we shall be only too pleased to deal more liberally with you, but safety, above all things, is our motto.

Mr. Jackson inquired as to the fee which was paid for the inspection of the property.

The chairman: £150. We had this inspection made just to satisfy ourselves, and we do not regret having had to pay this amount, as we must use every effort to try and find another ore-body.

Mr. Jackson: I suppose the same answer would apply to any question regarding the writing off of two-fifths of the commission account?

The chairman: As regards the commission account, I may say that we felt that it was a good time to get rid of it altogether. It is a good fault, and I am quite sure that if you are all spared you will reap the benefit of it.

The resolution was then put to the meeting and carried unanimously.

The chairman next moved the following resolution, viz.: "That the sum of £22,124 12s. 10d. be written off the commission and mines development accounts, being two-fifths instead of one-fifth as agreed under resolution passed July 2, 1903." In doing so he said: We bring this before you, although we are told that it is not necessary that we should do so; but we feel that we like the shareholders to know everything that we have done. We feel that it is a wise thing to do, now that we have the money.

Mr. Nicol Brown seconded the motion, which was unanimously agreed to.

The chairman then moved: "That a dividend of 1s. per share for the year ended April 30, 1906, being at the rate of 5 per cent per annum, be, and is hereby, declared, payable forthwith to all shareholders whose names stand on the register of members at this date."

Mr. H. von Berg seconded, and the resolution was agreed to.

A shareholder: Is that free of income tax?

The chairman: Yes; free of income-tax. I have now to announce that the directors retiring on this occasion are Mr. A. Straubé, who at present is unfortunately away in South America, and Mr. von Berg, who, being eligible, offer themselves for re-election. I have very much pleasure in saying that in the past we have received great support from these gentlemen, and I therefore beg to propose their re-election.

The resolution was seconded by Mr. Nicol Brown and carried unanimously.

Mr. H. von Berg: I thank you very much for having re-elected me, and I can assure you that I shall do my best to further the interests of the shareholders.

Mr. Jackson proposed the re-appointment of the retiring auditors (Messrs. Everett, Morgan and Grundy).

Mr. Lancaster seconded the motion, which was carried.

Mr. Hancke: I should like to have the privilege of proposing a hearty vote of thanks to our general manager (Mr. Clermont Livingston) and his very able staff for their services. I think that, with a monthly output of only 2,000 tons, the year has shown a very satisfactory result, and we can appreciate the able services which they have rendered the company. It says a great deal for the manner in which our property is looked after, and I think that it will meet with the general approval of the meeting that we should express our thanks to Mr. Livingston and all concerned on the other side. (Hear, hear.)

Mr. Theobald seconded the motion, which was carried with acclamation.

Mr. Henrik Loeffler: I think that before we separate we ought to pass a vote of thanks to the chairman and directors for the very able way in which they have conducted our business. (Hear, hear.)

Mr. Jackson seconded this, and it was carried unanimously.

The chairman: On behalf of myself and my colleagues I thank you for your kindness in passing this resolution. I can assure you that we have done our best, and we shall continue to do so, and I hope that when we meet you next year we shall have a better account to give you. However, you are perfectly safe in regard to this: you have a fine property, you have plenty of money, and if we find the ore-body for which we are looking we shall be able to carry on this undertaking very successfully.

The proceedings then terminated.

ALASKA MEXICAN GOLD MINING CO.

This is a California company, controlled by the Exploration Co., Ltd., London, England, and the Compagnie Française De Mines D'Or & De L'Afrique Du Sud, Paris, France. Its mines are situated near the famous Alaska-Treadwell mine, at Treadwell, Douglas Island, Alaska. The report covers the fiscal year ended December 31, 1905, and deals with the Mexican and 700-ft. mines.

During the year dividends amounting to 53 per cent on the par value of the issued stock and totalling \$477,000 were distributed, and a balance of \$111,995 was carried forward.

The company's 120-stamp mill crushed 233,985 short tons of ore during the year for a return of \$745,189. The actual running time of the mill was 354½ days. Steam was used for power for 226 days and water for 128½ days. During the whole period, according to the accurate detailed accounts of the company's operations, kept by the officials, each 1 lb. of chrome steel in the shoes crushed 2.35 tons of ore, and each 1 lb. of iron in the dies (which were made in the Treadwell foundry) crushed 4.28 tons of ore at a cost of \$0.0292 per lb. per ton of ore crushed. The average loss of quick-silver in the mill amounted to 33 per cent. The average milling cost was \$0.28 per ton; of this amount labour cost \$0.09, supplies \$0.035, foundry expenses \$0.017, steam power \$0.0101 and electric light \$0.0016.

