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BRITISH COLUMBIA MINING RECORD

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MINING RECORD

E. JACOBS,.....Managing Editor

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CONTENTS.

NOTES AND COMMENTS.

We have to thank Mr. Norman Carmichael for four photographs used to illustrate our account of the visit of the A. I. M. E. excursion party to the Tyee mine, and to acknowledge the courtesy of the Victoria *Times* in lending us five of the numerous blocks used in this issue.

The London *Mining Journal* observes: "Conflicting statements come from across the water with reference to the Le Roi amalgamation, and the different interests find more or less artful advocacy in the local press. It would seem that the question of terms is the important one, and that Mr. McMillan is standing out for the interests of the Le Roi. We hope this is the case."

The General Press Bureau of the Lewis and Clark Exposition, now being held at Portland, Oregon, describes the Klondike mining exhibit as "Pre-eminent from an educational standpoint and offers the visitor a truthful portrayal of mining methods in vogue in the gold fields of Alaska. The building that houses the show is designed inside in panorama effect and a full-sized placer mine is found in operation. Clean-ups of real gold, worth $10,000, are made every hour."

Dr. H. S. Poole continues to seek for the Canadian Geological Survey, from all available sources that have come to his notice, information relative to the coal fields of Vancouver Island. Thanks to the thoughtful courtesy of the provincial mineralogist, in his capacity of chairman of the local committee, the Doctor was this month afforded opportunity to enjoy a brief respite from his work in meeting the visiting members of the A. I. M. E., among whom were several of his eastern friends.

It has been announced that the annual convention of the Provincial Mining Association of British Columbia, which it was intended should be held at Vancouver about July 25, inst., at which date it was expected the members of the American Institute of Mining Engineers would have returned to British

Columbia from Dawson, Yukon Territory, has been postponed, owing to the itinerary of the excursionist party as finally arranged providing for only a few hours' stay at Vancouver before taking the C. P. R. train for Banff, in the Rocky Mountains, instead of two or three days, as had been expected. The date of the convention will be arranged when the executive of the provincial association shall meet in the autumn.

Speaking of the Granby Co's stock, Hayden, Stone & Co., of Boston, in their Market Letter of June 23, say: "The buying of this stock represents very largely purchases by the management and their friends, as the public element that are active in the market do not seem to be attracted to this stock, doubtless due to the fact that the fluctuations have been very narrow. We are of the opinion, however, from what we can learn, that with the two new furnaces recently installed in operation, a production will be attained at costs much less than last year, and will warrant higher prices for the shares, even figuring copper at 13 cents per pound."

The following is an excerpt from a specially contributed article on "Rare Minerals in Canada," published in the June number of the *Canadian Mining Review*: "In British Columbia, some large pegmatite dykes have been opened up for mica in the vicinity of Tete Jaune Cache, about 150 miles north-west of Donald on the C. P. R. According to Mr. McEvoy, the pegmatite veins cut the country rock, which consists in that locality of garnetiferous mica schists and light coloured gneisses that resemble foliated granitoid rock, the garnet mica schists being the predominating rock. The pegmatite vein has a width of 18 ft. and is copiously charged with mica crystals but no investigations have yet been made as regards the occurrence of rare minerals."

We regret the omission this month of particulars of the recent purchase by men understood to be friendly to the Canadian Pacific Railway Co. of the Gooderham-Blackstock interests in the Centre Star and War Eagle mines, at Rossland, and the St. Eugene at East Kootenay. All that we have space for now is an expression of opinion that the purchase price can hardly be so low as the sum mentioned in the press dispatches, viz., $825,000, especially with the War Eagle debt of approximately $500,000 paid by the sellers; also that it may be expected a determined effort will now be made to secure the inclusion of the Le Roi, so that a larger tonnage of ore may be obtained for the C. P. R. Co.'s smelter at Trail, instead of its shipment to the Northport works being continued.

The collection of the tax on net earnings of mines, imposed by the State of Nevada, observes the Denver *Daily Mining Record*, is meeting with some difficulties. The last legislature provided for the appointment of a bullion inspector, with power to visit mines, inspect their accounts, and also those of smelters and railroad companies, in order to determine the shipments and their value. Whether this measure will succeed is doubtful. If a company is disposed to evade taxation, it is easy to reduce the net earnings on the books; in fact, the actual payment of dividends is the only positive evidence that can be relied upon. Even that is not always a certain rule; for we have in mind a case where the ore from a mine is worked by a separate company, and its charges absorb the value of the ore. In this case, the mining company pays no dividends, but the milling company has large profits; and no taxes are paid.

The *Engineering and Mining Journal* has joined in the discussion on the conditions under which zinc ore is being imported into the United States. It remarks that when the existing tariff schedules were enacted there was no zinc ore imported into the United States, never had been, and no one expected there ever would be. The schedules covering this contingency were therefore treated carelessly. Calamine, which term is employed metallurgically and commercially to designate all the carbonate and silicate ores of zinc, was put on the free list. The other class of zinc ore, being unscheduled, should, it is suggested, be classed as "other ores and minerals not elsewhere specified," and be dutiable at 20 per cent *ad valorem*.. The opinion is expressed that "It is pure evasion to enter such ore as silver ore, lead ore, or anything but zinc ore, and the Missouri and Colarado miners have good reason to protest, unless the zinc ore be calamine." Should the U. S. Treasury adopt this view producers of zinc-silver-lead ores in British Columbia will be unfavourably affected thereby.

The recent visit to British Columbia of the American Institute of Mining Engineers' excursion party, to an account of which considerable prominence is given in this number of the MINING RECORD, was the occasion of much pleasure to the many residents in the province who assisted in entertaining the visitors. We trust it was equally enjoyable to those to whom British Columbians had the privilege of extending hospiality. There is, though, we think, one chief cause for regret, viz., that the opportunities to obtain an idea of the extent of the mineral resources of the province were very inadequate. Not a single coal mine was seen, nor a silver lead mine, though the copper mines fared better. Of the first, the Crow's Nest Pass and Vancouver Island collieries, respectively, and of the second such mines as the St. Eugene and Slocan Star should have been visited in order than an estimate of the extent of development and productiveness of these several larger mines of the province could have been intelligently made. This was not practicable, though, so we must hope that but few years will pass ere another visit under conditions more favourable in this respect shall be made to this province. We wish the excursionists a safe return home, and take the liberty of reminding them that should they again visit British Columbia they will find the latch string on the outside.

That the effective work the Le Roi Mining Co. has been, and is still doing at its mine and smelter has been unfavourably criticised is not surprising when it is remembered that certain influences have been, and are, at work to discredit Mr. A. J. McMillan, the company's managing director and general manager. That gentleman, however, continues to attend to the business of putting the company in a sound financial position and of developing the mine at depth. The reply to the allegation that he is "gutting" the mine is that he is only shipping to the smelter ore that can be mined and treated at a profit. His carping critics complain further because profits that are being applied to development at depth—down to 1,550 ft.—are not available for distribution among the stockholders. They are indeed hard up for proof of Mr. McMillan's alleged unsuitability for the important position he so successfully fills when they misrepresent him in this connection. If there is one thing more than another required to ensure permanence of the mining industry in this province, it is to prove that ore of profitable quality and in payable quantity occurs at considerable depth. This Mr. McMillan and his competent officials are doing, and doing it thoroughly, yet misrepresentation and abuse are indulged in. It is evident that the old fable of the man who was blamed whether he rode or carried the ass still finds application. Mr. McMillan, however, is not giving the faultfinders the satisfaction of answering their complaints. Like a wise man he is reserving the rendering of his account of his stewardship for the next general meeting of Le Roi shareholders, who will judge him by the gratifying results achieved, and not by criticism that is manifestly unfair.

The MINING RECORD has been taken to task by the Nelson *Tribune* for quoting from the Report of the Minister of Mines for 1904 $12 to $15 per ton as the average values recovered from about 10,000 tons of ore from the Nickel Plate mine, Similkameen, last year, and told that "assays made by one of the most eminent metallurgists in Canada, his samples being taken from every part of the mine for purposes of valuation," give values ranging from $80 to $100. If it be intended to convey the impression that average values of Nickel Plate ore range not less than $80 per ton, then so much the worse for the "eminent metallurgist." Not only do we think that the provincial mineralogist took pains to verify the average values he gave in the Annual Report, which he could easily have done from sworn returns in the possession of the government, but we have most positive assurance that the general manager of the company owning the Nickel Plate mine, when asked as to the truth of the statement, referred to elsewhere in this issue, "that $6,000 worth of gold is being recovered every day . . . . in addition to concentrates," denied its truthfulness and stated that the average value being recovered from Nickel Plate ore was about $12 per ton. Further, we must point out that the *Tribune* can not be well informed relative to Similkameen mines, or it would not have made the mistake of asserting that "the only large mine operating in the Similkameen is the highest grade copper mine in British Columbia, and one of the highest grade on the continent," when the only *producing* mine in the Similkameen at the time that assertion was published was the Nickel Plate, which is not a copper mine at all, its ores being generally arsenical iron, with values chiefly in gold, and no copper.

Last February we drew attention to the gross exaggerations of two Vancouver writers for newspapers. One gave as "the first really definite news" of the output of the Nickel Plate mine, near Hedley, Similkameen, the statement, which he (as we believed, wrongly) attributed to the gold commissioner for the Osoyoos district, "that $6,000 worth of gold is being recovered every day . . . . in addition to concentrates." The other asserted that by May 1 the Iron Mask mine, Kamloops, "will be shipping 500 tons of $30 ore daily." We return to this subject again to show that we were right in ridiculing these statements. Since the publication of the Report of the Minister of Mines for 1904, it has transpired that Nickel Plate ore, of which 9,000 to 10,000 tons were treated last year, "yielded values of from $12 to $15 a ton, chiefly in gold." Taking the higher value, which is an excessive one for the purpose of this comparison, since it includes more than the gold, it would thus have been necessary for the 40-stamp mill at Hedley to have been operated at full capacity and have treated not less than 400 tons per diem. If the purveyor of "the first really definite news" will enquire of any competent stamp mill man he will be told that such a quantity would be three to four times the maximum capacity of the mill, with all its stamps dropping continuously, but as they were not it is evident the exaggeration was the gerater. As to the fairy tale about the Iron Mask mine—any one reading the report of the meeting of the Kamloops Mines, Ltd., which we published last month, can quickly decide on the utter unlikelihood of any such production having been suggested by the management of the mine, or any one else with the slightest idea of its reasonable capabilities under existing conditions. Further, the manager has been reported in English newspapers to have last month cabled to London to the following effect: "Three hundred tons of high-grade ore, valued at $4,500, shipped last week. This week shipped 250 tons, valued $5,000." That is to say the actual tonnage of ore shipped during two weeks since the date mentioned in the misstatement to which we took exception was 550 tons, of a total value of $9,500, as compared with the grossly exaggerated forecast of 6,000 tons (allowing twelve working days in two weeks) of a total value of $180,000. While the MINING RECORD is at all times anxious to give British Columbian mines credit for all they are entitled to, it believes the press owes to the investing public the duty of adhering to facts as closely as practicable. It therefore suggests to the Vancouver romancers that it would be well for them to take to heart two lines occuring in an exchange, recently received: "The public is weary of painted lies—or of any other kind."

TO EXPLORE NORTHERN BRITISH COLUMBIA.

THE provincial mineralogist, Mr. W. Fleet Robertson, has gone north with the object of exploring much of the British Columbian territory through which the Grand Trunk Pacific railway will pass on its way to the Pacific coast. He is accompanied by Mr. John Kiddie, C. E., and Mr. George Watson. The latter has charge of all camp matters, in which he is an experienced and thoroughly capable man. Mr. Kiddie is not new to field work, so will doubtless prove an efficient and reliable assistant to the provincial mineralogist.

The route, as planned before leaving Victoria, was to go in *via* the Cariboo wagon road, following in a general way the line of telegraph and examining the country about Ootsa lake, Bulkley valley, Telqua river, Copper river, Francois lake and probably visit Fort Fraser and Fort St. James and possibly Fort St. George, together with Stuart river and Nechaco, coming out toward Hazelton. It is anticipated that during three or four months about a thousand miles will travelled in the course of the trip, and that the topography of the country and its prospects for mineral development will be in some measure ascertained.

"MARTIN'S MINING CASES OF BRITISH COLUMBIA."

THE following, from the London *Mining Journal*, which is the leading mining journal published in the United Kingdom, is interesting as indicating the opinion of a British journalist competent to form a just estimate of the value of the work of Hon. Mr. Justice Martin, who is widely recognized as an authority on the laws of this province relating particularly to mining:—

"The reports will be of utility to all who are interested in mining matters in British Columbia; and many of the decisions, more especially those relating to employer's liability, are interesting from the point of view of comparative legislation. The cases are reported by Mr. Justice Martin concisely, and the head notes are instructive. The report of the decision of the Full Court of the Supreme Court in *re* The Coal Mines Regulation Act of British Columbia is of more than merely local interest. The Full Court, in determining a question referred to them by the Lieutenant-Governor in Council of British Columbia, held that Rule 34 of the Act, as amended in 1903, which prohibits the employment of Chinamen below ground, and also in positions of trust or responsibility in or about the coal mines in the province, is *ultra vires*. Mr. Justice Martin, as a member of the Full Court, dissented from the judgment of the two other members of the Court, and expressed the opinion that Rule 34 should be regarded as essentially a regulation for the working of coal mines, and therefore, within the powers of the Legislature of British Columbia. His full discussion of the history and position of Chinese within the province, and of local legislation affecting them, is of much interest. The question will ultimately be decided by the Privy Council, as special leave to appeal has been granted by the Privy Council."

MONTREAL & BOSTON CONSOLIDATED MINING AND SMELTING CO.

AT last a definite and official announcement regarding the affairs of this company has been made; the new management having issued a circular explaining the sale of its properties to the Dominion Copper Co. and plans for future operations, says the *United States Investor*, of Boston. The Dominion Company, under this final reorganization plan, takes over all the mines and other properties and issues its stock share for share in exchange for Montreal & Boston stock, without assessment, or payment of any kind. The Dominion Copper Co., however, in order to provide for the payment of debts and capital requirements, has authorised an issue of $1,000,000, of which $700,000 are to be put out at 90, with a 200 per cent stock bonus attached. This issue, it is stated, has been fully underwritten, and the right to subscribe is reserved for Montreal & Boston stockholders, although they are not under any obligation to purchase. Ready capital is needed to push the work on the mines and to pay the balance of the payment price of these holdings, the statement being made that the Montreal & Boston owed more than $320,000 to the former Dominion interests. As far as the present management knows, total obligations amount to something like $320,070.64, of which more than $186,000 are for royalties dues. Other items are: $90,000, due to A. J. Dittmar and Robert C. Miller, trustees, on account of various payments extending from February 9 to April 19; $15,000 for requirements at mine to date; $20,000 due for coke; and $8,281.31 for miscellaneous debts.

As far as concerns the physical condition of the property, it is of interest to note that the management intends to complete the smelter to its fullest capacity of 1,500 tons per day and to erect a converter plant in connection with the smelter. Mr. Samuel Newhouse, it develops, is actively engaged in looking after the properties, having been in actual charge for several weeks past. Mr. Newhouse and his associates in the Cactus mine, Utah, including Mr. Samuel Untermyer, who had charge of the reorganization, are apparently bound to start things moving, Mr. Newhouse having sent his superintendent at the Cactus to take charge of operations in British Columbia.

BRITISH COLUMBIA'S PRODUCTION OF LEAD.

THE total output of lead in East and West Kootenay during the year ended June 30, 1905, was 55,752,019 lb. or 27,876 tons. Of this quantity nearly 17,000 tons were produced from ores smelted in the province, and the balance of a little less than 11,000 tons from ore shipped to Europe from the S

Eugene mine, East Kootenay. The bounty on the lead produced in the province, at $15 per ton, was about $253,000, and on that obtained from ore sent out of British Columbia, about $110,000, being at the rate of $10 per ton. As, however, during part of the year the London price of lead was higher than £12:10s. per ton, which is the highest price at which the full bounty is payable, a reduction in the amount of bounty actually paid of about $25,000 has to be made, this bringing the total amount of the bounty earned during the fiscal year down to about $338,000. The Lead Bounty Act provides for payment on any quantity up to 33,333 tons per year, so that the total amount of bounty earned as shown above, falls short of that available in any one year. As indicating the stimulating influence of the bounty it is noteworthy that the production of lead during the fiscal year under notice was within 7,606,000 lb. of that of the maximum yearly production recorded in the lead statistics of the province, and was more than three times that of the calendar year 1903. The Lead Bounty Act came into operation on October 24, 1903, but no money was disbursed under its provisions until April, 1904. The comparatively high production in 1900 and 1901 was due to the fact that the United States lead market was open to British Columbian lead in those years, which has not since been the case. Official statistics during 10 calendar years show the province's lead production to have been as under:

Year.	*Lb.*
1895	16,475,464
1896	24,199,977
1897	38,841,135
1898	31,693,559
1899	21,862,436
1900	63,358,621
1901	51,582,906
1902	22,536,381
1903	18,089,283
1904	36,646,244
Total for 10 years	325,286,006

THE GOLD DREDGING INDUSTRY.

THE comments of the provincial mineralogist on dredging for gold in British Columbia, included in his review of the Progress of Mining, contained in the Annual Report of the Minister of Mines for 1904, do not present so favourable a condition of this branch of the mining industry of the province as is desirable. Mr. Robertson observed: "Dredging for gold has not, as yet, been a commercial success, despite all attempts to solve this problem. The difficulties are mechanical, but, therefore, none the less difficult to surmount. Many of the propositions which have been started have had ground sufficiently rich to pay very handsomely, if the conditions were right—that is, freedom from boulders or hard clay cement, a dredgable bed rock, and the gold not in too fine a state of division. The dredge in Atlin attempted to handle dirt that proved too tough for it, and from reports it would appear that the Lillooet dredge was too weakly constructed to stand the work, and the constant stoppages for repairs interfered with what promised to be a very successful run." The particulars of last year's gold-dredging operations in the province, printed elsewhere in this number of the MINING RECORD, show some of the causes of the comparative failure to recover gold in appreciably large quantity. It is encouraging to note that the local experiences of the past season appear to have shown where the appliances in use were unsuitable and wherein they could be improved, so as to secure good results this season. It is significant, though, that at Atlin, in a case where there was no lack of money with which to provide the newest and most effective gold-saving apparatus, it was found when dredging out some tailings from earlier operations that these yielded about as much gold as did the original dirt. As long ago as in 1897 Mr. W. A. Carlyle, then provincial mineralogist, remarked in connection with dredging operations in Cariboo streams: "In most of these experiments, the gold-saving appliances, on which success mostly depends, are reported to have been wholly inadequate." Seven years later his successor appears to have good grounds for similar comment, notwithstanding that in New Zealand (where at the close of each of two successive recent years there were 201 dredges working), Australia, California, and other gold-producing countries, many improvements have been made in gold-saving plant. Yet this notwithstanding, the future of the industry is decidedly promising. As a writer in the *Mining and Scientific Press* stated last year: "The industry is young, but it is clean and strong and healthy, and bids fair to grow to great proportions. It is useless to predict what the future has in store for gold dredging, so rapidly has the industry developed within the last two years. The improvement is steady and the field is constantly increasing."