In the Mexican mine, the main shaft has been sunk to a depth of a little over 1,200 ft. The total development of the mine now embraces the following: 32,835 ft. of drifts and cross-cuts, 15,436 ft. of raises, 622½ ft. of stations and skip chutes, 262 ft. of winzes, and 1,463 ft. of shaft. The 660-ft. level west stopes yielded the largest quantity of ore. No. 3

west stopes from this level yielded over 11,000 tons, and there are 14,000 tons of \$3 ore opened in this stope ready for mining. In the 770-ft. level, large bodies of \$3 ore are developed. In the 880-ft. level the ore-body is 44 ft. wide. The average assay value of the first 21 ft. is \$5.39, the remaining 23 ft. is low-grade ore. The tonnage developed ready for mining is estimated at 841,900 tons of average value of \$3.20 per ton. The 700-ft. mine yielded 23,877 tons of \$2.87 ore during the year. Although the mine is remotely situated labour for all departments throughout the year was plentiful. The following are the current rates of pay ruling along the seacoast of Alaska: Machine drillers, \$2.50 per day with board and lodging; machine helpers, \$2.25; mine labourers (white) \$2, (Indian) \$2 without board; blacksmiths \$4 with board and lodging, and tool sharpeners \$3.50. The average wages, including cost of board and lodging, is about \$3.15 per day. The average cost of the company's boarding house, including all meals, was \$0.57 per day per man, notwithstanding that the food was of the best and in abundant quantity.

On the average, 17.11 machine drills were daily employed in the Mexican mine. Each machine during a shift drilled 36.6 ft., which resulted in the breaking of 27.9 tons of rock, at a cost of \$7.95 for labour, and \$2.75 for explosives. The average cost of mining, raising, sorting and delivering ore to the mill amounted to \$1.419 per ton.

NORTH STAR MINING CO., LTD.

The annual meeting of shareholders and directors of the North Star Mining Co. Ltd., was held at Montreal, Quebec, on June 27. The directors' report showed that the operations for the year resulted in a net profit of \$25,000. This was due to the mining and shipping of about 2,000 tons of ore, and the high prices of lead and silver prevailing throughout the year, together with better freight and treatment rates. The mining of the ore was done under contract.

The report of Mr. Neil McL. Curran, the mine manager, shows development work done during the year to the extent of 1,024 ft., almost entirely in the vicinity of the Kellogg shaft. About 100 ft. up the hill from the Kellogg shaft a drift was driven 215 ft., and at a distance of 70 ft. from the surface a winze was started on a small seam of ore. This ore widened out and improved in values at depth. The winze is now down about 32 ft.; when a depth of 50 ft. shall have been reached the vein will be explored by cross-cuts. Mr. Curran states, further: "From conditions opened up by the winze, together with the work of the cross-cuts and drifts, it is reasonable to conclude that ore exists in this ground, and I have great faith that further work in the winze will prove the occurrence of ore in paying quantities."

The financial statement showed total receipts for the year, \$52,473.97; total working expenses, \$26,618.70. The balance of \$25,855.27 was transferred to Profit and Loss account. The balance in the treasury is \$58,513.67.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia—

Cariboo Consolidated.—During the month of June washed 1,200 cu. yd. of gravel, yielding 112 oz. gold. Am looking for considerable improvement this month in upper workings, where we have just commenced to work the gravel.

Le Roi. June: Shipments amount to 12,215 tons, containing 4,868 oz. gold, 6,282 oz. silver, 259,100 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realisation and depreciation, \$47,000. Expenditure on development work during the month, \$16,000.

Le Roi No. 2.—June: Shipped 2,186 tons. The net receipts are \$31,134, being payment for 2,270 tons shipped and \$2,385 being payment for 99 tons concentrates shipped; in all, \$33,519.

Tyee.—June: Smelter ran 15 days, and smelted—Tyee ore, 2,123 tons; custom ore, 810 tons; total, 2,933 tons. Matte produced from same, 280 tons. Gross value of contents

(copper, silver, and gold), after deducting costs of refining and purchase of custom ore, \$36,630.

Ymir.—June: 25 stamps ran 24 days, crushing 1,500 tons of ore, producing 286 oz. of bullion, having an estimated gross value of \$3,400. Concentrates on hand, 150 tons, value \$3,600. (Office note—The ore milled in June was extracted in the ordinary course of development from all parts of the mine. Owing to the scarcity of miners and to the wet nature of the ground in the new raise due to the melting of the snow, it has been impossible to stope the rich ore-body which was opened up by the raise. Drifting has now been commenced east and west from the raise, and a supply of high-grade ore should soon be available for milling purposes.)

U. S. A.

Alaska Consolidated.—Developments in the mine during June were 335 ft. During last week the developments were 83 ft. No. 3 west drift Alexander tunnel advanced 5 ft.; average assay \$9. No. 1 level over Alexander tunnel going west advanced 20 ft.; average of assays \$5. No. 1 level over Alexander tunnel going east advanced 3 ft. No. 3 upraise advanced 23 ft.; average of assays \$4. No. 6 chute in No. 3 east drift advanced 35 ft.; average of assays \$2.

Alaska Consolidated.—July 9: Connection has been made between No. 1 and No. 3 upraises. During last week driven 23 ft. No. 7 chute advanced 12 ft. No. 8 chute commenced. Resumed driving No. 3 west drift from Alexander tunnel. Commenced engine house. Work interrupted by holidays (4th July celebration). Assays next week.

Alaska Consolidated. Mr. John R. Mitchell, superintendent at the mines, Juneau, Alaska, reports by cable:—"Sixty stamps ready. Will start crushing as soon as concentrating tables are in place."