ADDITIONS TO PLANT AT GRANBY CO.'S MINES AND SMELTER.

ADDITIONS to the machinery, plant and other equipment of the Granby Consolidated Mining, Smelting & Power Co.'s mines at Phoenix, and smelting works at Grand Forks, Boundary district of British Columbia, have been made during the past few months to an extent not generally known. Complete equipment, at a cost of about $75,000, of a terminal for the branch of the Great Northern railway, entirely separate from that in use by the C. P. R., has been provided, this including receiving ore bins, ore crusher with a capacity of 150 tons per hour, crushed ore bins and facilities for loading about 1,000 tons of ore on a train of 35 cars in 25 minutes. No. 3 tunnel, which is about three-quarters of a mile in length, has been double tracked and equipped with a 75-h.p. electric motor and 10-ton steel ore cars. The new main double-compartment incline shaft, which is being sunk to the 500-ft. level, is well forward towards completion. For use in hoisting from this shaft specifications are at the manufacturer's for a 200-h.p. electric hoist. Balanced

skips, each of a capacity of 3 to 4 tons, will be used. The size of shaft and capacity of equipment will admit, it is estimated, of an eventual hoisting tonnage of 3,000 tons in two 8-hour shifts. This tonnage will not, however, be hoisted from this shaft for the present. The output of the mines will, it is expected, be increased during next month to from 2,700 to 3,000 tons per diem.

The two 48 by 210-in. water-jacketted furnaces, now being installed at the company's smelter, are the largest blast furnaces in British Columbia. They are fitted with 24 tuyeres on each side, this being double the number generally used and of half the customary area. The automatic charging cars lately brought into use are the invention of the manager, Mr. A. B. W. Hodges. These cars are side dumping and each is divided into four compartments. This arrangement ensures the proper distribution of the ore in the furnace, the necessary proportion of "roughs" going toward the centre. Two of these cars, coupled, are run into each of the ordinary sized furnaces on side rails. For the larger furnaces three will be used. The cars are moved between bins and furnaces by electric motors. All slag is dumped hot, being handled from the furnaces in 6-ton pots.

The new double cylinder blowing engine for the converter room, in which there are two converter stands and 10 shells, has a capacity of 6,000 cu. ft. of air per min., thus bringing the total available air up to 10,000 cu. ft. A 300-h.p. motor operates the new engine. An automatic slag conveyor, similar to that in use at the Washoe smelter, Anaconda, Montana, elevates the converted slag, this being the most modern method of handling that material. A second mixing mill, for converter linings, has been added.

The new Connersville blower, driven by a 300-h.p. electric motor, has a capacity of 30,000 cu. ft. per min., as compared with the 12,000 cu. ft. capacity of those previously installed.

An addition of 800 ft. has been made to the dust chamber, this bringing the total length up to about 2,000 feet. A second brick stack has been erected, dimensions of which are height, 150 ft. by 13. ft. inside diameter.

The machine shop has been enlarged and another lathe, a big power shear and puncher, and a pneumatic riveter (for riveting furnace jackets) added to the power equipment. Other building improvements include a new blacksmith shop, iron storehouse and a round house for the 4 slag locomotives.

THE COAL RESOURCES OF BRITISH COLUMBIA.

THE latent wealth British Columbia possesses in its enormous coal resources, says the *Colonist*, should suggest to those who doubt that the industrial future of the province will prove to be important, the big coal potentialities of the "mineral province" of the Dominion. Seven years ago the late Dr. Geo. M. Dawson wrote of the Crow's Nest Pass coal field: "It is already manifest that we have here one of the most remarkable coal basins known." Since then the Crow's Nest Pass Coal Company has extensively prospected the coal measures in its part of that large field, and although, owing chiefly to its market having been limited, it has produced only about 3,000,000 tons of coal, that it has full confidence in the future productiveness of its coal mines is evidenced by the comparatively large expeditures it has made, and continues to make, as market conditions warrant larger outlay on development and equipment. At one colliery alone—and it owns and is operating three collieries—it is now putting in plant and appliances for maintaining a daily output of 4,000 tons, with provision for an eventual enlargement to 8,000 tons per diem. And yet the coal measures of the Crow's Nest Pass have thus far been but little explored, for north, south, and east of the Crow's Nest Pass Coal Company's block of 250,000 acres of coal lands, there are known to be extensive portions of the field untouched and awaiting development.

Then there is the large area of coal-bearing country in the Similkameen and Nicola districts, shortly to be provided with railway transportation facilities, which will be but preliminary to an industrial advance in this section of the province. Coming farther west, the Coast coal fields, from which about 19,000,000 tons of coal have been taken, and which contain the best quality of coal on the Pacific Coast, are easily equal to a production of between one million and two million tons a year, and add to the big asset the province possesses in this connection. Of other known occurrences of coal—on Queen Charlotte Islands, in the Bulkley valley, in the Peace River section, and elsewhere in the province—little is yet known, other than that some of these give promise of proving productive to an important degree.

This brief summary of the coal resources by no means does them justice, yet it will serve to indicate the existence of good grounds for belief that later they will prove a basis of industry that will raise British Columbia high in the scale of industrial importance on the Pacific Coast. The effect of the development of great coal resources has been strikingly demonstrated in the United States. In 1850, with a population of 23,191,876 persons, 6,445,681 tons of coal were mined, the production per capita having been 0.278 tons. In 1903, with an estimated population of 81,000,000, the production was 357,356,416 tons, or 4.4 tons per capita. The rate of progress during recent years has been very much more rapid than earlier, for in the ten years been 1894 and 1904 the coal output of that country was more than doubled. The magnitude of the coal mining industry is not generally recognized. Six hundred thousand men and boys are now employed in the coal mining industry of the United States. The yearly value of the coal they handle is, at the pit's mouth, about $520,000,000. Measured at the price at which it ultimately reaches the retailer, the value would be more than $2,000,000,000. Such an enormous value staggers those who attempt to realize what it means. Of course, British Columbia's coal industry cannot be expected for generations to attain to any

thing like the importance of that of the United States, yet there certainly does exist in this province the basis for an industry almost beyond present conception, and one of which the present generation is but laying the foundations.

THE HUNTINGTON-HEBERLEIN PROCESS.

IT is noteworthy that the Huntington-Heberlein process for the desulphurization of lead ores, which is an analagous process to that known as the Carmichael-Bradford, is being tried at the Sullivan Group Mining Co.'s smelter at Marysville, East Kootenay. The Sullivan mine ore, as described by the provincial mineralogist (Mr. W. F. Robertson), "is a galena carrying an unusual amount of iron, the first class ore assaying about 40 per cent lead and 20 oz. silver, and the second class about 25 per cent lead and 12 oz. silver, varying somewhat as it may have been sorted. . . . . A very large amount of ore may fairly be classed as 'in sight,' which from rough calculations may be put down as from 300,000 to 400,000 tons, assaying, approximately, 30 to 35 per cent lead, and 15 to 19 oz. silver. The ore is of such a character, being chiefly metallic sulphides, as to preclude any method of water concentration, the only concentration possible being by smelting."

The *Engineering and Mining Journal* recently published the following information relative to the Huntington-Heberlein process: "It is a fact, not generally known, that the American Smelting & Refining Co. is preparing to introduce the Huntington-Heberlein process in all its plants, this beng the outcome of extensive experimentation with the process. It is contemplated to employ the process not only for the desulphurization of all classes of lead ore, but also of mattes. This is a tardy recognition of the value of a process which has been before the metallurgical profession for nine years, the British patent having been issued under date of April 16, 1896, and has already attained important use in several foreign countries; but it will be the grandest application in point of magnitude.

"The Huntington-Heberlein is the first of a new series of processes which effect the desulphurization of galena on an entirely new principle and at great advantage over the old method of roasting. They act at a comparatively low temperature, so that the loss of lead and silver is reduced to insignificant proportion; they eliminate the sulphur to a greater degree; and they deliver the ore in the form of a cinder, which greatly increases the smelting speed of the blast furnace. They constitute one of the most important advances in the metallurgy of lead. The roasting process has been the one in which least progress has been made, and it has remained a costly and wasteful step in the treatment of sulphide ores. In reducing upward of 2,500,000 tons of ore per annum, the American Smelting & Refining Co. is obliged to roast upward of 1,000,000 tons of ore and matte.

"The Huntington-Heberlein process was invented and first applied at Pertusola, Italy. It has since been introduced in Germany, Tasmania and Australia, in the last at the Port Pirie (South Australia) works of the Broken Hill Proprietary Co. Efforts were made to introduce it in the United States at least five years ago, without success and with little encouragement. The only share in this metallurgical improvement that this country can claim is that Thomas Huntington, one of the inventors, is an American citizen, Ferdinand Heberlein, the other, being a German."

In an earlier number of the same journal it was stated that "In the Huntington-Heberlein process galena is mixed with quicklime, the whole raised to a temperature of 700 degrees Cent. (1,300 degrees Fahr.) and air is blown in, whereby the lead sulphide is changed to the oxide and is fused by the heat of the reaction. In the similar Carmichael-Bradford process, the lead sulphide is mixed with calcined gypsum, and the blowing-in of air is performed at a somewhat lower temperature, the result being practically identical with that of the Huntington-Heberlein process, though the intermediate reactions, of course, may be slightly different."

PROSPECTS OF BRITISH COLUMBIAN LEAD IN JAPAN.

CANADA'S commercial representative in Japan does not offer much encouragement as to the prospects of a market being established for British Columbian lead ores in that country. He writes:

Having received an enquiry recently as to the probable prospect in Japan for the exportation of lead ores from British Columbia, I have made investigations on this subject. My information is to the effect that it will be difficult to do this unless the ore is sufficiently low in price to leave a margin of profit after paying freight and other charges. The fact is, the three or four Japanese firms smelting and refining lead are themselves mine-owners, and have plants at the mines, which, as a rule, are inconveniently situated as regards transportataion by water.

The only refinery situated at a convenient seaport is one at Osaka, owned by the Mitsu Bishi Kaisha. The refinery has, however ,been established for the refining of copper produced at the company's mines. That of lead is done only as subsidary work. As will be gathered from the figures following, there has been a gradual falling off in the production of lead in Japan in recent years. This is not owing to the scarcity of lead to be mined, but because of the less remunerative nature of mining on account of the depreciation in value of silver and lead, and also the comparatively low price of imported lead, which comes chiefly from Australia. In consequence of this some of the lead mines have suspended working, while others are being worked only irregularly.

The mining people here seem inclined to the belief that the importation of lead ores to be smelted and refined in Japan will not pay. The following Japanese firms, who are engaged in coal, copper, and lead mining, have their own smelting and refining works: Takata Shokai, Yaesucho, Tokyo; Mitsu Bishi Goshi Kaisha, Yaesucho, Tokyo; Mitsui Bussan

Kaisha, Kayabucho, Tokyo; Sumitomo & Co., Tokyo.

PRICES OF VARIOUS METALS.

The following were the standard prices of the variout metals in the Yokohama market during December, 1904:

Zinc—sheet	per	133 lb.	$5.70
" for roofing	"	"	5.00
Brass plate	"	"	24.00
Lead (Australian)	"	"	4.50
Tin	"	"	42.00
Copper plate	"	"	29.00
Spelter (best)	"	"	8.25
" (medium)	"	"	6.50
Tea lead	"	"	6.40
Sheet lead	"	"	4.75
Paints—white zinc 4 tins, each, containing 25 lb.			9.40
Paints—white lead 4 tins, " " "			6.25
Paints—red lead, 4 tins, " " "			6.00

IMPORT DUTIES ON METALS.

The import duties on metals are as follows:

Zinc—block, ingot and slab	Per	133 lb.	$0.28
" sheet	"	"	0.70
Brass plate	"	"	3.40
Lead—pig, ingot and slab	"	"	0.21
" sheet	"	"	0.49
" pipe and tube	"	"	0.55
Tin—block, ingot and slab	"	"	1.68
" plate and sheet	"	"	10 p.c.
Yellow metal—sheet	"	"	2.00
Copper—plate and sheet	"	"	3.60
White zinc	"	"	1.00
Lead paints	"	"	1.00

The duties shown above include the increases on and after July 1, 1905, as war taxes. Zinc sheet No. 2 and tea lead are free from duty.

LEAD AND ZINC.

The imports of lead and zinc during four years ended 1903 were as under:

Lead—block, ingot and slab.

1900	$463,576
1901	438,114
1902	255,356
1903	313,047

Zinc—block, ingot and slab.

1900	$343,040
1901	115,279
1902	127,500
1903	200,984

Zinc Plate No. 2.

1900	$298,404
1901	254,752
1902	390,934
1903	354,859

Lead is imported chiefly from Australia and the United States; zinc, and zinc plate from Germany, Belgium and Great Britain.

COBALT-NICKEL ARSENIDES AND SILVER IN ONTARIO.

THE Toronto *Globe* lately published the following: "The superintendent of the M. J. O'Brien mines at Cobalt says that these mines have just made a shipment to New York of 21 tons of ore averaging in values $2,000 per ton. This ore was taken out in three weeks by eight men. There is a rumour at Cobalt that the superintendent of the C. P. R. smelter at Trail, B. C., is going to Cobalt with a view to making experimental shipments of ore to the former place, to test the practicability of profitable shipments and treatment there." Cobalt is in the northern part of Ontario, in the Temiskaming district, where late in the autumn of 1903 remarkable finds of the arsenical ores of cobalt and nickel, some of the veins carrying a profusion of native silver, were made during the construction of the Temiskaming and Northern Ontario railway from North Bay junction, on the Canadian Pacific railway, to the head of Lake Temiskaming. The ore bodies lie five miles south of Haileybury one of the two sister villages on the Ontario side of the northern part of Lake Temiskaming. By railway Haileybury is 106 miles north of North Bay station. Professor Willet G. Miller, provincial geologist for Ontario, visited the locality just before snow fell in 1903 and again in the summer of 1904. Writing on June 26, 1904, to the director of the Ontario Bureau of Mines, Professor Miller enumerated the principal minerals up to that date recognised in these unique deposits, as follows: "The chief ores are: niccolite, smaltite, chloanthite, native silver, erythrite, annabergite, dyscrasite, pyrargyrite, argentite. Native bismuth is found in all the deposits. Millerite and morenosite occur sparingly. Tetrahedrite and copper pyrites are also found, as also is graphite. Galena, zinc blende and iron pyrites occur in the disseminated form in the adjoining rock masses. Secondary products resembling asbolite and other minerals are common. The oxides of manganese appear to be present. Sulph-arsenides and sulph-antimonides of silver, which have not yet been analysed, are also probably associated with these ores, as are the arsenides of iron and various bismuth compounds. No large crystals are found, thus making it difficult to recognise some of the rarer minerals in the field. Microscopic or semi-microscopic crystals of smaltite and one or two other minerals are abundant. Professor Miller's first report on these ores—"Cobalt-Nickel Arsenides and Silver"—appears in the Ontario "Report of the Bureau of Mines' 1904," Part I.

A representative of the Canadian Smelting Works, Trail, left British Columbia this month for Cobalt to investigate the conditions and prospects there, samples of ore very rich in silver received and assayed at those works having indicated the probability of the ore deposits there being well worthy of the attention of the Canadian Pacific Railway Co.'s mining and metallurgical department.

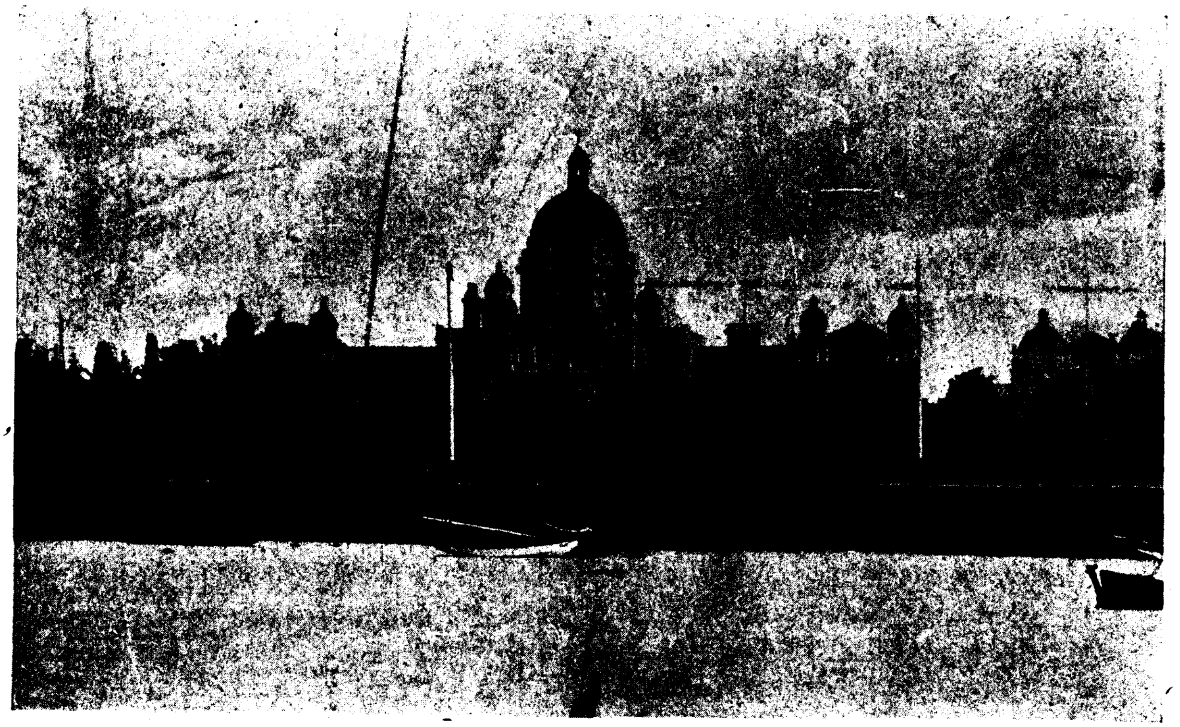
The amended name of the recently organised American Smelters' Exploration Co. is the American Smelters Securities Co. It is controlled and managed by the American Smelting & Refining Co., and its properties include the Selby Smelting & Lead Co., San Francisco, Cal., the Tacoma Smelting Co., Tacoma, Wash., and the Puget Sound Reduction Co., Everett, Wash. Mr. William R. Rust, for years manager of the Tacoma Smelting Co., is to be the business manager for the new consolidation, and Mr. Alfred von Der Ropp, of the Selby Co., will supervise the metallurgical and technical departments.

AMERICAN INSTITUTE OF MINING ENGINEERS.

British Columbia Meeting and Excursion to Yukon Territory.

BRITISH COLUMBIA and Yukon Territory have at last had opportunity to entertain in a body a number of members of the American Institute of Mining Engineers, together with ladies and other non-members who were also of the party that on July 1 reached Victoria, after having spent three days in the West Kootenay and Boundary districts of the province. The visit to British Columbia of the A. I. M. E. on one of its periodical excursions had for years been looked forward to by resident members, of whom there are some 50 or 60 in the province, and by others interested in the mining and metallurgical industries of "The Mineral Province" of Canada. It was first suggested by Mr. William Fleet Robertson, provincial mineralogist, who has been a member of the institute nearly a quarter of a century, his membership dating back to 1881, and later was taken up and most persistently advocated by Mr. W. M. Brewer, who has been a member since 1893. In 1903 arrangements had almost been completed for the excursion of that year to be to British Columbia and the Yukon, but unfortunately after the preliminary arrangements had been well advanced and some 200 members and friends had intimated their intention to join in the excursion the programme had to be changed, owing to the stated inability of the Canadian Pacific Railway Company to take from their ordinary uses the number of Pullman cars requisite for the accommodation on its return trip of so large a party Notwithstanding this disappointment, Mr. Brewer continued his efforts, until the executive of the institute was able, early in the current year, to notify him that the proposed visit to British Columbia would be practicable this year. However, difficulties in connection with transportation were again met with, but these were finally overcome, with the result that the excursion has been carried out with but little variation from the plan outlined in the preliminary proposals.

The meeting held recently at Victoria was the sixth meeting of the institute held in Canada during the twenty-four years over which its proceedings have spread. Its twenty-seventh meeting was held at Montreal, Quebec, in September, 1879; its forty-third meeting at Halifax in September, 1885; its fifty-fifth meeting at Ottawa in October, 1889; its sixty-fourth meeting at Montreal in February, 1893; another meeting was held in Canada in August, 1900, at a place not stated in the list from which these particulars have been taken; and now, in July, 1905, it has held at Victoria what was somewhere about the ninetieth meeting of the long series that have been increasing in interest and importance over well nigh a quarter of a century of useful and valuable work. It is noteworthy that Dr. R. W. Raymond, its invaluable secretary, was the second president, having held that office in three successive years, namely, 1872, 1873 and 1874, following Mr. David Thomas, since deceased, who was the first president and held office in 1871. The only other past president of the institute taking part in the 1905 excursion is Capt. Robert W. Hunt, of Chicago, Illinois, who became a member in 1874 and who filled the office of president in 1883.



Parliament Buildings, at Victoria, B. C.

The membership of the institute is international, if not cosmopolitan, in character, for besides the large number of members resident in the states, territories and other possessions of the United States, including Alaska and the Philippines, there are—in America—others in Canada, Newfoundland, Mexico, Central and South America, and Cuba; in Europe—in Great Britain, Austria, Belgium, France, Germany, Italy, Portugal, Russia, Spain, Sweden, Switzerland and Turkey; in Asia—in China, Dutch East Indies, India, Japan, Malay, Persia and Siam; and still others in Africa, Australia, New Zealand and Tasmania. It is, therefore, not surprising that the periodical meetings and excursions of this influential organization

View of Olympics from Government House, Victoria, B. C.

are generally regarded in mining countries as of much importance, and of benefit to localities visited wherever there are mineral resources worthy the attention of capital available for their development.

The itinerary of this year's chief meeting and excursion, designated the "British Columbia Meeting and Alaska Excursion," provided for the party leaving New York on June 23, passing through Chicago the following day, reaching Spokane, Washington, on 26th, and, after spending one day each at Nelson and Rossland, in West Kootenay, and in the Boundary district of B. C., arriving at Victoria, Vancouver Island, which is the capital of British Columbia, on the morning of July 1. This programme was carried out, and at the time of writing, the Alaska excursion —which, by the way, is almost altogether in British Alaska, better known as the Yukon Territory, is in progress. The return to British Columbia has been set for July 23, and arrangements have been made for spending three days in the Rocky Mountains,—at Glacier, Field, Laggan and Banff—going thence to Chicago by 29th and reaching New York on 30th.

PERSONNEL OF THE PARTY.

The personnel of the party was as follows: Mr. W. P. Agnew, New York City; Mrs. M. B. Ayres, Mrs. S. Ayres, Bound Brook, N.J.; Mr. and Mrs. Truman H. Aldrich, and Miss Aldrich, Washington, D. C.; Mr. and Mrs. W. S. Ayres, Banff, Alta.; Miss Pearl Browning and Miss Elizabeth Browning, Syracuse, N.Y.; Mrs. Jos. G. Butler, Youngstown, Ohio; Mr. and Mrs. G. D. Barron and Miss M. E. Barron, Rye, N.Y.; Mr. and Mrs. Briggs, Chicago, Ill.; Mr. Sidney M. Bamberger, Salt Lake City, Utah; Mr. and Mrs. D. W. Brunton, Denver, Colo.; Mr. and Mrs. W. B. Cogswell, Syracuse, N.Y.; Mr. F. Clymer, Reading, Pa.; Mr. Francis T. Freeland, Aspen, Colo.; Mr. and Mrs. E. S. Cook, Mr. Richard Cook, Master Cook, Pottsdown, Pa.; Mr. and Mrs. F. J. Campbell, Denver, Colo.; Mr. and Mrs. A. E. Carlton, Cripple Creek; Colo.; Mr. J. B. Cullum, Pittsburg, Pa.; Mr. Theodore Dwight, New York City, N.Y.; Mr. and Mrs. E. V. d'Invilliers, Miss d'Invilliers, Philadelphia, Pa.; Mr. and Mrs. B. F. Fackenthal, Easton, Pa.; Mr. E.

L. Ford, Master Ford, Youngstown, Ohio; Mr. D. G. Forbes, Shillingstone, Blandford, England; Mr. and Mrs. E. L. Foucar, High Bridge, N.J.; Mr. C. W. Goodale, Butte, Mont.; Prof. J. C. Gwillim, Kingston, Ont.; Mr. and Mrs. W. H. Harrington, Miss M. L. Harrington, Mr. Arthur Harrington, Philadelphia, Pa.; Mr. and Mrs. L. Holbrook, New York City; Mr. and Mrs. R. W. Hunt, Chicago, Ill.; Mr. Holt, Miss Ida Holt, Macon, Georgia; Mrs. J. R. Howard, Brooklyn, N.Y.; Prof. S. F. Kirkpatrick, Kingston, Ont.; Mr. John C. Kafer, Mr. Paul. S. King, Mr. Jas. M. Lawson, New York; Mr. and Mrs. John Lilly, and Mr. Wm. Lilly, Lambertville, N.J.; Mr. and Mrs. A. B. W. Hodges, Grand Forks, B.C.; Major Charles E. Lydecker, New York City; Mr. F. W. Lyman, Mr. George Lyman, Minneapolis, Minn.; Mr and Mrs. Wm. R. McIlvain, Reading, Pa.; Miss Anna W. Olcott, Mr. Charles T. Olcott, Master Mason Olcott, New York City; Mr. and Mrs. W. S. Pilling, Miss Mary B. Pilling, Mr. Joseph Ross Pilling, Mr. Geo. Pilling, Philadelphia, Pa.; Mr. and Mrs. I. P. Pardee, Master James Lee Pardee, Hazelton, Pa.; Dr. and Mrs. R. W. Raymond, Brooklyn, N.Y.; Gen. and Mrs. Chas. F. Roe, New York City; Miss Ross, Macon, Ga.; Dr. Joseph Struthers, New York City; Miss Florence Starr, Brooklyn, N.Y.; Miss Ella Sealy, Miss Rebecca Sealy, Galvaston, Texas; Miss Velasquez, New York City; Mr. A. E. Vaughan, Brooklyn, N.Y.; Mr. Walter Wood, Philadelphia, Pa.

Kootenay River, near Nelson, B. C., with Bonnington Falls and West Kootenay Power and Light Co's Hydro-Electric Power Station in foreground.

IN THE NORTH-WEST.

Spokane was reached on June 26, according to schedule, and thence the party was taken north to Nelson over the Great Northern Railway Co's Spokane Falls and Northern railway to the southern boundary of British Columbia, after crossing which the system is known as the Nelson & Fort Sheppard railway. A few miles beyond Northport, Washington, the boundary line was crossed and then the well-known Ymir gold mining district was passed through| In less than an hour the waters of the west arm of Kootenay lake were in sight. Nelson is situated on this lake, and this was the first place in British Columbia to be visited by the excursionists.

AT NELSON.

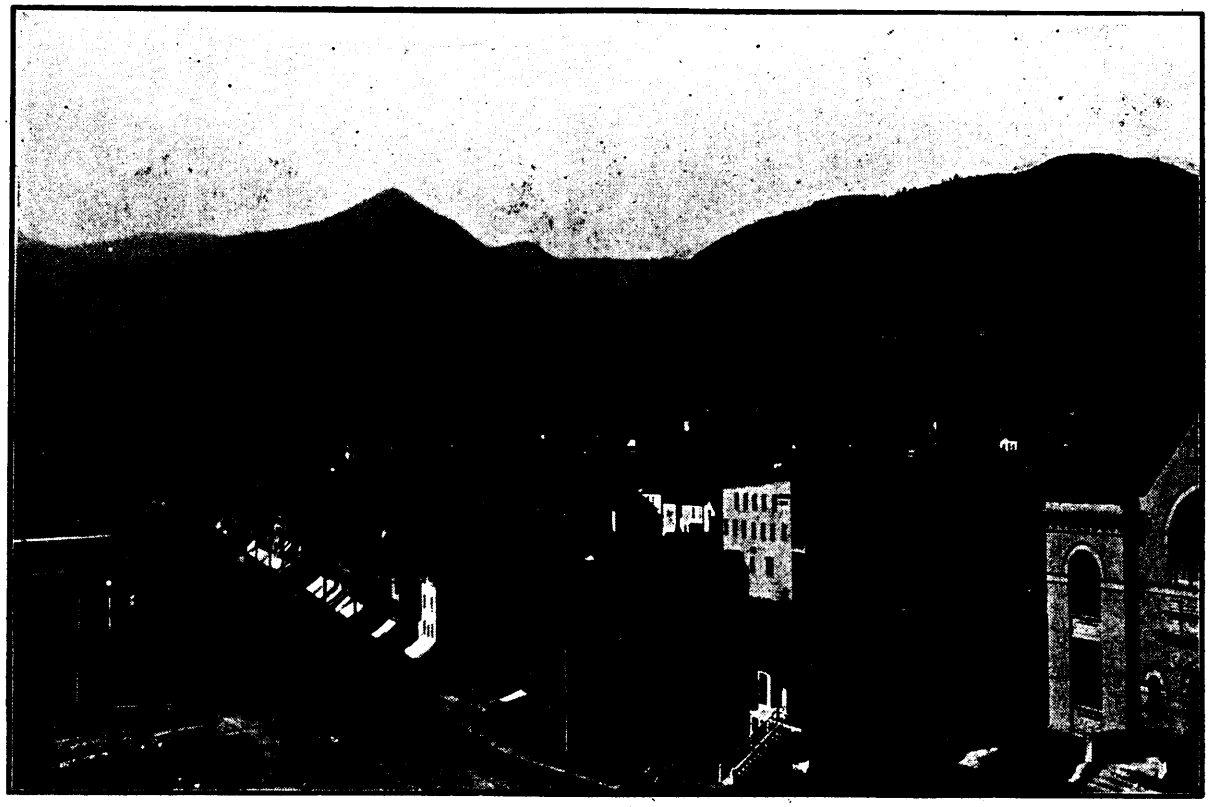
The visit to Nelson is thus described by the Nelson *Daily News*:

The touring party of the American Institute of Mining Engineers arrived at the union station yesterday morning at 11 o'clock. The Great Northern special train carrying the visitors was scheduled to reach this city at 8 a.m., but it was three hours later before the long train of seven Pullman, apartment and ob-

servation coaches, with a single baggage car, reached the union depot. Messrs. S. S. Fowler, Leslie Hill, R. R. Hedley and other local mining men were on hand to greet the visitors, who were escorted to the city wharf, where the steamer Kaslo, gaily bedecked with flags, was in readiness. The party was quickly on board and a start was at once made for Procter. After their long railway journey across the continent, the visitors greatly enjoyed the fresh air on the lake, and admired the scenery.

At Procter, where a landing was made the party was met and welcomed by Mr. T. G. Procter. Mr. W. S. Drewery, of Moyie, had a couple of fine freshly caught trout for the visitors to inspect, and after a stroll around the grounds lunch was served in the Outlet hotel dining room and out on the lawn. Music followed, and some of the visitors who had seen Mr. Drewery's fish, started out in a small boat to try their luck, while the rest of the party boarded the steamer for a run on Kootenay lake. There were plenty of maps handy and the local men were kept busily engaged during the run out to Procter and on the return trip in answering the innumerable questions the visitors asked their hosts. There were many ladies in the party, and everyone enjoyed the trip from start to finish. Dr. Raymond, of New York, who has not been out here since he came to Rossland as an expert witness in the Iron Mask-Centre Star case, several years ago, recalled his experiences at the famous trial with much pleasure. Mr. W. F. Robertson was in great demand as an official explainer on all sorts of subjects relating to mining in the Kootenays. Mr. Fowler, who was in command of the expedition, had his time fully occupied in seeing that everyone was properly looked after and that nothing was left undone to provide for the comfort and entertainment of the visitors. Nearly every one of the visitors had a camera and innumerable pictures of Kootenay scenery were snapped on the trip.

When the Kaslo reached the C. P. R. wharf at 4:30 a special C. P. R. train of three cars was in readiness and the party at once got aboard and started for Bonnington Falls. The run to Bonnington was quickly made and the party inspected the West Kootenay Power & Light Co's plant, viewed the falls, and surrounding scenery, and then had a picnic lunch. Nelson was reached again shortly after darkness had set in, and the male members of the party went up to the Nelson club, where a couple of hours were pleasantly passed. By 11.30 all the members of the party had returned to their train, which at that hour started for Rossland.



Rossland, B. C.—Surface Works of LeRoi, Centre Star and War Eagle Mines on Hillside in Background.

AT ROSSLAND.

The Rossland *Miner* of June 29 published a lengthy account of the visit of the A. I. M. E. party, from which account the following has been taken:

At 9.45 yesterday morning the train containing the members of the American Institute of Mining Engineers' excursion party arrived at Rossland. The reception commmittee was on hand, and as soon as the party had detrained extended to its members a hearty welcome.

Mr. S. M. Bamberger, Mr. F. Clymer, Mr. and Mrs. E. V. d'Invilliers and Miss d'Invilliers, Mr. Wm. Lilly, Major Charles E. Lydecker, Miss Rebecca Sealy, Mr. A. E. Vaughan and a number of others of the party elected to go through the mines. They were taken in charge by General Superintendent J. W. Astley, Foreman Trevorrow and several of their subordinates of the Le Roi, and shown through the different levels of the mines. Miss Rebecca Sealy showed the most courage of any of the ladies, for she descended down to the 1,550-ft. level on a small skip.

The Centre Star mine was next visited and here Superintendent Stewart, Assistant Superintendent M. E. Purcell and others took the party through the main workings of that big mine. They were shown some enormous reserves of ore, and were much surprised at what they saw. They made their way underground to the War Eagle and were escorted through several levels of that mine, and had the reserves of ore there pointed out to them. They emerged to the surface through the shaft of the War Eagle, and from the shaft house had a magnificent view of the town and the surrounding mountains.

Another section of the party elected to visit the Le Roi and Le Roi No. 2 concentrators. This party consisted of Messrs. W. P. Agnew, Theodore Dwight, S. F. Kirkpatrick, C. W. Goodale, Dr. Joseph Struthers, and a number of others. They were piloted by H. H. Claudet of the Canadian Ore Concentration company. Mr. Claudet explained to the visitors the Elmore oil process as exemplified in the mill of the Le Roi No. 2. This party also visited the head works of the other mines and enjoyed the scenery from the top of the hill.

A third section of the party took drives about the city, some going as far as the Columbia and Kootenay mine, and here the lady visitors went into raptures over the splendid view which lay before them. The mountains, with their tops shrouded in shivering mists, the valley of the Columbia with Trail and the smelter were plainly in view.

By 1 o'clock the entire party and a large number of local people, about 150 in all, had gathered in the War Eagle hotel, where luncheon was served.

At 2.30 p.m. the party left on a special train for Trail. The run down was made in quick time, arriving there in less than an hour. The party was divided into a number of groups and taken through the smelter by J. Labarthe, the superintendent, and his aides. They had explained to them the different smelting processes and were particularly interested in the lead refinery. They saw the process of casting the anodes and the cathodes in the lead refinery, and were told how the pure lead is turned out, and of the processes which result in in the production of silver, gold and sulphate of copper. The lead pipe making plant was in operation, and this greatly interested many. The engineers were surprised at the completeness of the plant, as they did not think such large smelting and refining works could be found in this province, where the mining industry is comparatively young. After inspecting the entire plant the party returned to Rossland, reaching the C. P. R. depot at 7 o'clock.

More than 100 guests sat down to dinner at the Hotel Allan, the greater number of whom were of the visiting party. His Worship Mayor Hamilton presided, and, after the appetites of the diners had been

Bird's Eye View of Canadian Smelting Works at Trail, B. C.

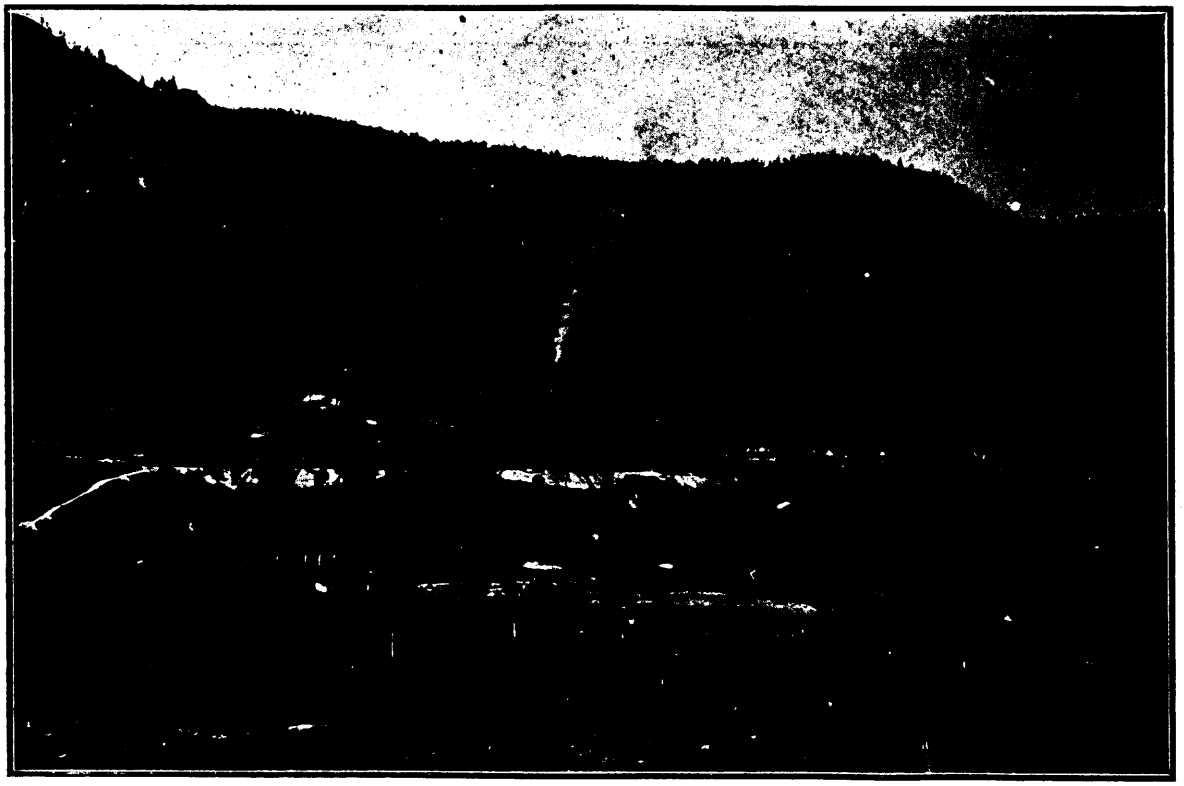
satisfied, first proposed the toasts of "The King" and "The President of the United States," and next that of "Our Guests." He said it was a peculiarly gratifying pleasure to welcome them because they were mining men and because the people of Rossland were engaged in the mining business. Rossland had mines and was not ashamed to show them. What this section wanted was more money and more men. He concluded with the hope that the mining engineers would tell their friends of what they had seen in the mines of Rossland, and that the time would come when the headquarters of the institute would be in Rossland.