Alaska Mexican.—June: 120-stamp mill ran 30½ days, crushed 20,849 tons ore; estimated realisable value of bullion, \$36,535. Saved 429 tons sulphurets; estimated realisable value of same, \$36,504. Working expenses for month, \$21,930.

Alaska Treadwell.—June: 240-stamp mill ran 30½ days; 300-stamp mill ran 30½ days; crushed 91,087 tons ore; estimated realisable value of bullion, \$98,000. Saved 1,490 tons sulphurets; estimated realisable value of same, \$79,245. Working expenses for month, \$78,337.

Alaska United.—June: Ready Bullion claim—120-stamp mill ran 30½ days; crushed 21,050 tons ore; estimated realisable value of bullion, \$22,630. Saved 424 tons sulphurets; estimated realisable value of same, \$15,442. Working expenses for month, \$21,448.

DIVIDENDS.

A dividend (No. 44) of 30 cents per share has been declared by the Alaska Mexican Gold Mining Co., payable July 28. Total of dividends paid to date, \$1,428,381.

A dividend (No. 74) of \$1 per share has been declared by the Alaska Treadwell Gold Mining Co., payable July 28. Total of dividends paid to date, \$9,660,000.

A dividend (No. 3) of 30 cents per share has been declared by the Alaska United Gold Mining Co., payable July 28.

The Consolidated Mining and Smelting Company of Canada, Ltd., owning the St. Eugene, War Eagle and Centre Star mines and the Trail smelter, has declared its second dividend, viz., of 2½ per cent for the quarter ended June 30, or at the rate of 10 cents per share per annum, payable August 1, 1906. As the capital stock issued totals \$4,698,888 the amount of profits to be divided among the shareholders on this occasion is \$117,472.

The Le Roi No. 2, Ltd., has declared an interim dividend of one shilling per share on its 120,000 £5 shares, making a total of £6,000 (about \$29,100) for this distribution and 21 shillings per share, or £126,000 in all to date.

The directors of the Boundary Iron Works, Ltd., Grand Forks, B.C., have declared a dividend of five per cent for the half year ended June 30.

The directors of the White Pass & Yukon Railway Co., Ltd., have declared an interim dividend of 2 per cent (4s. per share) on account of the year to June 30.

The shareholders of the Tye Copper Co. adopted, at the annual meeting held in London on July 12, the following recommendation of the directors: "That a dividend of one shilling per share for the financial year ended April 30, 1906, being at the rate of five per cent per annum, be and hereby is declared, payable forthwith."

NOTES.

The *Sandon Mining Standard* states that good progress is being made in sinking the shaft from No. 8 tunnel of the Payne mine. Years ago the Payne Co. was the leading dividend payer in Kootenay.

Mr. J. D. Sibbald left Revelstoke on July 12, for McCullough Creek, Big Bend, accompanied by several men who will be employed on his company's hydraulic claims.

Messrs. H. C. Peering and J. H. Coleman, agent and foreman for the Guggenheim Co., left Whitehorse, Yukon Territory, early in July with 38 men who will be employed on the company's dredges near Dawson.

Notice has been gazetted that W. Hart McHarg, of Vancouver, barrister-at-law, has been appointed the attorney in the Province of British Columbia for the British Columbia (Rossland and Slocan) Syndicate, Limited, in the place of Anthony John McMillan, whose appointment has been revoked.

Tenders have been invited for the purchase of all the hydraulic plant, mining machinery, pipes and outfit belonging to the Columbia Hydraulic Mining Co. The plant is on Spruce Creek, Atlin.

During July the Tye Copper Co's smelter ran 11 days and treated 1,792 tons of Tye ore, giving a return, after deduction of freight and refining charges, of \$31,128.11.

The Revelstoke *Mail-Herald* states that news comes from French Creek of a rich strike of gold having been made on the property of the American Mining Co. An old channel has been located showing a rich run of gold.

Active operations are being resumed by the Reward Gold and Silver Mining Co., near Ferguson. Tenders have been called for extending the tunnel a distance of 1,000 ft. Americans, headed by D. D. Forbes, a well known mining man, are now behind the company.

Stockholders of the Guggenheim Syndicate held a special meeting at Perth Amboy, New Jersey, U.S.A., on July 2, to vote on a proposal to increase the capital stock from \$17,000,000 to \$20,000,000. The new capital is required to finance obligations of more than \$10,000,000, which have been incurred during the current year in the acquisition of large interests in mining properties in Utah, Nevada, Alaska, Yukon Territory and British Columbia.

Important changes have taken place in the management of the Canadian Metal Co. Mr. S. S. Fowler, M.E., of Nelson, has been appointed general manager. Mr. F. W. Rolt has retired from the position of secretary and been succeeded by Mr. J. E. Harrington. The offices of the company have been moved to the offices of the London and B. C. Goldfields, Ltd., Baker street, Nelson, where Mr. Fowler has his own offices.

The Boulder Creek Mining Co. (better known as the Cousin Jack), which owns property situated on Boulder Creek, in the Otter Valley, says the *Nicola Herald*, is looking first rate and from the work done this season is showing up better than ever. At present only a few men are at work but it is the intention later on to put a larger gang to work. Last season considerable work was done and showed up a clean ledge of eight feet of ore, which from several assays averaged \$16.20 a ton. The company is incorporated and shares are principally owned locally.

The secretary of the Slough Creek Gravel Gold Ltd., London, England, has issued to the shareholders the following notice: "The engines which have been purchased to double the output of water from the mine have now been shipped to the property. The drain tunnel which is being driven with the object of taking any water from the upper gravels has been completed for about 1,500 ft. It is intended to continue this tunnel for another 1,000 ft. for the

purpose of intercepting any water from the upper part of the valley, and so reducing the possibility of this water finding its way to the lower or gold-bearing gravel. This will leave the increased pumping plant free to deal with the water in the gold-bearing gravel, which should thus be more quickly pumped dry."

CERTIFICATES OF INCORPORATION.

- Greenwood-Eureka Mining Co., Ltd.*, with capital of \$300,000, divided into 300,000 shares of \$1 each.
Prince Rupert Power and Light Co., Ltd., with a capital of \$100,000, divided into 1,000 shares of \$100 each.
Stemwinder Gold and Coal Mining Co., Ltd., with a capital of \$1,250,000, divided into 1,000,000 preference and 4,000,000 ordinary shares, all of 25 cents each.
British Columbia Mining Exchange, Ltd., with a capital of \$25,000, divided into 250 shares of \$100 each.

NEW REGISTRATION IN ENGLAND.

Slough Creek, Ltd.—Registered June 19, by G. Kershaw, 22 Hawksley Road, Stoke Newington, N. Capital £200,000, in 4s. shares. Objects: To carry on the business of miners, prospectors, explorers, metallurgists, etc. No initial public issue. The first directors (to number not less than two nor more than seven) are to be appointed by the signatories. Qualification, £100. Remuneration, £100 each per annum, £50 extra for the chairman, and 5 per cent of the distributed profits, divisible. Registered office: Broad Street Avenue, London E.C.

APPOINTMENTS GAZETTED.

The following appointments have been gazetted:
 Ezra Evans, of Manson, Cassiar, as deputy mining recorder for the Omineca mining division, with recording office at Manson.

John Collins, of Port Essington, as deputy mining recorder for the Skeena mining division, with sub-recording office at Port Essington.

Christopher Carlson, of Bella Coola, as deputy mining recorder for the Bella Coola mining division, with sub-recording office at Bella Coola.

A Eugene Knapp, of Harriet Harbour, Queen Charlotte Islands, as deputy mining recorder for the Skeena River mining division, with sub-recording office at Harriet Harbour.

Geo. Murray, of Nicola, as mining recorder for the Nicola mining division of the Kamloops district, with recording office at Nicola.

Herbert C. Rayson, of Ashcroft, as deputy mining recorder for the Ashcroft mining division.

Constable David E. Anderson, of Quesnel, as deputy mining recorder for the Cariboo and Quesnel mining divisions, with sub-recording office at Quesnel.

Edward Edwards, of Revelstoke, as deputy mining recorder for the Revelstoke mining division.

Geoffrey Butler, of Taku, as deputy mining recorder for the Atlin Lake mining division, with headquarters at Wynn-ton, Windy Arm.

Charles Cunliffe Fisher, of New Westminster, as gold commissioner for the New Westminster mining division, in the place and stead of Neil Franklin Mackay, resigned.

Mr. J. Kojima, who is in charge of the Ashio copper mines, Japan, is returning to that country after having spent six months in inspecting many of the most important mines and metallurgical works in the United States and Canada. He was at the Granby Co's smelting works and mines in the Boundary district on July 18 and 19, and proceeded thence to Seattle, Wash., to take steamer from that port to Japan.

COAL NOTES.

The driving of the new tunnel in the Crow's Nest Pass Coal Co's No. 9 mine, at Coal Creek, lately completed, was a very accurate engineering feat. Working from both ends, it came out to an inch.

It is stated that the International Coal and Coke Co. is producing 1,200 tons of coal a day from its mines at Coleman, Southwest Alberta. The larger part of this product is shipped as coal, but sufficient is made into coke to produce about 125 tons of the latter per diem. The coke is nearly all sent to British Columbia. At the Dominion Copper Co's smelter at Boundary Falls this coke is exclusively used.

Announcement has been made in provincial newspapers to the effect that the Western Fuel Co., of Nanaimo, Vancouver Island, has arranged to supply 400 tons of coal daily for use at cement works to be established at Kendall, Washington, U.S.A. The coal will be shipped to Bellingham by water and taken thence to Kendall. The works are expected to be turning out cement by next spring.

A bill to incorporate the Hilcrest Railway, Coal and Coke Co. has passed the Dominion House of Commons. The railway the company proposes to construct is to run from Morrissey *via* the Crow's Nest Pass to Hilcrest Junction in the Blairmore-Frank district of Southwest Alberta and thence to Cardston, Alberta, with branch lines to Pincher Creek and to coal and oil lands in Southwest Alberta. The provisional directors of the company are, M. P. Davis and John Thompson of Ottawa, C. P. Hill of Hilcrest, Alta., W. L. Bell of Winnipeg, and C. E. Ross of New York City.