Capt. R. W. Hunt made a graceful and humorous speech in responding, in which he seconded the motion made by the mayor that the headquarters of the mining institute be removed to Rossland. He spoke eloquently of the hospitality that had been shown to the members of the party.

Dr. Raymond, in picturesque language, spoke of the scenery of the Kootenays, and told how easy it was to cross the international boundary line. It was so easy that it was difficult for the members of the party at times to tell which country they were in. So far as Mayor Hamilton's wishing the American institute's headquarters to be in Rossland, it was already here, for it was wherever a number of its members were gathered at one time.

"The Mining Industry" was proposed by Mr. J. A. Macdonald, K.C., M.P.P., who said in part: "The toast I have the pleasure to propose is one which has often been proposed in Rossland, but to-night it has a broader significance than on any former occasion. It is not confined to our own field of operations, nor to our own province, nor to our own country, yet, while embracing all these it is intended more particularly to voice our appreciation, and I may add our admiration of the greatness, the magnitude of the mining industry in that great country which has the honour to call the members of the American Institute of Mining Engineers her sons, and which you our guests are proud to call your home. On behalf of the people of Rossland I ask guests to join with us in fraternal greeting to "the Mining Industry.'"

Professor R. W. Brock, of the Canadian Geological Survey, in responding, told of the immense potentialties of the country from mining, cattle raising and agricultural standpoints, but principally in regard to mining. It was a country of vast resources with the dimensions of an empire but only the population of an ordinary city, and hence its growth was slow. His speech was full of pertinent and important points and was listened to with the closest attention.



Granby Co's Smelting Works, at Grand Forks, B. C.

Mr. Anthony J. McMillan, general manager and managing director of the Le Roi, spoke very effectively and closely to the point. While optimistic to a high degree, his remarks were closely confined to facts and cold logic.

Mr. A. A. Cole, of the Centre Star-War Eagle engineering staff, who followed, directed attention to the great tonnage which is now being taken from the Rossland mines, and told, of his personal knowledge, how great is the present value of the mines with which he is associated. He asked the visitors to judge by

what they have actually seen and not by what they may hear from pessimists.

Other toasts were duly honoured, before the dinner closed with the singing of "Auld Lang Syne" and "God Save the King." The party then hurried to the railway station, where the train was waiting to convey them to Northport, leaving the Red Mountain station at 11 o'clock.

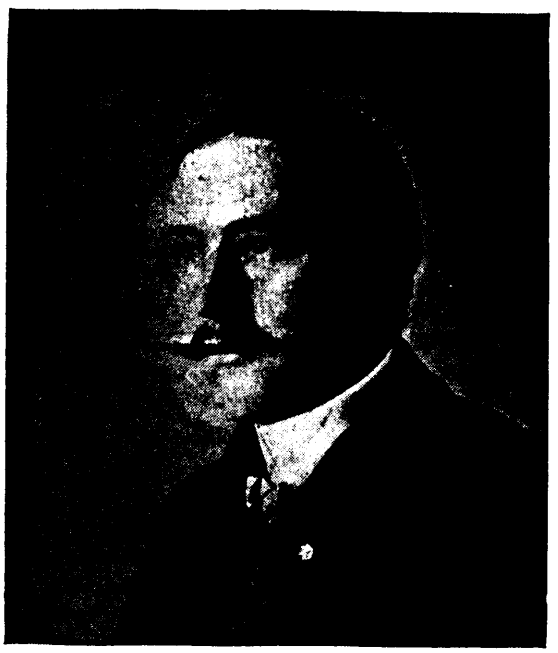
AT GRAND FORKS.

In its account of the visit to that town the Grand Forks *Gazette* said:

The big excursion of the American Institute of Mining Engineers arrived by Great Northern special Thursday morning, June 29. There were seven Pullman coaches in the train, and it was about ten o'clock when it reached the smelter siding. A finer day could hardly have been made to order. In addition to Mr. and Mrs. A. B. W. Hodges, Mr. and Mrs. G. W. Wooster and the Granby officials, there were among the reception committee Mayor Hammar, Messrs. W. T. Spier, G. M. Fripp and L. A. Manly. The visitors were piloted round the big reduction works, and the various processes were explained by Supt. Hodges, Assistant Superintendent Williams and the staff. At twelve o'clock a rest was taken at the general offices, and at one o'clock luncheon was served. An hour later the engine with three coaches pulled out for the trip to Phoenix. The valley about Grand Forks looked at its best, and elicited many words of warm admiration.

AT PHOENIX.

The following excerpts are from the Phoenix *Pioneer* account of the visit to the Granby Co's mines,



Mr. A. B. W. Hodges, Metallurgist, General Superintendent of Granby Con. M. S. & P. Co., Ltd., Grand Forks, B. C.

at Phoenix: Sitting in the compartment of the private Pullman coach Olympia, which has been occupied by the martyred president, William McKinley, and also by Prince Henry of Prussia, on his trip through America, the *Pioneer* man learned something of the trip of the American Institute of Mining Engineers, while the special train was bringing them up from Grand Forks to look at the Granby mines for the first time.

Granby Co's Mines, at Phoenix, B. C.

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At Phoenix they were met by local officials of the Granby mines, headed by Superintendent O. B. Smith and were welcomed to the camp. The members of the party, including the ladies, were taken to the No. 1 level of the Knob Hill mine, where they could see the gigantic ore quarry, note the steam shovel at work and go into the No. 1 tunnel. They also visited the ore crushers and compressor building, and had a chance to see the ponderous machinery that furnishes power for all purposes at the mines.

Following this the party proceeded to the Granby office, which, under the skilful hands of the ladies of the town and the Granby office force, had been transformed into a bower, with festoons of bunting, etc., the entire room being taken up with tables and booths, where a delicious lunch was served to all, the ladies of the party being welcomed by the ladies of Phoenix—the visitors evidently appreciating the courtesy. A social time was spent here, and it is believed, most enjoyably to all, the train pulling out on the return trip to Spokane about 6.30 p.m.

AT SPOKANE AND SEATTLE.

Notwithstanding that only a brief stoppage at Spokane had been arranged for in making up the itinerary, prominent citizens took possession of the excursionists on their arrival at that city on Friday morning, June 30. Spokane Falls and other points of interest in the city were rapidly viewed, and then luncheon, served at the railway station, was enjoyed. A bountiful supply of fresh fruit and flowers, thoughtfully placed on the cars by their Spokane hosts, added to the pleasure of the journey to Seattle, Puget Sound, which was reached before midnight.

Upon arrival at Seattle, the Canadian Pacific Railway Co's new steamer Princess Victoria, the finest of her class on the Pacific coast, was in waiting, with Mr. W. M. Brewer, secretary of the Victoria reception committee, to assist in making the travellers comfortable for the night. Early next morning the party was landed at Victoria, the 80-mile run up Puget Sound and across the Straits of San Juan de Fuca having been made during the night.

Mr. Wm. Fleet Robertson, B. A. Sc., Provincial Mineralogist of British Columbia, who was Executive Chairman of Local Committee of A. I. M. E.

AT VICTORIA.

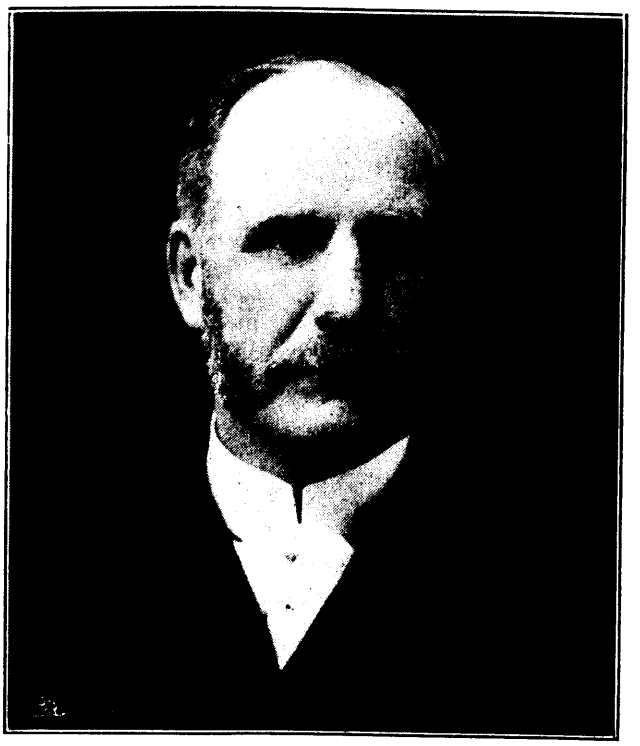
The committee of local members of the American Institute of Mining Engineers may fairly be congratulated upon the large measure of success that followed their comprehensive and carefully prepared arrangements for the reception, accommodation and entertainment of the comparatively large party that early in the morning of Saturday, July 1, landed in Victoria with the set purpose of crowding as much pleasure and as little business as possible into the five days the excursion itinerary provided should be the extent of their stay in British Columbia's charming capital city. An instance of the appreciation of the visitors came under the notice of the writer on Monday, July 3, while speaking to Mr. W. M. Brewer at the Driard Hotel, which was the rendezvous of the party during the stay in Victoria. One lady member came to him and enquired where she could find the Post Office and on being informed that the postmaster had been requested to place all mail for members of the party in the post office box of the secretary of the local committee, so that it might be obtained and distributed as quickly as possible, asked: "Say, can you tell me anything you have forgotten to do for us?" On receiving assurance that it had been the committee's misfortune to have overlooked several things they might have done, the response came promptly: "Well, the Engineers don't know of a single thing you could do and haven't done to make them comfortable." And a disinterested onlooker may be permitted to express the opinion that that verdict was

pretty generally agreed upon among those who came, most of them, as strangers in a foreign land, but who departed with not a litttle regret from what they were not slow to declare they had found to be a scene of great natural beauty and much spontaneous and generous hospitality.

The local committee consisted of members of the institute, as follows: Mr. Wm. Fleet Robertson, provincial mineralogist of British Columbia (executive chairman); Mr. W. M. Brewer (honorary secretary); Messrs. Harold Grant, Thos. Kiddie, Clermont Livingston, E. C. Musgrave, W. J. Sutton, and Francis A. Thomson. Mr. Grant's duties had necessitated his proceeding to Quatsino Sound before the arrival at Victoria of his visiting fellow members of the institute. Mr. Thomson, who is now metallurgist for the New Western Reduction Co., at Goldfield, Nevada, came back to Victoria for a few days' stay while the British Columbia meeting of the institute was being held. The reception committee had the assistance of the Hon. Richard McBride, premier and minister of mines, who was its hon. chairman.

Saturday morning was occupied by some of the ladies in settling down in their temporary quarters, shopping, etc., while others joined their menfolk or friends in taking a drive on the Tally-ho. By noon many prominent citizens had called on the visitors and had extended to them a welcome hearty though informal. The formal welcoming of the members of the institute took place in the afternoon. The account of the proceedings that followed is largely from reports of the local daily newspapers.

Mr. W. M. Brewer, M. E , of Victoria, B. C., who was Secretary of Local Committee of A. I. M. E.



Mr. W. J. Sutton, Geologist, Victoria, B. C., Member of Local Committee of A. I. M. E.

FIRST BUSINESS SESSION.

In the afternoon, at 3 o'clock the first business session was held in the ministers' room of the Parliament Buildings. The room was decorated for the occasion with flowers and the flags of the two nations.

His Excellency the Lieut.-Governor, Sir Henri Joly de Lotbiniere, introduced to the visitors by Mr. Wm. Fleet Robertson, chairman of the local reception committee, in a brief and cordial speech of a few well chosen phrases, warmly welcomed the institute and said if any country or any province of the Dominion of Canada ought to be gratified by a visit from the mining men of the great neighbouring republic, it certainly was the province of British Columbia, since they could, by their influence and authority, do more for it than anyone else. The resources of the province were, he said, well known to the world at large, but what was wanted was the authority of reliable men whose high attainments and repute inspired confidence, and whose report would be accepted without hesitation by the world at large. He bade them heartily welcome and trusted that their stay would be as much a source of benefit and pleasure to them as it undoubtedly would be to Victoria.

Hon. Richard McBride, premier and minister of mines, was next introduced to the members, and in a terse speech expressed the great pleasure he felt in meeting the members of the institute here. They had listened, he said, to the remarks of Sir Henri, which all must endorse. He had watched with interest the development of the American Institute of Mining Engineers, so beneficial in its far-reaching influence, not

only to the United States, but to every country they had honoured with their attention. He was glad to think that in the course of their travels they would gain an insight into the vast extent and resources of British Columbia, which would be to the advantage of the province generally. "I believe," he said, "in meetings of professional men from year to year as forging annually one more link in a chain which binds all together for the universal good. I heartily endorse the welcome so happily accorded by Sir Henri and feel sure that you will return home with a deeper, wider view of the vast resources of the northwestern portion of the continent; I look forward to the pleasure of seeing you all again on a future occasion."

Capt. Robert W. Hunt, of Chicago, Ill., a past president of the institute, in reply to the welcome extended to them, said that the members of the institute, forgot the boundary line which separated countries and looked upon the different parts as only portions of the one continent. The United States visitors, resident on the same continent, were glad to meet in British Columbia with people who were the same in blood, sentiment and nearly everything else as themselves.

Dr. Raymond, the secretary, then outlined the business which would come before the meeting. He explained that of the large number of papers which were down for presentation only a small number would be read. The others would be distributed among the members later, when printed. The following is the list of papers:—

Blast Furnace Practice—

Discussion of the paper of James Gayley on "The Application of Dry-Air Blast to the Manufacture of Iron," and of the paper of J. E. Johnson, Jr., on "Physical Action of the Blast Furnace," by Baker, Dudley, Birkinbine and Bachman.

Wrought Iron and Steel—

Discussion of the paper of James P. Roe on "The Manufacture and Characteristics of Wrought Iron," by Stafford, Cushman, Dudley, Hartshorne and Wittman.

Coal, Coke and Gas—

"Commercial Value of Coal Mine Sampling," by M. R. Campbell, Washington, D. C.

"The Outlook for Coal Mining in Alaska," by Alfred H. Brooks, Washington, D. C.

"Anthracite Washeries," by George W. Harris, New York City.

"A Machine for Drawing Coke from Bee-Hive Ovens," by George T. Wickes, Covington, Va.

General Mining and Metallurgy—

"An Improvement in Mine Maps," by D. W. Brunton, Denver, Colo.

"Cyaniding Silver-Gold Ores at the Palmarejo Mine, Chihuahua, Mexico," by T. H. Oxnam, Chinipas, Chihuahua, Mexico.

"The Importance of Fine Grinding in the Cyanide Treatment of Some Gold and Silver Ores," by Frederick C. Brown, Auckland, New Zealand.

Reply to discussion by Jarman, by Charles H. White, Boston, Mass.

Discussion of the paper of H.O. Hofman, on "The Effect of Silver on the Chlorination and Bromination of Gold," by T. K. Rose, London, England.

"Some Notes on Surface Tension Action in Wet Concentration," by H. E. T. Haultain, Nelson, B.C., Canada.

"A Process for the Economical Extraction of Copper from Low Grade and Very Silicious Ores," by Richard Lamb, New York City.

"The Electrolytic Assay of Lead and Copper in Daily Work," by George A. Guess, Silverton, Colo.

"Tin Mining and Smelting at Santa Barbara, Mexico," by A. H. Bromly, Vancouver, B.C., Canada.

"Kernel Roasting," by Herman Poole, New York City.

"Results Obtained in Smelting a Copper Ore Carrying a High Percentage of Barytes and Zinc," by Thomas Kiddie, Ladysmith, V.I., B.C.

Ore Deposits—

"Genesis of the Ore Deposits at Bingham, Utah," by J. M. Boutwell, Washington, D. C.

"Gravity as a Direct Cause of Vein Fracture," by Arthur C. Spencer, Washington, D. C.

"The Limestone-Granite Contact Deposits of Washington Camp, Arizona," by W. O. Crosby, Boston, Mass.

"Genetic Relations of the Western Nevada Ores," by J. E. Spurr, Washington, D.C.

"The Gold Placers of the Seward Peninsula of Alaska," by Arthur J. Collier, Washington, D. C. (Introduced by A. H. Brooks.)

"Reconnaissance Geology of the Northern Rockies," by R. H. Chapman, Washington, D.C.

"The Formation of Ore Deposits by Hot Springs," by Walter Harvey Weed, Washington, D.C.

"Short Sketch of Geology and Mineral Resources of Vancouver Island," by W. J. Sutton, Victoria, B.C.

Mr. W. J. Sutton, of Victoria, then delivered an address on the geology and mineral resources of Vancouver Island, using a large map of the island to illustrate his observations. He explained that exact knowledge of the island was very difficult to obtain, owing to the fact that its area was comparatively large, with a length of between 200 and 300 miles, and that as yet it had been but little explored. He traced its geological history from the time when basic volcanic activity prevailed and violent eruptions from the sea had taken place. Later the granite range along the mainland of the province had been formed, and tongues had been sent across to Vancouver Island. A period of rest had followed, when sandstone shales were deposited, in the Upper Cretaceous period. Another time of volcanic activity came later, producing the fine building stone so well-known in these parts. The outflow of lava at this time, too, had come into contact with some of the beds of bituminous coal, as at Cumberland, where the coal had been converted into semi-anthracite. In the after glacial period an outlet was formed by the Straits of San Juan de Fuca, in the south, and by the northern end of Vancouver Island, in the north. Glacial markings about Victoria and elsewhere on the island were about the best to

be seen in the world. In conclusion the character of the mineral deposits of the island, so far as yet discovered, was outlined. An interesting discussion supervened, and many questions were asked, particularly in regard to the conversion of the bituminous coal into anthracite.

Mr. Thos. Kiddie, who will later contribute a paper bearing on this subject, in response to an invitation to address the meeting, gave some information relative to the characteristics of the ore occurring in the Tyee Copper Co's mine at Mt. Sicker, and its treatment at the smelter. He first gave the following generaly analyses of the ore—raw and burnt—and the slag made at the company's works, of which he is manager:

General Average Assay and Analysis of Tyee Ore.

Copper (wet) by electrolytic assay	4.08	per cent.
Silver	2.67	oz. per ton.
Gold	0.131	" "
Iron	10.49	per cent.
Zinc	7.36	" "
Silica	13.48	" "
Alumina	7.01	" "
Barium sulphate	37.63	" "
Lime	2.04	" "
Magnesia	Trace.	
Sulphur (as sulphides)	6.32	" "

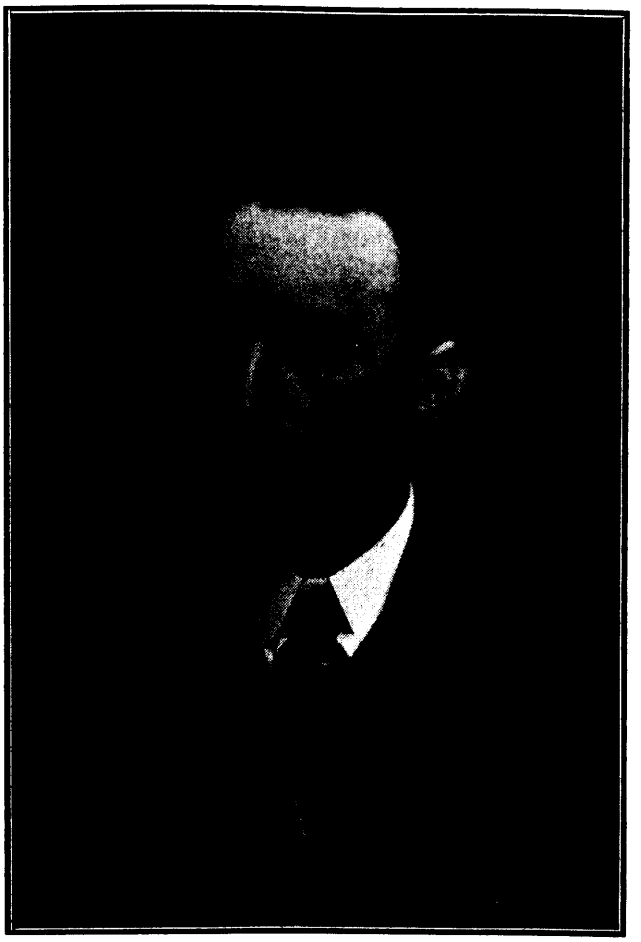
Burnt Screened Ore.

Iron	10.35	per cent.
Silica	10.96	" "
Barium sulphate	41.50	" "
Lime	1.94	" "
Zinc	7.60	" "
Alumina	4.93	" "
Magnesia	Trace.	
Sulphur (as sulphides)	6.32	" "

General Analysis of Slag.

Copper	0.41	per cent.
Gold	Trace	
Silver	0.14	oz. per ton.
Iron oxide	17.25	per cent.
Zinc oxide	6.47	" "
Barium oxide	28.57	" "
Calcium oxide	6.00	" "
Silica	31.42	" "
Alumina	10.73	" "
Magnesia	Trace.	

He followed with an account of the earlier experiments with this ore in the blast furnace, and explained the reduction of the sulphate of barium to sulphide and its precipitation along with the copper and zinc in the matte, together with the manipulation of the charge and furnace practice in overcoming the reducing action of the coke and carbonaceous gases upon the barium sulphate, explaining that the barium in the slag existed entirely in the form of silicate, and not as sulphate as had been claimed; also that the zinc in the slag existed in the oxidized form and not as sulphide. He next reviewed the treatment of the fines of the ore received from the mine, and gave a description of the ore brick-making and burning methods in operation at the smelter roast yards. In conclusion, he mentioned that he had quite recently installed at his company's smelter at Ladysmith a hot blast system designed by himself, which in its operation is based upon the principle of long travel of the air at comparatively low temperature as against the short travel at high temperature in the ordinary hot-blast stove system, the waste heat from the blast furnace being utilised in heating the air blast. The discussion which ensued was participated in by Mr. A. B. W. Hodges, Mr. E. V. d'Invilliers, and others.

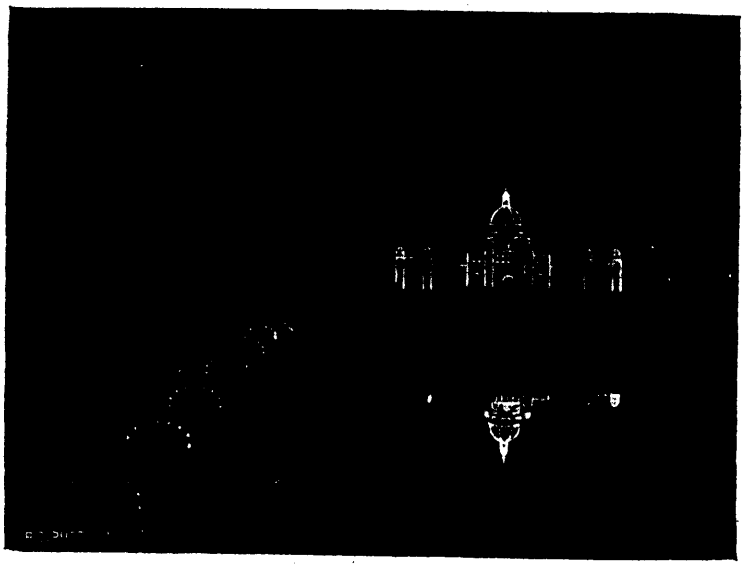


Mr. Thos. Kiddie, Metallurgist, Manager of Tyee Copper Co's Smelter.

Mr. A. B. W. Hodges, general superintendent for the Granby Consolidated Mining, Smelting & Power Co., gave an account of the operation of mechanical furnace chargers at the Granby Co's smelter at Grand Forks, B.C. He mentioned some of the disadvantages of the first mechanical charger he had designed and used in that smelter. It had, though, been a a considerable improvement on hand-feeding. Next he explained the changes he had this year made, these consisting of two side-discharge ore cars run into the furnaces. Each car has four compartments so arranged that the charge can be placed in any part of the furnace desired, thus securing the distribution of the charge wherever needed. These cars are moved along tram tracks between ore and coke bins and fur-

naces by electric motors, and this charging system is operated so economically that a saving at the rate of $80,000 to $90,000 per annum, with six blast furnaces running, is effected, this being the difference between the cost of hand-feeding and the new system of mechanical feeding. After Mr. Hodges had replied to the questions of several members, the business session was adjourned until 5th inst.

There still being several hours of daylight after the adjournment of the business session, these were devoted to sight-seeing about the city and neighbourhood. The delightfully mild summer climate; the magnificent scenery, a prominent feature in which is the snow-capped Olympic range of mountains just across the straits, in Washington; the many cosy homes with their green lawns and pretty gardens; the great profusion of flowers; the shady groves of the park and the white swans on its several small lakes; the numberless charming views, whether of landscape or "seascape"—these during their five days' stay strongly appealed to the visitors, who were loud in their expressions of admiration of Victoria, which they unanimously voted a delightful place for residence.



Electric Illumination of Parliament Buildings on Occasion of Visit of Duke and Duchess of York.

On the Tally-Ho.

In the evening a public reception, under the auspices of the Government of British Columbia was held in the large and ornate Legislative Hall of Parliament Buildings, which had been elaborately decorated with evergreens, flowers and flags for the occasion. The hall was well filled shortly after the arrival of Sir Henri Joly de Lotbiniere, who at its entrance welcomed the many who were presented to him, but later, as the guests wandered down the long corridors to the public museum and other interesting parts of the big buildings there was ample room for comfort, whether in promenading, or in gathering in groups to enjoy the informal socialibity that prevailed. An orchestra of stringed instruments and piano rendered selections throughout the evening.

The arrival of Captain Miles and four or five of his officers from the U.S.S. Boston, on a few days' visit to Victoria, was a welcome addition to the pleasure of the reception, and after these naval visitors had been introduced by the American Consul, Hon. Abraham E. Smith, they received marked attention from many prominent Victorians present.

On the first floor, in the circular hall below the dome of the tower of the buildings, refreshments were served, while on the floor, in the large ante-room to the Legislative Hall there was a fine display of roses. This latter attractive feature of the evening's entertainment was the happy idea of Mr. Herbert Cuthbert, secretary of the Victoria Tourist Association, who obtained from various gardens in the city numbers of beautiful roses, which were tastefully arranged in vases on tables placed opposite the entrance to the reception hall. These roses were afterwards distributed among the visiting ladies, who were delighted to receive them.

Among the leading men of the city present were His Honour the Lieutenant-Governor, Hon. Richard McBride, premier and minister of mines; Hon. F. J. Fulton, provincial secretary; Hon. R. F. Green, commissioner of lands and works, and Hon. R. G. Tatlow, minister of finance; Hon. A. E. Smith, United States consul; His Worship the Mayor of Victoria, (Mr. G. H. Barnard), Mr. S. J. Pitts, president of the Victoria board of trade; Col. Prior, Major Dupont, Hon. E. Dewdney, Hon. C. E. Pooley, Canon Beanlands and many others. The gathering also included many ladies prominent in local society circles.

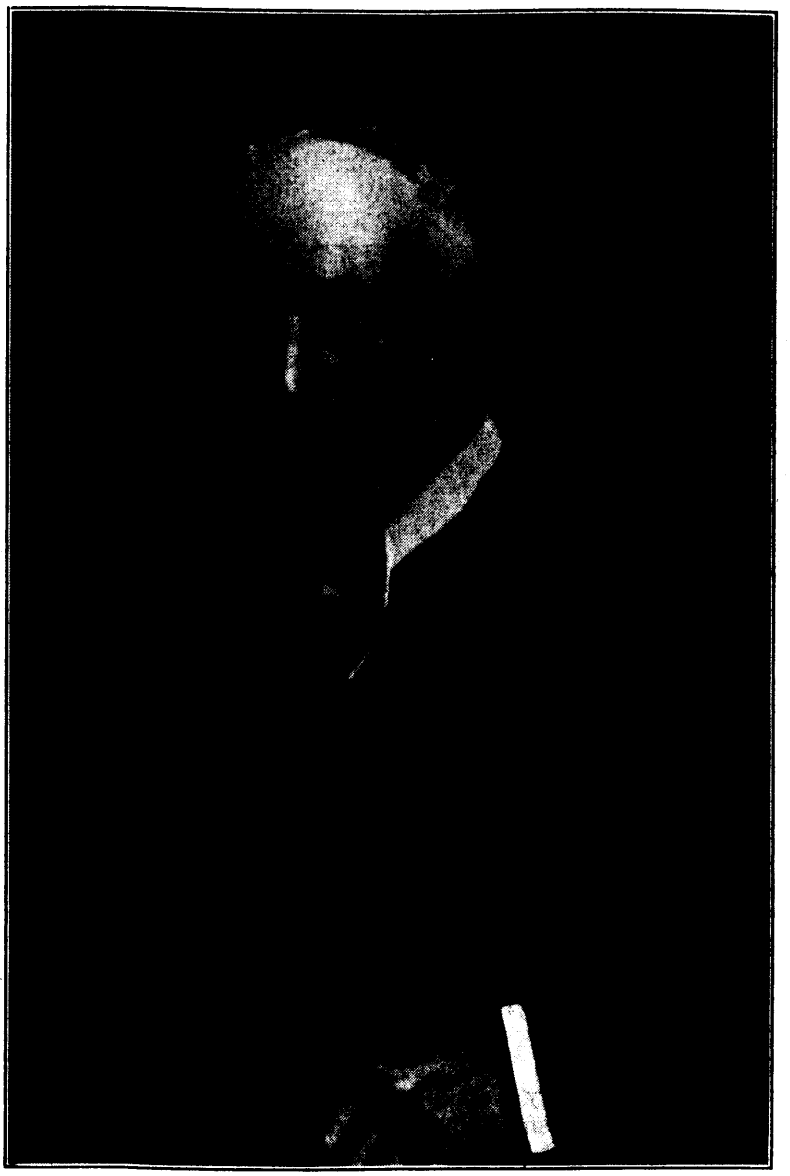
Sunday was spent in various ways. Some drove out to the Vancouver Portland Cement Company's cement manufactory at Tod inlet; others saw the suburbs of the city from the top of the Tally-ho coach; others, again, went to church, or visited new-found friends. In the afternoon a number accepted Major Dupont's hospitality, taking afternoon tea in the beau-

tiful garden surrounding his attractive home.

On Monday there was an all day excursion among the neighbouring islands on the steamer Charmer, about 300 citizens accompanying the visitors on this pleasurable outing, which was arranged for by the Victoria board of trade, city council, and others. Weather conditions were most favourable,—bright sunshine, a cool breeze and a smooth sea. The route chosen was along past Oak, Cadboro and Cordova bays, thence up through the beautiful archipelago of the Gulf islands—rounding Salt Spring Island, through Cowichan Gap, down the east side of Salt Spring, passing Galiano and Mayne and the innumerable islets which dot that pretty stretch of water. Luncheon and afternoon tea were served on the steamer, which was gaily decorated from stem to stern. Upon return to Victoria at 6 p.m., hearty cheers were given in acknowledgment of the successful efforts of the committee in charge to promote the pleasure of those who had so greatly enjoyed the day's outing on the water.

AT THE TYEE MINE.

On Tuesday the visitors were the guests of the Tyee Copper Company, whose general manager, Mr. Clermont Livingston, had them conveyed by special train up the Esquimalt & Nanaimo railway line 40 miles to Duncans, and thence 11 miles by vehicles to the Tyee mine on Mt. Sicker, or, in the case of those who preferred to visit the company's smelter, 20 miles farther by rail.



Mr. Clermont Livingston,
General Manager of the Tyee Copper Co , Ltd., Duncans, Vancouver Island, B. C.

The Tyee, Lenora, and other mineral claims on Mt. Sicker, were staked in April, 1897. After some prospecting work had been done, Mr. Livingston, seeing the promise the Tyee gave of proving a good property, bought an interest in it. Exploratory work was then done, with results that encouraged Mr.

Livingston to proceed to London, where he succeeded in interesting capital in it.

At first a company was formed with 15,000 shares and £5,000 working capital, and a shaft was sunk 200 ft. In 1900 the shares of the Tyee Co. were increased so that there were 120,000 shares. The company issued 100,000 shares and had £20,000 working capital. Mr. E. C. Musgrave, who is superintendent of the mine, joined the company in 1900, and next year he located a big ore body, which has since been worked with good results. It is estimated that before this ore body shall have been worked out it will have produced from 200,000 to 300,000 tons of commercial ore. Fresh stock was issued in October, 1901, increasing the company's shares to 180,000 with £50,000 working capital. Then the more extensive development of the Tyee mine was entered upon. An aerial tramway was built 3½ miles down to the E. & N. railway; a hoisting engine and two cages, five boilers, air-compressor, steam pumps and other machinery were installed, contiguous claims were secured, timber limits and land were obtained from the Esquimalt & Nanaimo railway, and the smelter was built at Ladysmith. This smelter has since treated 125,000 tons of ore from the mine.

Up to the end of April last £112,000 in profits for the last two years' work had been sent to the directorate in London, which not only paid a dividend of 20 per cent., but also placed a substantial amount to credit of a reserve fund, and this too, with considerable exploratory and development work proceeding down to the 800-ft. level at which depth cross-cutting was lately commenced, and prospecting with the diamond drill is beng done.

The road to the mine is for five miles through country in which are numerous small farms. Then come six miles of a steady ascent, with luxuriant forest growth on either side. The drive was made a leisurely one, with occasional stoppages at cool wayside springs or near clumps of spirea in full bloom. Arrived at the mine it was found that the camp buildings had been decorated for the occasion with flags and evergreens, and that the saw mill building had been transformed into a luncheon room, with tables loaded with tempting eatables and adorned with bouquets of flowers and a profusion of native maiden hair fern, which last was carried off by the visitors when going away.

A speedy team had taken a party, including Mr. Alfred H. Brooks, (geologist in charge of the United States division of Alaska mineral resources), Mr. D. W. Brunton, Mr. E. V. d'Invilliers, Mr. W. M. Brewer and Mr. E. C. Musgrave. (superintendent of the Tyee) up to the mine ahead of the others so that the three first-named were enabled to spend a couple of hours underground examining particular features of the geology and ore occurreneces in the mine under the guidance of Superintendent Musgrave. Others went below, including several ladies who were lowered in the cage to the first level, but they had not time nor opportunity to give the mine much attention. Those who remained above ground spent the time looking over the surface works and watching the hoisting engine and aerial tramway in operation, until luncheon was announced.

Mr. Livingston was at the head of the table and seated near him were Dr. Raymond, Hon. A. E. Smith and other prominent visitors. Immediately

On the Road to the Tyee Mine, Mt. Sicker, Vancouver Island, B. C.

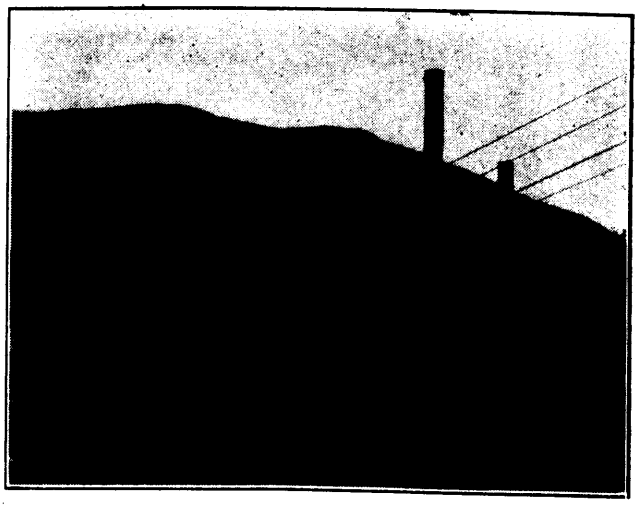
behind Mr. Livingston hung a facsimile copy of the Declaration of Independence, among the signers of which appeared the name of one of the ancestors of the general manager of the Tyee. About it was draped the Union Jack and the Stars and Stripes.

The meal disposed of, Mr. Livingston charged the company to fill their glasses. He then proposed the toast of King Edward and President Roosevelt. In doing so he referred to the kindly relations between the two great Anglo-Saxon nations. Hon. Mr. Smith responded, paying a compliment to the King and the President. He said he did not fear any trouble arising between the two countries. As long as the two flags remained furled together as they were that day the Anglo-Saxon people would dominate the world. He referred to the fact that he had spent seven years in British Columbia and could assure his countrymen that Canadians are unexcelled in hospitality. British Columbia is rich in mineral resources, which only want similar push and capital to that of the United States to develop them.