The Fernie *Ledger* states that a survey party is now locating the route of a railway line from a point near Michel on the Canadian Pacific Railway Co's Crow's Nest line, to the coal fields of the Imperial Coal and Coke Co. on Fording River. The length of the line will be 31 miles, extending north from the initial point near Michel to the confluence of the Fording and Elk Rivers, and thence northeasterly to the extensive coal lands belonging to the company. The estimated cost of the road is \$720,000.

Early in July the S.S. "Elleric" took on about 3,500 tons of sacked coal for Nome, Alaska. This coal was shipped from the Wellington Colliery Co's bunkers at Ladysmith, Vancouver Island, which is the shipping point for the company's Extension mines.

A three year contract for the coke supply of the Granby Consolidated Mining, Smelting and Power Co., of Grand Forks, has been signed by the Crow's Nest Pass Coal Co. The coke requirements for the Granby Co. run from 300 to 400 tons per day.

The Moose Mountain Coal Co. is developing coal deposits near Calgary, Alberta. The company holds 13,130 acres of coal lands, distant about 35 miles from Calgary and 14 miles from Morley. The various seams have been traced 15 miles paralleling the main range of the Rocky Mountains. Eight seams have been already exposed, varying from 3 to 10 ft. in thickness. According to the engineer's report the coal resembles that occurring at Canmore.

The Fernie *Free Press* states that the Canadian Pacific Railway Co. is commencing operations upon its coal property at Hosmer in earnest and it is expected a large sum of money will be expended during the next two years in opening up the coal seams and getting in readiness to ship coal and coke. There are now 50 men at work under the superintendence of Mr. J. Brown. A tunnel 3,000 ft. in length will be driven. It is understood that the coal will be handled from the mine's mouth to spur tracks 1,200 ft. distant by means of tram lines. An air compressor is to be installed for use in opening up the tunnel.

An Atlin resident recently informed a Vancouver newspaper that the coal deposits on the Tuya River, Cassiar district, promise well. The best lie between Telegraph Creek and Atlin, where seams 34 and 26 ft., respectively, have been uncovered. These are being worked by the Atlin-Tuya Coal Prospecting Syndicate in which local capital is interested.

The coal is high-grade bituminous and there is ample water and timber in the near vicinity.

A press despatch gives the information that Mr. Robert Coulthard, general sales agent for the Crow's Nest Pass Coal Co., returned to Fernie on July 10 after having been for several weeks conducting a series of coal tests in Manitoba, Alberta and Saskatchewan, all of which proved eminently satisfactory. The product of the company's Coal Creek and Michel mines more than upheld its enviable reputation against all competitors.

COAL UNDER WATER.

The Canadian commercial agent at Manchester, England, in the course of a report to the Department of Trade and Commerce, recently published, gave the following information relative to storing coal under water and in the open air, respectively:

Important experiments are being carried out by the naval authorities at Portsmouth dockyard to ascertain to what extent the steaming properties of the Welsh coal used in the British navy are improved by storage in the sea.

Eighteen months ago iron crates, each containing two tons of coal, were sunk in the big basin, and at the same time a similar quantity of coal was carefully stored in the open air at the coaling point, and sheltered from the weather beneath tarpaulins.

At intervals of six months, two ton samples from each storage have been taken out and carefully burned, and the results by the experiments have shown conclusively that by submarine storage of coal its calorific value steadily increases, while by storage in the open air a decided decrease is shown.

THE LINK-BELT COMPANY OF CHICAGO.

The widely-known Link-Belt Machinery Co. of Chicago, Illinois, which supplies much plant and machinery to mines, smelters and other industrial enterprises in British Columbia, will hereafter be styled "The Link-Belt Co." The following particulars relative to this manufacturing organisation may be of interest to many readers of the B. C. MINING RECORD:

The Link-Belt Machinery Co. was organised in 1880 for the purpose of manufacturing labour-saving appliances employing the product of the Ewart Mfg. Co., of Indianapolis, manufacturers of the original Ewart Detachable Link-Belt-*ing*.

In 1882 a branch office of the Link-Belt Machinery Co. was established in New York City. In 1888 this department of its business had grown to such an extent that it became necessary to have a manufacturing plant located in the East, and in that year the Link-Belt Engineering Co. of Philadelphia was organised. At no time have the three companies been competitors; the Ewart Mfg. Co. continuing as manufacturers of chain, while the two Link-Belt companies have operated along exactly similar lines, each in its own territory.

The present consolidation was effected by the Link-Belt Machinery Co. of Chicago purchasing the plants and assets of the Ewart Mfg. Co. of Indianapolis and the Link-Belt Engineering Co. of Philadelphia.

The new company controls three splendidly equipped plants located at Chicago, Indianapolis and Philadelphia, respectively, and the line of manufacture covers the entire field of conveying, elevating and transmission machinery, and malleable and machine-made driving chains.