Mr. Livingston then toasted the American Institute of Mining Engineers. In response, Dr. Raymond, secretary, said the Tyee was one of the most striking properties in the remarkable list they had had opportunity on this trip to examine. His reminiscences of British Columbia ran far back. His brother, Captain Raymond, had explored the Yukon and made the first map of the lower Yukon river in 1878. In that year he had come to Victoria. The city was then having a reaction, following the boom times of the Fraser river gold rushes. The city was suffering from a relapse. But the spirit of the citizens was great, for all that. His brother said the shopkeepers all reported a sad state of business. He had said to one: "I don't see how you live." "Oh, that's easy," said the man addressed; "There's a hundred dollars in town, and anyone who wants to buy anything, goes and borrows it." The citizens had soon tided over the reaction, however, and reached a time of prosperity akin to that on which this beautiful country is now launched. Dr. Raymond said this was a country in which a man is glad to live when he is earning his money. It is not a country, like many in which miners unfortunately have to work, in which they earn what they can and get out. But it is different here. Men do not talk about getting out to God's country. This is God's country. There is no doubt as to the future of our industry in this segment of the west. The great Cordilleran range with its stores of copper and silver and gold and other riches, which runs from one extreme of the continent to the other on this western shore has no break in British Columbia. The country for the miner is here. But mining of itself does not make homes and happiness. In Mexico after Cortez landed the gold was a curse. Mining, he said, is the great pioneer industry. It leads and other industries follow in the train, bringing happiness. Mining opens up the valleys of the country to railways; it opens the land to other industries. Even should it not prove a permanent industry in British Columbia, which is unlikely, it had already discharged its duty in the province in leading to the provision of transportation facilities in parts of the interior that in its absence would not have had these for many years. How fortunate British Columbia and this glorious island were was seen when comparison was made with many mining districts in other countries. Here men might *live* indeed. And whether mining flourished or not, they would live among so much beauty, enjoy so much good health, and develop so much culture, that such a country is never going to decline. In many districts of the United States there are areas of treeless deserts, great alkali plains, and other places where himself and his colleagues had spent many weary days. There were also patches where nature had its charms as in the Grand Canyon of Arizona. But here there are no patches: it is one great, glorious country. It is the Olympus of the gods. and he wished that blessings would descend upon those in the Olympus, and on their gods and goddesses.

Mr. d'Invilliers proposed the health of Mr. Clermont Livingston, the host, which was drunk with applause.

Forest Scenery on Road to Tyee Mine.



Boiler and Engine House, Ore Bunkers, and Aerial Tramway, at Tyee Mine.

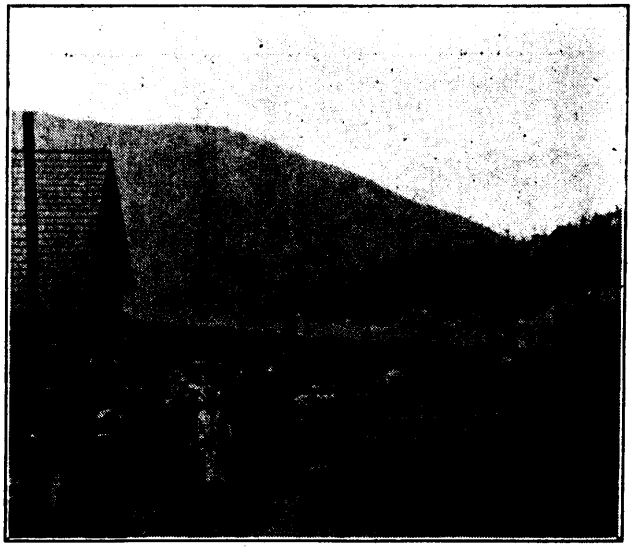
and cheers were added.

Shortly afterwards adieu was said and the visitors were driven down the mountain side to Somenos, where all embarked again on the train which brought back the contingent that had visited the smelter.

AT LADYSMITH.

Upon arrival at Ladysmith the members of the party who had chosen to visit the Tyee Copper Co's smelter rather than the mine were met at the railway station by Mr. Thos. Kiddie, manager of the smelter, and his assistant, Mr. W. J. Watson. A cordial welcome was extended to the visitors, who without delay proceeded to the company's offices. After looking through these and the contiguous assay offices, the party was divided into sections, Mr. Kiddie taking charge of one, Mr. Watson of another, and Mr. W. F. Robertson, who is also an experienced metallurgist, of a third.

These works have been erected on a site between



Waiting for Lunch at the Tyee Mine. Lunch was served in the Sawmill Building on the Left.

the Esquimalt & Nanaimo Railway and Oyster Bay, giving a water frontage of about 3,000 ft. long. Between the works and deep water, which is suitable for dock purposes, there is ample room for slag dumpage for years. The ground between high-water mark and the E. & N. Railway has been laid off in terrace form, which admits of a gravity system throughout the works. These were built from the designs of the manager, whose son, Mr. John Kiddie, C.E., had charge of construction, with Mr. Geo. Williams, now at the B. C. Copper Co's smelter at Greenwood, Boundary district, as mechanical engineer. Mr. W. J. Watson is assistant superintendent and Mr. H. Collinson, chief chemist.

The plant, as constructed, is of 250 tons daily capacity, but in the erection of the main buildings provision was made for enlargement to 600 tons capacity and room was left for a Bessemerizing plant whenever the quantity of ore available shall warrant the installation of the additional machinery, etc., requiste for the treatment of this larger tonnage, and for producing blister copper on the spot.

The inspection of the works was commenced at the roast yards. It was explained that the ore from the Tyee mine (which constitutes by far the larger part of that treated here, the remainder being custom ores), is brought from the lower terminal of the company's aerial tramway near Somenos, 17 miles distant from the smelter, in bottom-dumping 30-ton railway cars, the proportion to be smelted raw going to receiving bins immediately behind the furnace house and that to be roasted to bins above the roast yard at the highest level of the smelter site. A spur from the railway runs, on a rising grade, to the top of the roast yard receiving bins, of which there are 16, having a total

Mr. E. C. Musgrave, C. E. and M. E., Superintendent of Tyee Copper Co's Tyee Mine.

storage capacity of about 1,600 tons of crushed ore. These bins are constructed to allow ample head room for the men to work under them.

The ore falls from the railway cars on to fixed screens placed in the bins. These screens are set at an angle of about 40° and they screen out to ⅜-in. size and less, the fine ore, which falls into a separate compartment, built in the centre of each bin. The surface of the screens is so arranged, by bending the sides downwards, that the "roughs" are distributed all about the bins, thus preventing the screened ore from piling up immediately underneath the lower ends of the screens. All bins have bottom-discharge gates, through which the ore is drawn off into ore-cars running on tram tracks, the roughs going to the roast piles and the fines to the brick house to there be made into bricks.

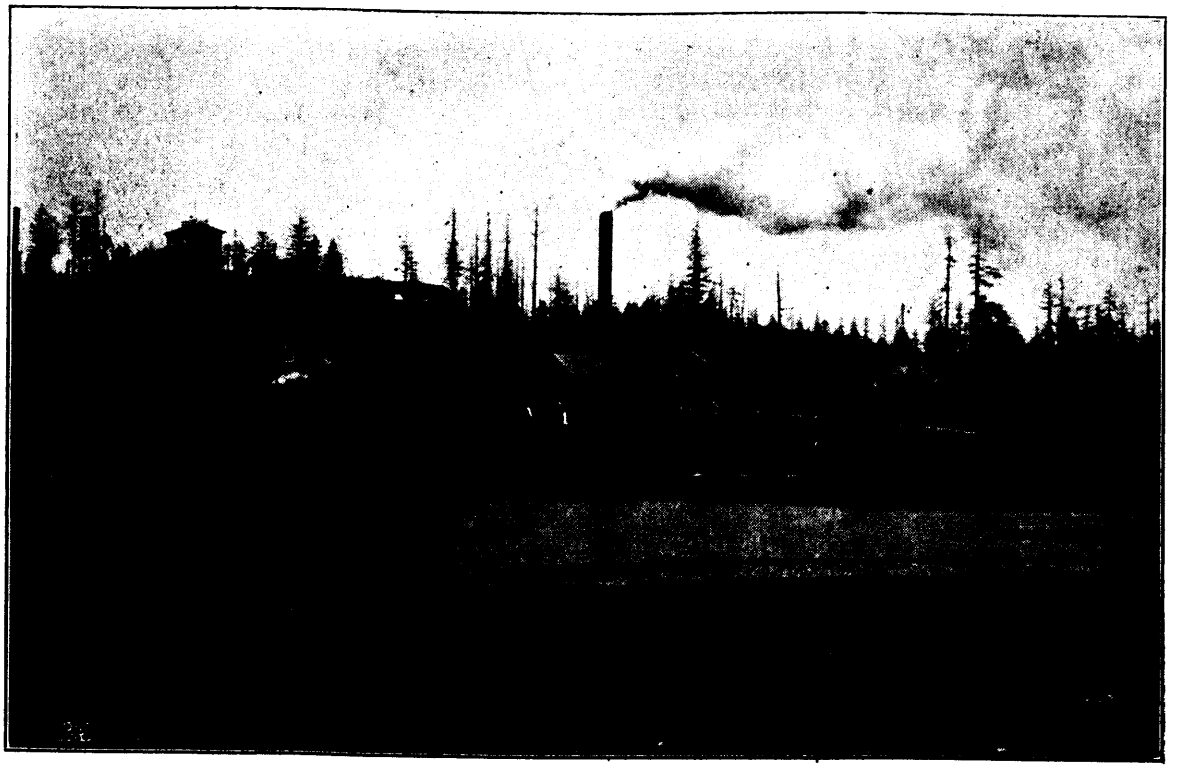
The level of the roast yard is about 8 ft. below that of the tram tracks under the receiving bins, these tracks being carried lengthwise of the yard on a series of six trestles, built 60 ft. apart, measured from centre to centre. These trestles are permanent structures. the fire from the burning ore in the roast piles not coming into contact with them. At right-angles to the trestles here are six cuttings or trenches, each 4 ft. deep and 40 ft. (centre to centre) apart, these and the trestles dividing the yard into beds.

Between the permanent trestles there are movable bridges, these travelling on wheels and bridging the spaces between the trestles. They are so constructed as to admit of their being easily moved over and past the ore beds, as required. The bridges carry tram tracks which, by means of adjustable curves, substituted for the turntables at first used, connect with the tracks on the trestles and allow of the side-dumping ore cars being run over them from the part of the trestle nearest to the ore bed on which the pile is to be built up.

The ore piles are built 50 ft. long by 40 ft. wide and 8 ft. high. They contain on an average about 350 tons of ore to the pile. The object in not building them higher is to shorten the time required for roasting and, as well, the period during which the burnt ore shall necessarily be exposed to rain and consequent leaching, this latter being an important consideration where the rainfall is considerable. The ore is piled on a layer of about 12 in. of cordwood. each pile requiring some eight cords of wood. The ore falls from both sides of the cars as they are moved along the bridges, and it is so uniformly distributed as to obviate any necessity for shovelling, excepting for the levelling off when the pile is being completed. The period ordinarily occupied in burning these piles of ore is about three weeks.

The bricks of fines are roasted with the screened ores. The process of making the fines into bricks is as simple as that of ordinary brick-making. The plant for this purpose consists of two one-horse power pug mills and a specially constructed drying floor, so arranged as to equalize the heating over the whole floor space. The building housing the former is 60 by 30 ft. and that covering the latter 140 by 30 ft. The pug mills are such as are commonly used in brick-making. The drying floor is bottom-heated. It is fired from both ends, with flues of red brick tiling between each fire box and two separate stacks (one for each set of heating furnaces) the flues, which are covered with clay and rolled, forming the drying floor. This has proved a practical and very economical mode of drying, the capacity of this plant being 8,000 bricks, equal to 28 tons of ore per day.

When the fines are trammed from the receiving bins they are dumped into the pit of one of the pug mills where enough water is added to make them into a plastic mass for moulding, the fine ore being sufficiently adhesive without the addition of any binding material. The moulding is done by hand in the ordinary manner, and the bricks are then placed on the drying floor. After they are dry, which is within 24 hours, they are wheeled out to the near-by roast-heaps in which they are piled and covered with screened ore,



Tyee Copper Co's Smelting Works at Ladysmith, Vancouver Island, B. C.

requiring no different treatment in burning to that given the other ore in the piles. The bricks after burning are hard and porous and are particularly suitable for smelting in the blast furnace, the oxidation of the zinc, copper and iron in the ore being remarkably complete, average samples of large piles of burnt bricks giving 1.5 to 2.5 per cent sulphur (as sulphides), as against 7 per cent in the ordinary burnt ore. This process does away entirely with any necessity that might otherwise exist for building and operating mechanical roasting furnaces and the subsequent briquetting of the roasted material. The roasted bricks are also an improvement on the ordinary briquettes, which at best are tender and very liable to make fines in the furnace, thus retarding its work. The bricks, on the other hand, stand rough handling and usage and are a valuable addition to the furnace charge of ordinary burnt ore.

Roast Yard at Tyee Copper Co's smelter, showing Permanent Trestles and Burning Ore Piles.

The roasted ore is shovelled into 2¼-ton ore cars standing on tracks in the cuttings between the ore piles. The tops of the cars are on the same level as that of the floor of the ore beds. As half of each pile can be shovelled to the nearest cars, the distance it has to be thus moved is proportionately lessened. Horses draw the ore cars two at a time along a level track to the burnt ore bins, which are distant about 1,500 ft. The loaded cars are run on a trestle over the bins, situated just behind the smelter building. There are 18 of these ore bins, these having a total capacity of 800 tons. They are constructed with central bottom-discharge gates, emptying into charging cars which run on rails over the scales to the charging floor of the furnace.

The ore from the Tyee mine has proved to be a comparatively free-burning ore and but little trouble has been experienced by its cintering in the roast heaps. As already stated, the average percentage of sulphur in the burnt ore is about 7 per cent, this being exclusive of the sulphur contained in the barium sulphate, which is not oxidzed in the process of roasting. A general average analysis of the screened burnt ore has already been given.

The visiting smelting men particularly were much interested in the methods, novel to them, of handling the ore fines and the making and burning of the bricks into which it is made. The roasted product also had close attention; while the movable bridge, with its especial suitability and economic working, was favourably commented on as well.

The sampling mill was found to be equipped with a complete sampling plant, including Snyder automatic samplers, crushers, screens, rolls and grinders with

a novel and effective contrivance for dividing the final ground sample.

The hot blast system, designed by Mr. Kiddie and only lately introduced, was carefully examined. In the operation of this system, which is based upon the principle of long travel of the air at comparatively low temperature, as against the short travel at high temperature in the ordinary hot-blast stove system, the waste heat of the blast furnace is utilised in heating the air blast. At the time of the visit Mr. Kiddie's system had only been a few days in practical use, following earlier experiments on a small scale, but it had already demonstrated its effectiveness, the visitors having been informed that the advantages gained included a substantial reduction in the quantity of coke used, an increase in the proportion of raw ore charge in the smelting, and a general betterment of conditions in the blast furnace. Further, a cleaner slag was being produced than when cold air blast and more burnt ore were being used. Several improvements in details of the furnace fittings were also noted.

The water-jacketted furnace is 42 by 120 in. at the tuyeres, of which there are 14 of about 6 in. diameter. There are two water-jacketted fore-hearths. The slag is granulated by water. A brick dust flue, 8 ft. by 11 ft by 165 ft. long leads to an iron smoke stack 7 ft. diameter and 90 ft. high. The engine and boiler-house is 60 ft. distant from the smelter building. An 80-h.p. return tubular boiler supplies steam to a 14 by 36-in. Reynolds-Corliss engine which drives a No. 7 Connersville blower and, by means of a rope drive, operates the matte crushers and elevators in the smelter. A separate 17-h.p. engine runs a 200-light dynamo for electric lighting the works and offices.

The inspection of the works having been concluded, an adjournment was made to the grounds adjoining the manager's house, where the visitors were introduced to Mrs. Kiddie. Here, in a gaily decorated marquee on the lawn, a similar bountiful luncheon to that provided for the mine contingent, was served. The keen appetites of the numerous guests having been satisfied, Mr. Kiddie proposed the health of the King and President Roosevelt, speaking in this connection with feeling of the loss of ex-Secretary Hay, whose death was deeply felt by the British as well as by the Americans. Capt. Hunt responded in a felicitious and well-received speech. The Mayor of Ladysmith, Mr. J. W. Coburn, then extended a civic welcome to the visitors, expressing the hope that the trip of the party of distinguished mining men might not be without benefit both to themselves and the sections they visit. Of Ladysmith he spoke hopefully. Col. Rowe next sang "Ten Million Miles Away," and Major Leydecker proposed a toast to the ladies. Col. E. G. Prior spoke eloquently of American and Canadian institutions, making reference to the fact that there was good feeling between Canada and the United States. Speeches were also made by Colonel Rowe, Dr. Struthers and W. F. Robertson, provincial mineralogist, the last-mentioned speaking with confidence of the future of the mining industry in British Columbia.

After the health of Mr. Kiddie, and success to the Tyee Copper Co., had been drunk, the gathering dispersed. Later afternoon tea was served, and then the return trip to Victoria was begun. At Somenos the visitors to the mine were taken on the train, and a quick run was then made to Victoria. At the railway station hearty cheers were given in acknowledgment of the generous hospitality of the Tyee Copper Co., and the kind courtesy and attention of Mr. Livingston and the mine and smelter officials.

THE DEUTSCHMAN CAVE, NEAR GLACIER.

On Wednesday morning, July 5, the business session of the Institute was resumed. This was opened by a very interesting address by Mr. W. S. Ayres, of Banff, Alberta, on the Deutschman cave, at Ross Peak, near Glacier, and about 10 miles on the British Columbian side of the boundary line between this province and Alberta. A preliminary examination of this cave was made five weeks previously for the Dominion government by Mr. Ayres, who took a number of photographs, both of the cave and the neighbouring mountains, canyons, and creeks. The address was illustrated by limelight views from some of the photographs, and an excellent idea of the physical conformation of the locality, and of the wild beauty of the scenery was thereby conveyed. Mr. Ayres' examination was made in company with Mr. Chas. H. Deutschman, the discoverer of the cave.

In the lengthy report made to the government, Mr. Ayres described the ascent to the cave as an arduous climb along a steep mountain side, over rock, snowslides, and through a tangle of black alders. The ascent is 1,900 ft. above Ross Peak water tank, and 8,000 ft. distant from the railway. The report continues:—

"Pools of water, more or less filled with ice, were encountered, which greatly impeded our progress, and finally a very deep one at a distance of 237 ft. from the surface barred further progress until a raft could be prepared. Retracing our steps to the surface we sought an entrance in the canyon by means of a rope. The passage was about 70 ft. below the natural surface and about 100 ft. above the bottom of the canyon was very small and blocked with ice. I have designated this opening as 'Entrance No. 3.' Here, by crawling on hands and knees and then descending a steep narrow water grove for about 50 ft., the brink of a very large cavern was reached that was estimated to be about 256 ft. deep, but its length and breadth, owing to their extent and the insufficiency of the lights at hand, were inestimable. It was observable that several openings led off from this great cavern. The plunge and roar of the great waterfalls somewhere down in the depths of the cavern reverberated in every inch of space and produced in the listener sensations so weird that those who have not elsewhere met its counterpart are at first startled.

"No further attempt was made at this time to explore the cave at this entrance, for the reason that the 300 ft. of rope sent by Mr. Ford, resident engineer of the C. P. R., for our use had not yet been brought up from the water tank. On the following day another obstacle presented itself. The rapidly melting

snow formed a sudden rush of water down the mountain side and into the openings, which made it not only inaccessible for the time being, but proved it to be dangerous to enter for any extended explorations until the snow had practically disappeared.

"On the afternoon of May 31 and the forenoon of June 1, a raft and additional ladders were constructed to cross over the large pool that impeded progress on May 30 in 'Entrance No. 1'. While we were eating our noon meal on the 31st, Cougar creek overflowed into the entrance. We made the attempt to descend, but were drenched with water and our lights were put out. We constructed a dam to prevent this as far as possible, and at 6 a.m. on June 2 we again descended into the cave at this entrance, and found at a distance of 331 ft. from the surface a large chamber 50 ft. wide by 60 ft. in length. A large portion of the length was inaccessible owing to Cougar creek, which flows across it and had accumulated ice. We named this chamber 'The Auditorium'.