The officers of the company are James M. Dodge, Philadelphia, chairman of board; Chas. Piez, Philadelphia, president; Glen G. Howe, Indianapolis, first vice-president; Staunton B. Peck, Chicago, second vice-president; S. Howard Smith, Philadelphia, treasurer; P. G. Reid, Philadelphia, assistant treasurer; Dyke Williams, Chicago, secretary; Edward H. Burr, Philadelphia, assistant secretary.

BOOKS, ETC., RECEIVED

- United States Geological Survey.*—
List of the Publications of the United States Geological Survey, (except Topographic Maps). Pages, 58.
Bibliographic Review and Index of Underground-Water Literature published in the United States in 1905. By Myron L. Fuller, Frederick G. Clapp, and Bertrand L. Johnson. Pages, 130.
Mineral Resources of Kenai Peninsula, Alaska. Gold Fields of the Turnagain Arm Region. By Ralph W. Stone. Pages, 73; illustrated.
A Gazetteer of Colorado. By Henry Gannett. Pages, 185.
Slate Deposits and Slate Industry of the United States. By T. Nelson Dale, with sections by E. C. Eckel, W. F. Hillebrand, and A. T. Coons. Pages, 147; illustrated.
Electric Winding Engines at the Exhibition of the North of France, Arras, Pas-De-Calais. A paper read before the Institute of Mining Engineers. By Ed. Loze. Pages, 38; illustrated.
Bulletin of the Imperial Institute. 1906. Vol. IV. No. 2. Pages, 188.
American Institute of Mining Engineers.—Bi-monthly Bulletin, July, 1906. Pages, 126; illustrated.
Columbia University, New York City.—School of Mines Quarterly. April, 1906. Pages 86; illustrated.
Bureau of Mines, Ontario.—*Report of the Bureau of Mines, 1905, Part II,* giving information of the Cobalt-Nickel Arsenides and Silver Deposits of Temiskaming. By Willet G. Miller, Provincial Geologist. Pages, 62; illustrated by numerous half-tones, diagrams and maps.

The Ontario Government has appointed Mr. George R. Mickel, lecturer in the Toronto School of Practical Science, inspector of mining claims under the new mines Act.

The deputy mining recorder's office at Phillips, Elk River, Southeast Kootenay, for the Tobacco Plains district has been closed, and the resignation of Michael Phillips, deputy mining recorder, accepted.

Mr. Simon Guggenheim has donated another large sum to the Colorado School of Mines, this time \$10,000 for the equipment of Guggenheim hall, for which he gave \$70,000 a short time ago, and which is nearly completed.

The American Smelting & Refining Co. has made a wonderfully rich strike in its Mina Vieja mine in the Santa Eulalia camp, Mexico. The particulars of the strike are in nowise made public, but the cave of ore encountered is estimated to be 60,000 tons, running 482 oz. silver to the ton. This will give 25,920,000 oz. of silver. The cave is said to be considerably more than 100 ft. long and about 40 ft. wide. This is said to be the richest find ever made in this mine, although it is noted for high-grade ore. This deposit is in some of the lower levels.

The record of the Calumet & Hecla Mining Company is calculated to encourage investment in mines. Up to the end of 1905 it has produced 1,811,400,000 lb., or about 800,000 long tons, of refined copper, worth, say, \$275,000,000. Shareholders have received in dividends \$92,350,000 or about 35 per cent of the value of the output. It is estimated that the cost of production has been 8.2 cents per lb. of copper. During 1906 the production should be close to 100,000,000 lb. and the dividends \$6,000,000. Despite the great opportunity for financial games, the management has been consistently straightforward and honourable. The mine has been conducted as a sound business and in a conservative manner, the effect of which has been beneficial to the reputation of the copper industry of Michigan.—*Mining and Scientific Press,* San Francisco.

MINING MEN AND AFFAIRS.

Mr. C. H. Dickie, of Duncans, Vancouver Island, has gone up to Portland Canal, where he has mining interests.

Mr. J. M. Turnbull, of Trail, has been visiting a mining property on Boulder Creek, Windermere district, Northeast Kootenay.

Mr. E. Riondel, managing director, and Mr. J. E. Harrington, secretary of the Canadian Metal Co., have returned to Paris, France.

Mr. S. F. Parrish, formerly of Rossland, has removed from La Jolla, San Diego county, California, to Los Angeles, in the same State.

Mr. A. P. Low, director of the Geological Survey of Canada, will represent the Dominion at the forthcoming Geological Congress at Mexico City.

Mr. Walter Harvey Weed, of the United States Geological Survey, well known as an authority on copper, visited Nelson and Rossland districts during the month.

Mr. W. H. Thomas, consulting engineer to the British Columbia Copper Co., Ltd., spent two or three weeks of this month at Greenwood, Boundary district.

Mr. F. C. Merry, superintendent of the Ferguson Mines, Ltd., owning the Silver Cup and other mines in Ferguson camp, Northern Lardeau, was a recent visitor to the Slocan.

Mr. A. B. W. Hodges, metallurgist and general superintendent for the Granby Con. M. S. & P. Co., Grand Forks, is spending a month's summer vacation at the seaside near Vancouver.

Captain Henry Stern, of New York, has succeeded the late Mr. Geo. H. Robinson as managing director of the Britannia Copper Syndicate, Britannia Smelting Co., and associated enterprises.