"At a point in the entrance just as we emerged from 'The Auditorium' a branch passage was found, which again joins the main entrance about 100 ft. from the surface. This branch passage is shown in photograph No. 2 by the dark spot in the exteme upper left hand corner of the picture. The curved path at the extreme lower right corner is the main entrance. Another branch passage was found to connect this entrance with the surface. A diligent search of this part of the cave disclosed no other accessible opening.

" 'The Auditorium' is the only place thus far discovered where any lime deposit is found on the walls. This beautiful curve sweeps around to the right and behind the overhanging light coloured rock at the upper right corner of the picture. Its lace-like drapery makes it wonderfully beautiful

"Photograph No. 4 is a typical illustration of this entrance, showing how fantastically the walls have been carved by the torrents of snow water that have rushed through it for centuries. At the bottom and near the centre of the picture is shown one of the poles of a ladder that leads down this passage, which is made up of a succession of rounded cistern-like cavities formed by the swirl and plunge of water. This passage is from 4 to 10 ft. wide, by from 10 to 30 ft. high.

"The falls, designated on the map as 'Lower Goat Falls,' were visited, with the hope than an entrance might be effected to the large cavern by the same passage through which the water from the falls enters, but it was practically filled with water and ice. The falls consist of two vertical drops; the upper one is about 30 ft. and the lower one 50 ft. A large amount of water is delivered into the cave from these falls, the place of entry being immediately at its foot. It is called 'Entrance No. 4.'

"No other openings were discovered by which access might be had to the large cavern, and we were barred entering it by those openings already described, and. for the reasons given, until such time as the spring floods shall have fully subsided.

"The rocks in which the cave occurs are of very hard crystalline limestone dipping about 30 degrees to the east. In 'Entrance No. 1' these beds are very thick, and are made up of alternate bands of white mottled and grey marble. Some of the bands are very highly impregnated with fine sharp sand, so much so, in fact, that excellent whetstones can be made from them.

"The cave has undoubtedly been formed from water erosion. The stream which formed it, Cougar creek, which is entirely made up of glacier and snow water, was found above the cave to be free from any lime-salts. Its capacity, therefore, to dissolve lime rock when brought in contact with it is at its maximum. The fine grains of sharp sand loosened from the lime rock and caught in the swift current of the small stream that at first found its way through a shrinkage crack of some particular bed of limestone, have undoubtedly given the water an uncommon erosive power, which through the countless years of the cave's history has enabled that mountain torrent to carve out a mammoth channel in solid marble.

"The absence of all stalactites and stalagmites, such as are usually found in caves, and the presence of curiously carved marble walls, wonderfully varied in fantastic shapes and sombre colouring, suddenly makes one realise that he is far removed from all things familiar.

"As to the extent of the cave, the probable outlet from the cave is about one half mile south of 'Entrance No. 4' and 'Upper Goat 'and 'Douglas Falls,' and the section is most probably a labyrinth of underground waterways.

"The one half mile between 'Lower Goat Falls' and the supposed outlet should be the largest part of the cave by reason of accumulated waters.

"There may exist many lesser caves farther north on the strike of this formation..

"No evidence whatever was discovered that any portion of the cave had ever been used as a habitation by any human beings, such as Indians, or by any wild animals, such as bears or wolves.

"This cave is situated on the west slope of the Selkirks in British Columbia, at the headwaters of Cougar creek, north about two miles from Ross Peak water tank on the C. P. R., and west two and one half miles from the Glacier station. It was discovered October 22, 1904, by Charles H. Deutschman, whose name it bears.

"Mount Sir Donald and the great Glacier are in plain view looking east from the cave, as is shown by photograph No. 5. In fact they can be seen from here to a far better advantage than from the Glacier House.

"Looking in the opposite direction, due west, the glacier forming Cougar creek is in plain view. We named it 'Grizzly Glacier,' because a grizzly bear only a few weeks ago came down over it on his way westward and disputed with Mr. Deutschman his right to invade the territory.

"Following up the Cougar creek towards this glacier for a mile and a half from the cave through a narrow valley with high mountains on either side, we came upon two little lakes, twins, covered with a spot-

less counterpane of snow, and fed by the glacier itself.

"On turning around to retrace our steps to the cave a view of Mount Sir Donald and the Great Glacier greeted our eyes that can never be forgotten.

"As we neared the cave again we came upon a natural bridge under which the Cougar creek flows for a distance of 350 ft. The bridge is called 'Cougar Bridge' on the map. Immediately north of this bridge are two cascades, which start several hundred feet up the side of Cougar mountain and descend with many slides and leaps and join Cougar creek just below the bridge. These cascades have been named 'Whistler Falls' because of the great number of whistlers, hoary marmots, that have their burrows in the neighbourhood.

"Passing down Cougar creek 100 ft. and turning back to look at the end of the bridge, a beautiful scene meets the eye. The opening in the rocks out of which the water quietly and mysteriously flows, the snow-covered banks and the falls in the foreground make this a very attractive spot.

"Another 100 ft. further down the stream brought us to a beautiful little fall immediately opposite 'Entrance No. 1' of the cave. Cougar creek, even now, during very high water, divides as it comes over the falls: a part of it flowing over the overhanging rocks at the right in the picture, enters the cave at 'Entrance No. 1.'

"From 'Entrance No. 1' down Cougar creek to the west end of the second natural bridge, is to be found a rare specimen of Nature's handiwork. It is a water channel cut into solid rock, with many round potholes in the channel and along the sides. For the first 160 ft. the descent is very moderate, but the next 150 ft. it descends on the dip of the strata, which is 30 degrees to the east. Through a series of large and deep potholes, joined by openings through their sides, the water plunges, whirls and roars until lost under the west end of the second natural bridge. The channel has been called 'The Flume,' owing to its resemblance to the flume of a mill.

"The second natural bridge has been named the 'Mill Bridge,' because immediately where the water enters under the bridge there is a roaring sound of a restless force such as is heard at many water-wheels. The length of this bridge is 243 ft.

"At the west end of the bridge, Cougar creek passes into a cavern about 170 ft. deep, which continues for a distance of 234 ft., where it abruptly ends, and Cougar creek enters the cave. It is called 'The Canyon' on the map.

"On the surface immediately to the east of this canyon are the beautiful waterfalls which I have named 'Bear Falls,' 'Upper Goat Falls' and 'Douglas Falls,' the last in honour of Mr. H. Douglas, superintendent of the Canadian National Park.

"From a point about 1,000 ft. south of the cave and along Cougar creek a very interesting view meets the eye. The falls in the upper part of the picture are 'Lower Goat Falls.' At their foot is 'Entrance No. 4' to the cave, through which all the water from the falls at once disappears.

"The trees forming the forest about the cave are nearly all balsam firs, which create a spicy fragrant atmosphere, peculiarly their own. They range in age from 150 to 250 years, are tall, and are perfect specimens of this attractive tree."

Mr. Ayres stated that it is his intention to revisit the cave in August, when the water will be lower, for the purpose of making a more extended examination.

The following paper on

AN IMPROVEMENT IN MINE MAPS,

by Mr. D. W. Brunton, of Denver, Colorado, was read by that gentleman:—

"The maps of our large mines are usually prepared with the greatest care, and it is somewhat singular that, in comparison with the great amount of time and money spent in surveying and platting, so little actual use is made of them. Almost the only purpose for which a completed survey-map is afterwards consulted, is the determination of the relative positions of the different workings to each other, and to the boundary lines of the property.

"After the completion of such a map of the survey, it should be made the beginning of another, and in most cases a far more important undertaking, namely, its utilization as a starting point for a complete inventory of the company's underground possessions. The ordinary mine-survey map, being nothing but a record of what has been done, is, in one sense, only ancient history. To increase its value, such additions should be made as will render it a complete statement of the amount and value of ore in sight at any particular time, and a guide for future developments. Comparatively little extra labour is involved in this undertaking, since the larger and more expensive part of the work has already been completed when the mine has been surveyed and mapped. The necessary additions consist in working out, and platting on the maps, the geology of the mine as exposed in the workings, in such a manner that the geological survey may be of daily use in the development and operation of the mine.

"The first step towards the production of a geological map consists in tracing individual level-sheets from the general or composite map. The area to be included, outside of the property in question, will depend very much on local conditions; but for geological, legal and commercial reasons, it should be extended as far as reasonably practicable. The scale to be adopted likewise depends on local conditions and individual preference; but experience has shown 40 ft. to the inch to be a very convenient scale. Where the area to be included would necessitate a map of more than 30 in. wide by 36 in. long it is better to divide it into different sections, the maps of which can then often be made somewhat smaller, say 24 by 30 in., which is a very convenient size.

"The individual level-sheets should be very carefully made, so as to register perfectly, and should be perforated (preferably on the left-hand side) to pass over three pairs of arch files, secured to the left-hand side of a very thin panelled frame, about 1 in. larger all round than the maps, somewhat after the

manner of an arch-file bill holder. The vertical stems on the front of the files hold the individual level-sheets in position so that they register perfectly with each other, and the swinging hooks at the top permit the removal of any sheet for additions or corrections. To keep the sheets from curling, a heavy past-board cover should be fitted over the top, and instead of perforating it for the front uprights, it will be found better to cut longitudinal slots to take both front and back uprights, so that the cover can be readily lifted off whenever the sheets are to be used.

"Where a district of considerable area has to be covered and a large number of section-hooks are required, they are most conveniently kept in a horizontal position in a case provided with runners, the same as drawers, and, in order to economise space, special arches 1.5 in. lower than the regular pattern can be readily obtained from the factory.

"After the individual sheet-maps are traced, the next step is to transfer them by means of carbon paper into pocket note-books. Any size may be adopted for this work; but in practice it is found that a large book, say 8 by 10 in., permitting comparisons over a considerable area, is most convenient. In some cases, where the geology is reasonably simple, a convenient plan is to take very light-coloured blue-prints of the individual level-sheets directly into the mine. These can be folded into a convenient size for carrying in the pocket, and, unless the geology is extraordinarily complicated, will answer every purpose. In taking the geology of different levels the greatest care must be taken to record the facts as they occur in the ground, without bias or favour for or against any previously adopted theory. In old workings the openings must be examined with the greatest care, in order to determine exactly the boundaries of the ore-body and the strike and dip of the spurs and intersecting veins, as well as of all faults, slips, water-courses, etc.

"After the geological records have been thus brought up to date, the geology of new workings is very much more easily determined. In fact, it will usually be found that the foreman, shift-bosses, and even the common miners will take such an interest in the work that every change of rock or ore-values, and every slip or fault, will be pointed out to the geologist by the men, instead of his having to hunt for them, as he had to do in the older workings.

"It has always been found that, when the work is recorded in exact accordance with observed facts, the theories will take care of themselves, and little or no difficulty will be experienced in interpreting the facts when vertical sections are made from the horizontal sheets. These are to be platted directly from the horizontal level-sheets, and, if the work has been carefully and correctly done, the result will be a set of vertical geological sections of the greatest value, not only in checking up the work on the horizontal sections, but also in furnishing the best possible basis for measuring the rate of development and ore-extraction, as well as determining at any time the amount and value of ore in sight.

"Both horiontal and vertical sections may be used for the recording of samples, the better plan being to encumber the map only with the number of the sample; the description of the ore, the width sampled, etc., together with the assays, being entered in a separate note-book.

"The entire system will be readily understood upon a study of the accompanying illustrations,* which, as engraved, differ from the originals in three respects: (1) They have been reduced in scale; (2) They are bound in place, so that the several sheets are not removable as they would be in practice; and (3) The colours which are most convenient and effective in practice are here replaced with conventional *brochure* in black.

"I would here say, that, in my judgment, every company operating large mines would find it advantageout to employ, as a separate official, a competent mining geologist, whose duty it should be to follow continuously all workings and surveys, and note with precision those indications which hard-worked superintendents, firemen and surveyors, however intelligent, might easily overlook or fail to record. The proper man for this most important work is a man who has nothing else to do, and who will do this one thing with industry, enthusiasm and technical knowledge.

"Description and Discussion of Illustrated Drawings.—These drawings represent an imaginary mine, presenting the ordinary conditions of practice.

"Fig 1 shows an ordinary mine-map, sometimes known as a composite map. This is useful only for showing the relations of the workings to each other and the boundary-lines of the property. It does not form a record of the ore-bodies encountered, or the disturbances to which they may have been subjected, nor has it any great value as a guide in further developments. In practice, this map would be tinted with a different colour for each level. In the engraving, these colours are omitted, since the different tints, as well as the county road on the surface, can be easily distinguished without such aid. It is evident upon an inspection of the map that, since the levels at successively increasing depths (40 ft. vertically apart) are situated correspondingly further to the east, while they have a general north-and-south direction the ore-deposit strikes N.-S., and dips E. But this is all that the map can tell us concerning it.

"Figs. 2, 3, 4, 5, 6 and 7 are the individual level-sheet geological maps. Each of these level-sheets is traced directly from the ordinary survey-map, after which the geology as exposed in the openings and determined by careful examination is platted on the map, care being taken to note the strike and dip of all faults, spurs, and intersecting veins. Tracing-cloth is always used for these maps both for speed and convenience in tracing from the working survey-map, and for the further reason that when the level-sheets are in the holder at least three sets of levels can always be seen through the transparent cloth, thereby af-

*These can not conveniently be reproduced here, but will be obtainable later upon application to the secretary of the American Institute of Mining Engineers, 99, John Street, New York, N.Y., U.S.A.

fording an opportunity to determine the dip and trend of the ore-shoots and consequently to project new workings to much greater advantage than if observations were limited to a single sheet.

"Fig. 2 (the surface-map) shows the outcrop of the ore-body a little further west than the line of the 40-ft. level in Figs. 1 and 3.

"Figs. 8, 9, 10, 11, 12, 13, 14 are vertical sections showing workings and geology. These sections, taken directly from the horizontal level-sheets, afford a very convenient means of studying the vein-structure and at the same time of keeping a record of the ground stoped during each calendar month.

"In addition to these advantages, the vertical sections afford an almost perfect check on the geology, which is nearly always noted first on the horizontal levels. Any errors that may have crept into the geologist's work, either in observation or interpretation, are sure to be detected when the vertical sections are platted."

A brief discussion followed, in the course of which Dr. Raymond strongly recommended what he termed the enlarged note-book system, and urged the advisability of every important mine employing a professional mining geologist, instead of leaving such matters as those dealt with by Mr. Brunton to a superintendent, probably already overworked and so having no time to attend to them. By such a system as that advocated by Mr. Brunton, the geological, as well as the ordinary mining, records of mines would be carefully preserved in a manner indispensable to the interests concerned and, as well, of enormous value in the event of litigation.

The meeting was then adjourned until 2 p.m., so that the provincial mineral museum might be inspected. Here Mr. Norman Carmichael, manager of the Highland mine, Ainsworth, West Kootenay, had on view a glass model of that mine, the details of which he explained. Mr. W. J. Sutton, whose own extensive and valuable mineral collection had previously been shown to a number of the visitors, supplied much information concerning the chief exhibits in the public museum.

At the afternoon meeting Mr. W. M. Brewer gave an address on "A Reconnaissance of the Coast Line of British Columbia and South-eastern Alaska." This included (1) a generalised description of the coast line with reference to fiords, islands, and its prevailing rugged character: (2) the general distribution of copper ores along the coast—at Howe Sound, Texada Island, Princess Royal Island, Gribbell Island, Prince of Wales Island, the Juneau district, and in the Whitehorse copper belt; and (3) a general description of the country from Skagway to Whitehorse rapids, and with reference to the geology of the neighbourhood of the rapids.

In supporting a vote of thanks to Mr. Brewer, Dr. Raymond made appreciative reference to that gentleman's efforts to bring about the present excursion, and mentioned that Mr. Brewer was no novice at such work, having some years ago been mainly instrumental in inducing the A. I. M. E. to make an excursion to Alabama. He also expressed his pleasure at the prospect of the party having the advantage of Mr. Brewer's extensive knowledge of the coast line along which they would pass *en route* to Whitehorse, to which point they would have his company. Mr. Brewer briefly thanked the meeting. The secretary announced that after the return east of the excursion, letters of acknowledgment of, and thanks for, the hearty welcome and profuse hospitality they had so much enjoyed, would be sent to those who had taken a prominent part in the entertainment of their party. The meeting was then formally declared closed.

The final public gathering took place at Government House, where there was a large gathering of visitors and residents at the garden party and reception given by His Honour Sir Henri Joly de Lotbiniere. Nearly all of the A. I. M. E. excursionists accepted His Honour's invitation, and the function proved a fitting finale to what was freely acknowledged to have been a delightful visit to the beautiful capital of British Columbia. Among the residents who attended were: Hon. A. E. Smith, United States consul; Hon. Capt. Tatlow, minister of finance; Hon. Chas. Wilson, attorney-general; and Hon. F. J. Fulton, provincial secretary. The Hon. Premier and other members of the provincial government were out of town, so could not attend. Numbers of ladies prominent in local society circles were also present to do honour to the visitors from the United States and elsewhere.

During the evening many Victorians boarded the steamer Princess Victoria to say adieu to the excursionists, who left after midnight for Vancouver, to admit of a day's visit to which city before going north a change in the printed itinerary had been made.

AT VANCOUVER.

The following account of the day's proceedings in Vancouver has been taken from the *News-Advertiser* of that city:

Members of the American Institute of Mining Engineers, with their wives and families, who are *en route* to Dawson, after holding their annual convention at Victoria, were the guests of Vancouver yesterday. It was intended that the Princess May should bring the excursionists to this city, but at the last moment it was found that owing to other arrangements that boat would not arrive here early enough, so the party came up on the Princess Victoria, which made the regular run from the Capital, arriving here between 8 and 9 o'clock.

The joint reception committee of the City Council, Board of Trade, Tourist Association and Mining Association met the party at the wharf and extended to them the freedom of the city. At 9.30 two prettily decorated cars, which had been provided by the B. C. Electric Railway Co., were boarded, and while some of the members visited industrial establishments, others were taken about the city over the various car routes. The Pacific Coast Lumber Co's saw mill on Coal Harbour was inspected, the Vancouver Engineering Works, and the large warehouses of the wholesale hardware firm of Wood, Vallance & Leggat.

Shortly after noon all the party gathered at the

Hotel Vancouver, where they were met by many of the principal residents of the city and after an informal reception luncheon was served. Some 200 in all were seated at the tables, many ladies being present and a large number of prominent citizens.

For an hour or so strict attention was devoted to the good things provided, after which Mr. Colin F. Jackson, president of the Vancouver branch of the Provincial Mining Association, in assuring the visitors of the hearty welcome of Vancouver, remarked that the coast cities and the mining centres of the Interior regarded this trip of the engineers as a matter of no small importance, and he had little doubt that since the great mining industries had been inspected the visitors would see the reason for the unbounded enthusiasm the residents of Britsh Columbia felt in their province and its resources. It was a common fact that the desire to get rich quickly by means not altogether *bona fide* resulted in disappointment and disaster and engendered a feeling of distrust on the part of outsiders. Mr. Jackson was confident that that period in British Columbia had now been passed, and that the great intrinsic value of the mineral wealth of the province ensured its future prosperity. It possessed unique advantages in the way of transportation facilities both by rail and water, and was also fortunate in having legislation which afforded security to investors. All these strengthened the conviction of the people here that the province was on the eve of a wave of prosperity which would see no diminution. He trusted the visit would result in the engineers becoming possessed of the same convictions and also become impressed with the solidarity of our country. He wished the party a pleasant trip to Dawson, for which city they would set out that evening.