Mr. J. E. McAllister, manager of the British Columbia Copper Co., Ltd., was on the coast lately, securing lumber for construction work at the company's smelting works at Greenwood, Boundary district.

Mr. Herbert Carmichael, assistant to the provincial mineralogist, has been examining mineral claims at Nootka, West Coast of Vancouver Island, to make a report thereon to the Minister of Mines.

Mr. G. G. S. Lindsey, general manager of the Crow's Nest Pass Coal Co., was lately called to Toronto, from Fernie, Southeast Kootenay, in consequence of the death of his mother in Ontario, where she resided.

Mr. E. C. Gardiner, formerly of Bingham, Utah, has been appointed superintendent of the Dominion Copper Co.'s mines in the Boundary district of British Columbia, of which Mr. Thos. R. Drummond is manager.

Mr. W. R. Wilson, general manager of the Imperial Coal and Coke Co. of Montreal, Quebec, which is opening up coal measures on the Upper Elk River, in the Crow's Nest Pass district, is now visiting the company's property.

Mr. F. S. Clarke, of London, England, is on a professional visit to Yukon Territory to examine some mining properties on Stewart River for Mr. M. Bovil, also of London, who is accompanying him.

Mr. Harry A. Guess, well known in the Boundary district of British Columbia eight or nine years ago, has received the important appointment of general superintendent of the reduction and concentration works of the Canada Copper Co. in Mexico.

Mr. O. B. Perry, general manager of the Yukon Consolidated Gold Fields Co., one of the Guggenheim companies recently incorporated under the laws of the State of Delaware to operate in the Canadian Yukon, was expected to reach Dawson during July.

Mr. Anthony J. McMillan, general manager of the Le Roi Mining Co., was in Toronto, Ontario, the last week of July, on his return journey from London, England, to Rossland. He was accompanied by Mr. T. D. Grimke-Drayton, chairman of the Le Roi Co's board of directors.

Mr. N. J. Cavanaugh, for years office manager for the Byron N. White Co., owning the Slocan Star and other mines in the Slocan district, has severed his connection with the company. He is now engaged in the sale of mining properties and has his headquarters at Nelson.

The Fernie *Free Press* states that Mr. John Brown, general superintendent of the Canadian Pacific Railway Co's coal properties in Crow's Nest Pass, was lately at the company's coal lands on Elk River, investigating camp conditions preparatory to sending in men to work on the properties.

Mr. F. W. Hale, general manager of the Alaska Copper Co., operating mining properties on Hetta Inlet and a 200-ton smelter at Coppermount in the same part of Prince of Wales Island, has returned to Southeast Alaska after an absence of several months in the East on his company's business.

Mr. Newton W. Emmens of Pittsburg, Penn., consulting engineer for the Elwood Tinworkers Gold Mining Co. of Elwood, Indiana, was at that company's Silver Dollar mine, near Camborne, Northern Lardeau, B.C., early in July in company with several large shareholders from Indiana and Ohio.

Capt. T. H. Trethewey, manager of the La Plata mines, situated near Nelson, has arranged to proceed to Sherbrooke, Quebec, to attend a general meeting of the La Plata company. He will present to the meeting a favourable report of the last year's progress at the company's mines and concentrating mill.

Professor H. Landes, professor of geology and mineralogy at the University of Washington, Seattle, Wash., and Professor Milnor Roberts, professor of mining engineering

and metallurgy and dean of the school of mines of the same institution, recently visited several mining camps in the Similkameen district.

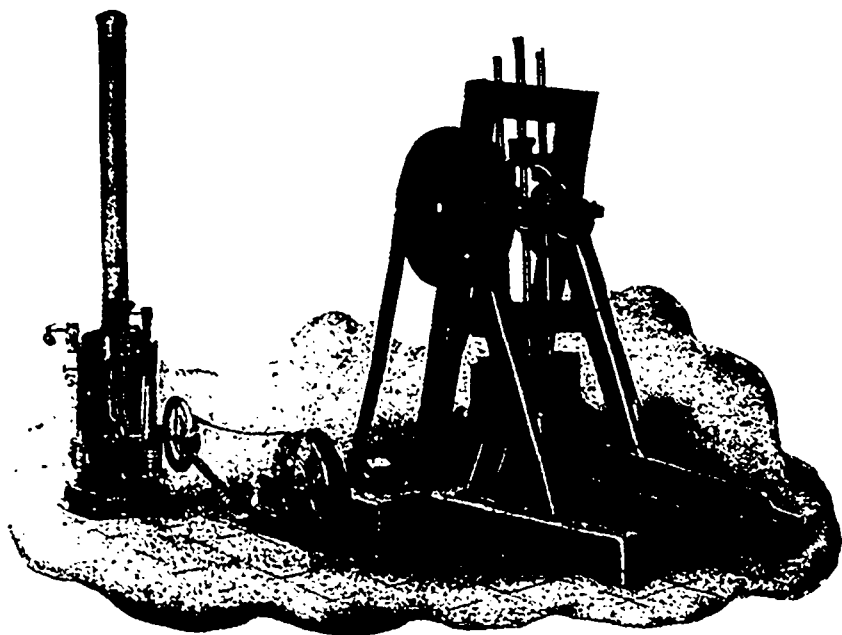
Professor E. J. Babcock, dean of the school of mines of North Dakota State University, accompanied by a party of students, visited the Hall Mining and Smelting Co's smelting works at Nelson on July 20, spending the greater part of the day investigating plant and processes and taking notes of what they saw there.

Mr. Forbes W. Guernsey, a mining engineer connected with the Trail smelter, was in Vancouver lately making enquiries concerning the mining properties of the United Verde Syndicate on Fitzsimmons Creek, some 40 miles from the head of Howe Sound, with a view to visiting the big showings of copper ore occurring there.

Mr. A. Tarut, manager of the Syndicat Lyonnais du Klondike, which owns a mining property known as the Ten-Mile Concession, situated on Ten-Mile Creek, a tributary of the Sixty-Mile River, Yukon Territory, and distant from Dawson about 62 miles, intends spending the summer at the Arkansas hot springs, where he will undergo treatment for rheumatism.

Mr. Joseph Hunter, C.E., and Mr. W. J. Sutton, geologist, both connected with the Wellington Colliery Co. and other Dunsmuir interests on Vancouver Island, have been on an exploring tour through part of the Skeena country in the central-coast section of the Province. They went up the Skeena River and, returning had a rough trip down the Copper or Zymoetz River. Coal and other minerals are known to occur in the section visited.

Mr. S. S. Fowler, of Nelson, has resigned as manager of



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the Cascade Water Power and Light Co., and Mr. W. Anderson, for several years resident superintendent at the company's power station, Cascade, Boundary district, has been appointed to succeed him. Mr. Anderson only recently returned from England, whence he had been to confer with the directorate. The company supplies electric power and light to Boundary district towns, mines, and smelting works.

Mr. Geo. L. Pearson, who has retired from the position of superintendent of the coke department of the Crow's Nest Pass Coal Co., East Kootenay, was recently given a valedictory dinner at Fernie on the eve of his leaving to return to his old home at Newcastle, Penn. The Crow's Nest Pass Coal Co operates between 1,100 and 1,200 beehive coke ovens in connection with its three collieries at Fernie, Michel and Morrissey.

Mr. Chas. Biesel who for some time past has been chief accountant and purchasing agent for the War Eagle and Centre Star mines, both at Rosslund, has been given charge of the Snowshoe mine at Phoenix, which the Consolidated Mining and Smelting Co. of Canada recently concluded arrangements with the Snowshoe Gold and Copper Mines, Ltd., London, England, to operate. Mr. Biesel is a graduate of the mining department of a German university and is reported to have had much practical experience in mining.

Mr. Thos. Kiddie, metallurgist, has returned to Victoria, after a month's stay at the Harrison Hot Springs, where he has been recuperating. Mr. Kiddie is under engagement to shortly proceed to Prince of Wales Island, Southeast Alaska, as manager of the Alaska Smelting and Refining Co's smelter, in place of Paul Johnson, who is retiring after having built and successfully operated these works. It is stated that Mr. Johnson proposes to return to his native land, Sweden, and with his family, remain there.

Mr. Wm Fleet Robertson, provincial mineralogist for British Columbia, who spent the greater part of last year's field work season in the Northern Interior Plateau of British Columbia has again gone North with a small party of men, this time on an exploratory trip to the Peace River country and other parts of the Province through which the route of the Grand Trunk Pacific railway will most likely run. Mr. Robertson expects to cover from 1,500 to 2,000 miles, going up the Skeena River to Hazelton, and thence on horseback or on foot, possibly returning by Edmonton, Alberta.

Mr. James Cronin, manager of the mines of the Consolidated Mining and Smelting Co. of Canada, Ltd., owning the War Eagle and Centre Star gold-copper mines at Rosslund; the St. Eugene lead-silver mine at Moyie, East Kootenay; and other mining properties in British Columbia, has resigned with the intention of taking a holiday and thereafter giving more attention to his private mining interests. He retains his large share holding in the Consolidated Co. Mr. W. H. Aldridge, of Trail, continues as managing director, Mr. R. H. Stewart is manager of the company's several mines; Mr. M. E. Purcell remains as mine superintendent at Rosslund; while Mr. W. H. White is superintendent of the St. Eugene.

Miss Lota Loss, C.E., daughter of Mr. C. G. Loss, of Minneapolis, Minn., who has been engaged in engineering work on the Spence's Bridge and Nicola railway Loss & Macdonald are constructing under contract with the Canadian Pacific Railway Co., was recently married in camp at Spence's Bridge, British Columbia, to Mr. Wm. H. Presley, C.E., of Ottawa, Ontario. Miss Loss is 26 years of age, is stated to be the only young woman who ever studied at the School of Civil Engineering of the University of Minnesota. She was recently included in an engineering partnership formed to undertake considerable work in connection with the extension of the water supply system of the Cariboo Gold Mines, Ltd., which some months ago acquired the hydraulic gold mines at Bullion, Cariboo, that for years have been operated under the direction of Mr. John B. Hobson.