Toasts to the King and the President of the United States were proposed by Mr. Jackson, and heartily drunk, "God Save the King" being sung in one instance and the "Star Spangled Banner" in the other.

His Worship Mayor Buscombe proposed the toast to the American Institute of Mining Engineers. He said it was a very pleasant duty to officially express his gratification in extending to the visitors the hand of good fellowship. No doubt they had recognized that Vancouver was the premier city of the province, commercially and industrially, and he thought the trip of the engineers would mark an epoch in the history of mineral development in British Columbia. The mines had not received that amount of development which, because of their wealth, they were justly entitled to, but the vast stores of minerals in the mountains and beneath the valleys of the province were only awaiting capital to bring them forth, and he felt sure this visit would hasten the happy day when the cities here would profit by the further development of these mineral properties.

Mr. R. P. McLennan here extended the invitation of the City of Dawson. He returned from the North only a few days before, and while in the Yukon's capital was chairman of the first meeting held to arrange for the entertainment of the engineers. In the course of his remarks Mr. McLennan observed that ever since Sunday school days it had no doubt been the dream of all to enter the golden city. Now, the engineers and their families were about to have their dreams realized. (Laughter). In the event of some of his hearers not being aware of the fact, he reminded them that the Good Book says the streets shall be paved with gold. This was the case with Dawson, gravel having been brought in from the creeks for the roads, and it was an easy matter to get "colours" at any time. Further, it said there was to be no night there. Neither there was in Dawson just now, and in proof of this, one of the list of attractions was a baseball match to begin at 12 p.m. He could not remember any mention of baseball in the Golden City spoken of in the Book he had once read. Of the $120,000,000 gold produced in the Yukon during the last eight years, Mr. McLennan said this was from merely a scratching of the ground and from a few potholes. The country had hardly been touched. He was sure the trip all through the north would be greatly enjoyed, especially the stopover at Whitehorse where great copper deposits were being opened up.

Dr. Raymond responded in a happy vein. He said the members of their party would never forget the shining skies, the smiling air, the sublime loveliness, the natural wealth and the illimitable hospitality of British Columbia. He pointed out that the institute in coming to this province was not going away from home, as its memberhsip and domain extended from Canada through the United States to Mexico, and anywhere in these three countries its home was. At one time the conferedation of the United States and Canada under one flag was talked of, but that is now dead. He had a better thing to suggest, that of the union of the two countries under two flags. (Applause). The only objection he had to make to such trips as the present was that they could not visit everywhere. It was the everlasting parting from good friends which brought the blood out of young hearts. In describing the present parting he told of a visit to Yellowstone Park, when in the early grey of the coming dawn he had gone down to the river's brink, and had seen myriads of birds rising from the ground, and the unison of their fluttering wings sounded like the tearing of some great sheet. If Vancouver people heard such a sound as they were leaving, it would be the wrenching of their hearts, as they were loth to part. (Laughter). In conclusion, he referred to the great achievements of the institute, how it had conquered a continent rich in great wealth. He likened it to the sleeping beauty, who, after ages, had been awakened by the coming of the engineers, and had risen in her splendour of beauty and richness of dowry. He was glad to have been born just when he was, to have assisted in the development of such a country.

After the luncheon, the party was taken for a drive around Stanley park, which is one of the most beautiful and attractive resorts on the Pacific coast of Canada. The start for the north was made about 10 o'clock, p.m., before which time the excursionists to the number of about 75 had been comfortably accommodated on the C. P. R. steamer Princess May.

IN YUKON TERRITORY.

The MINING RECORD is unable to publish this month an account of the visit to the Yukon, for this issue will be printed before the return of the party from the north. The Vancouver *Province* of 11th inst. stated that:

Escorted by a committee of Dawson citizens who repaired to Whitehorse to meet them, the members of the American Institute of Mining Engineers and the ladies accompanying them will reach the metropolis of the Yukon to-morrow on a special steamer of the river division of the White Pass. Dawson will turn out *en masse* and give them a reception such as was never before in the history of the northern city tendered to any visiting body.

Three days will be spent by the engineers at Dawson, and during that time they will visit many of the nearby creeks and see for themselves how wealth is taken from the ground in the Yukon; they will judge of the value of the country as a gold-producing district by what they see of its development, and doubtless will carry away with them well formed and generous ideas of the future possibilities of the great Klondike in respect to its placer, quartz and gold-dredging areas.

The Dominion government has provided $5,000 and the territorial council $2,500 to be expended in the entertainment of the visiting engineers, and Dawsonites do not intend to quit showing the strangers the resources of their district till the last dollar has been spent. Particular attention will be paid to the entertainment of the ladies of the party while the men are absent touring the creeks, and the whole affair will be rounded off with a sumptuous banquet.

In its desire to impress the identity of Dawson and the Klondike indelibly on the memory of the engineers, their wives, sons and daughters, the citizens of Dawson have prepared, and will present each member of the party with a handsome gold-pan, flanked with pick and shovel, as a souvenir of the trip. The miniature gold-pan will be made of gold taken from the Klondike creeks, and will make the handsomest souvenir imaginable.

Altogether Dawsonites are determined that the visit of the mining engineers shall be an occasion long to be remembered in the community, both in its features of hospitality and dissemination of information concerning the Yukon's resources. Dawson hopes to reap material benefit through imparting this information to the engineers who represent in an advisory capacity many million dollars seeking investment in mining ventures.

The Dominion government has appropriated $15,000 for the purpose of making experiments with the electric process of smelting ores and manufacturing steels. The experiments will take place at the plant of the Consolidated Lake Superior Company at Ottawa, which concern will supply 400 h.p. for four months without charge.

SIMILKAMEEN.

(Special Correspondence.)

Princeton, June 27.

SINCE the partial close down last winter, caused by scarcity of water through the freezing of its flume, the Daly Reduction Co's mill at Hedley, has been dropping 40 stamps steadily, crushing ores from the Nickel Plate and Sunnyside mines. Concentrates have been made, these consisting mainly of fine particles of arsenical iron, a little chalcopyrite, and some free gold which evidently escapes the plates. On an average about $1,000 a day is saved on the plates. From near the electric tram on which the ore is hauled to the mill, a tunnel has been driven on the Sunnyside vein and at 200 ft. from the portal the hanging wall was recently reached. This vein is between 60 and 70 ft. wide, but lies rather flat at its outcrop, hence the necessity for so long a tunnel to cut it. The Sunnyside ore is less silicious than that of the Nickel Plate and carries in addition to arsenical and iron pyrites, a little yellow copper. The matrix is of a limy character. The general grade of the ore is reported to be quite as good as that of the Nickel Plate.

It has been announced by the management that work will shortly be commenced on the Kingston and Horsefly properties, in Hedley camp, but as yet no preparations are in evidence.

A little work is being done on the Golden Zone, owned by Marks, Brodhagen and Murphy, on a fine showing of arsenical iron carrying good values in gold.

A company, composed largely of local men, has been formed to develop the Pollock group, on Henry creek, and a limited amount of treasury stock is being sold for development purposes. On this group occur several quartz veins, assaying well in gold, which can be developed almost entirely by tunnels. Considerable work has been done on the property with good results, and the company intends building a 5 or 10-stamp mill as soon as sufficient ore can be opened up to justify its erection. There is an excellent supply of wood and water, and with good management this group should have a prosperous future.

The most important mining deal made in the upper Similkameen for some years was the bonding some months ago of a group of properties on Copper mountain, surrounding the Sunset, and the securing of a controlling interest in that property by the British Columbia Copper Co. This group consists of a number of the best mineral claims on Copper mountain, including the Princess May, Sunrise, Helen H. Gardner, Copper Farm and Red Eagle, all of which have good surface showings. The company's foreman, Mr. D. Morrison, formerly of the Emma mine, in Summit camp, Boundary District, has under him about 15 men, who are running drifts from the old Sunset shaft in three directions at the 150-ft. level. Some good ore is being hoisted, this showing bornite, and yellow and native copper.

Last May the Granby Co. took options on a group of claims, including the Ada B., on which a large body of ore has been exposed, but after an examination by Mr. W. Yolen Williams, the company's consulting engineer, no payments were made, the supposition being that the proposition was not of the magnitude desired. For a company satisfied with ore shoots 60 to 70 ft. wide and traceable for 700 ft. or more, the Ada B. will prove attractive, as the ore is of good grade.

In Voigt's camp, on the east end of Copper mountain, 15 or 20 men are employed mainly in making surface cuts on extensive bodies of low-grade copper-gold ore. The Great Northern Railway Co. is running a location line from Similkameen river up Wolf creek and it is probable it will build a branch 12 miles up this creek, to give transportation to this camp.

No development work of importance is being done on Kennedy mountain, but on Friday creek, a few miles higher up the Similkameen on the same side, the Columbia Copper Mining Co. is working three men on the Gladstone. Mr. E. P. Wheeler of Conconully, Wash., is president and Mr. J. L. Spath secretary of this newly-organized company. Considerable work has been done on the Gladstone on a showing of bornite occurring in trap rock and syenite. The lead is from 5 to 7 ft. wide and the ore averages 5 or 6 per cent copper and several dollars in gold and silver. Picked samples assay up to 60 per cent in copper.

On Roche river Pouwels and Bonnevier are working on the Red Star. On this claim a vein 6 in. to 6 ft. wide, carrying copper pyrites and black oxides of copper, is being prospected by tunnelling. Assays run as high as 27 per cent copper, and $4.00 in gold and silver. The general grade of the ore will approximate $35 to $40 a ton.

Up the Tulameen, at Boulder creek, a tunnel on the Cousin Jack group, which will involve a large outlay, is being planned by Messrs. Gallinger and Rogers, of the Boulder Mining Co. It is expected the contract for this work will shortly be let. Last year Professor Lakes examined this property and reported to the shareholders that their claims showed a very large body of ore averaging $6.00 to the ton, with plenty of wood and water for mining and milling purposes. The vein is of white quartz carrying iron pyrites and a little galena. The values are almost entirely in gold. Some portions of the vein run $25 to $35 a ton.

A number of men are at work between Otter flat and Bear creek, building a 10-mile wagon road, which will give access to the St. Lawrence and St. George properties, owned by Messrs. W. H. Armstrong, C. F. Law, and other Vancouver men. Not much development work has yet been done on the property, but a lead containing 5 to 6 ft. of ore, a smelter test of which gave values of about $70 in gold, silver and copper, has been sunk on to a depth of 60 ft., and has been traced by surface cuts a long distance over several claims.. The veins occur between lime and porphyry. Machinery will be brought in soon after the road shall be completed, and development to a greater depth will be proceeded with.

At Princeton the Vermilion Forks Mining & Development Co., under the management of Mr. Ernest Waterman, is planning some important work on its coal property adjoining the town. The coal is being mined from a 200-ft. tunnel running in near the bridge across the Similkameen river. The manager's intention is to sink a shaft from the bench above, which will ventilate the present workings, and from which a 5-ft. seam not at present being mined, can be developed. With the completion of this shaft the company will have exposed seams, aggregating 28 ft. in width, which can be cheaply and expeditiously mined. The coal contains from 48 to 56 per cent. fixed carbon and is of an excellent quality for steam and fuel purposes.

Taken altogether the mining outlook is brighter in the Similkameen than ever before in the history of the district, as the evident intention of Mr. J. J. Hill to penetrate this portion of the province with a line of railway, will doubtless awaken investors to a realisation of the wealth and variety of its natural resources.

FRANKLIN CAMP, NORTH FORK OF KETTLE RIVER.

IN the official report of Mr. S. R. Almond, gold commissioner for the Grand Forks mining division of the Boundary district, occurs the following account of Franklin camp, a most promising section situated up the north fork of Kettle river, 40 to 50 miles above the town of Grand Forks. The information was supplied by Mr. Geo. A. McLeod, one of the most energetic workers in it:—

The Monterey and Manhattan are situated on the western extension of the McKinley ledge. There are numerous cuts and trenches exposing copper-gold ore, the average of an 11-ft. cut being $17.50, consisting of 7 1-2 per cent copper, balance gold and silver.

On the Gloster a tunnel 200 ft. long is being run this fall and winter. The object is to tap the ledge underneath the present shaft, at an estimated depth of 150 ft. The shaft is down 55 ft., in ore all the way, and the bottom is in ore of an average assay value of 13 per cent copper, and $3.50 in gold and silver.

McKinley Mountain.—On the Jumbo an immense iron cap was prospected by open cuts, and large, loose blocks of copper sulphide ore were encountered. The work accomplished was not sufficient to locate the solid formation.

On the McKinley, at an elevation of 3,758 ft., an ore body estimated at 400 ft. wide, occurs at a contact of lime and birds-eye porphyry. The property was heavily covered by fallen timber, but the forest fires this summer got rid of this completely. In the spring a space 40 ft. long by 20 ft. wide was sluiced off by utilizing McKinley creek, and considerable iron and copper sulphide ore exposed. On this exposure an open cut was run across the ore-body, the size of the cut now being 80 ft. in length, 40 ft. wide, and 30 ft. deep; all in ore of an average assay value of 3½ per cent copper and $2.50 in gold and silver.

About 200 ft. easterly along the ledge and about 150

ft. higher another cut 30 ft. long, 20 ft. wide, and with a breast of 25 ft. was made, the ore averaging 4½ per cent copper and $2 gold and silver. A shaft was sunk 10 ft. from the bottom of this cut to determine the dip of the ore-body, and afterwards a tunnel, which is now in 55 ft., was started to cross-cut the ledge at a depth of 125 ft.

In addition, about 50 trenches were made over the hillside, and almost invariably the characteristic iron capping was encountered. Another 8-ft. ledge, parallel, and lower down the hill, was exposed for 600 ft., but no attempt was made to open it up. It contains copper sulphides and lead carbonates in a lime gangue.

A number of substantial buildings have been erected, good trails constructed, and preparations made to ground-sluice a large part of the ore-body this coming spring by damming and fluming the water of McKinley creek.

Eight men are at work under the direction of Mr. A. D. McPhee. Machinery will be installed in the spring, should the Government assist in completing the wagon road the remaining seven miles to the camp.

"ALL HAIL TO THE WESTWARD TRAIL."

THE Executive of the Lewis and Clark Exposition, now being held at Portland, Oregon, U.S.A., offered a prize of $100 for the best poem on "The Trail." Of the large number submitted in the competition, that of a lady was adjudged the best. The General Press Bureau of the Exposition sent out the following comment:

"Mrs. Lindsley's poem is deemed peculiarly fitting for the purpose, as it brings out in strong, snappy language the lilt and swing of the rider 'hitting the trail' to the westward, shows forth the development brought about by the pioneers, and gives due honour to Lewis and Clark." The winning poem follows:

THE TRAIL.

The call comes, strong and insistent,
Out of the West, Oh, hark!
"Follow through hail and sun the trail
Blazed by Lewis and Clark!"

On with the blanket and saddle,
Ride like the devil possessed,
Swift on the way by night and day,
Hit the trail to the West!

Sting of the wind in our faces,
Crunching of hoofs on sand;
Whate'er betide, pause not, but ride
Straight to the promised land.

Whiteness of sails on the ocean,
Gleaming of gold in the hills,
Glory of grain on the harvest wain,
Curling of smoke from the mills.

Off with the saddle and blanket,
Kindle our hearthfires' spark;
Here's "All Hail to the Westward Trail
Blazed by Lewis and Clark!"

MONTHLY AVERAGE PRICES OF METALS.

(From The Engineering and Mining Journal, New York.)

SILVER.

Month.	New York		London.	
	1904	1905	1904	1905
January	57 055	60.690	26.423	27.930
February	57.592	61 023	26.665	28.047
March	56 741	58.046	26.164	26.794
April	54 202	56.000	24.974	26.108
May	55.430	57.832	25 678	26.664
June	55 675	58.428	25 644	26.910
July	58.005	.....	26.760	.....
August	57.806	.....	26.591	.....
September	57.120	.....	26 349	.....
October	57.923	.....	26.760	.....
November	58.453	.....	26.952	.....
December	60.563	.....	27.930	.....
Year	57.221	.....	26.390	.....

The New York prices are in cents per fine ounce; the London quotation is in pence per standard ounce, .925 fine.

COPPER IN NEW YORK.

Month.	Electrolytic		Lake.	
	1904	1905	1904	1905
January	12.410	15.008	12 553	15.128
February	12.063	15 011	12.245	15.136
March	12.299	15 125	12.531	15.250
April	12 923	14.920	13 120	15.045
May	12.758	14.627	13.000	14.820
June	12.269	14.673	12.399	14.813
July	12.380	.....	12.505	.....
August	12.343	.....	12.468	.....
September	12.495	.....	12.620	.....
October	12.993	.....	13.118	.....
November	14.284	.....	14.456	.....
December	14.661	.....	14.849	.....
Year	12 823	.....	12.990	.....

Prices are in cents per pound. Electrolytic quotations are for cakes ingots and wire bars, cathodes are usually 0.25c. lower.

COPPER IN LONDON.

Month.	1904	1905	Month.	1904	1905
January	57.500	68.262	July	57.256	.....
February	56.500	67.963	August	56.952	.....
March	57.321	68.174	September	57.645	.....
April	58.247	67.017	October	60.012	.....
May	57.321	64 875	November	65.085	.....
June	56.398	65 881	December	66.384	.....
			Av., year	58.857	.....

Prices are in pounds sterling, per long ton of 2,240 lb., standard copper.

TIN IN NEW YORK.

Month.	1904	1905	Month.	1904	1905
January	28.845	29.325	July	26.573	.....
February	28.087	29.262	August	27 012	.....
March	28.317	29.523	September	27.780	.....
April	28.132	30.525	October	28 596	.....
May	27 718	30 049	November	29.185	.....
June	26.325	30.329	December	29.286	.....
			Av., year	27 986	.....

LEAD IN NEW YORK.

Month.	1904	1905	Month.	1904	1905
January	4.347	4 552	July	4.192	.....
February	4.375	4 450	August	4.111	.....
March	4.475	4 470	September	4.200	.....
April	4.475	4.500	October	4.200	.....
May	4.423	4.500	November	4.200	.....
June	4.496	4.500	December	4.600	.....
			Av., year	4.309	.....

SPELTER.

Month.	New York		St. Louis	
	1904	1905	1904	1905
January	4.863	6.190	4.673	6.032
February	4.916	6.139	4.717	5.989
March	5.057	6.067	4.841	5.917
April	5.219	5.817	5 038	5.667
May	5.031	5.434	4.853	5.284
June	4.760	5.190	4.596	5.040
July	4.873	.....	4.723	.....
August	4.866	.....	4.716	.....
September	5.046	.....	4.896	.....
October	5.181	.....	5.033	.....
November	5.513	.....	5.363	.....
December	5.872	.....	5.720	.....
Year	5.190	.....	4.931	.....

COAL MINING NOTES.

It is reported that Mr. D. C. Corbin, of Spokane, well known in the Kootenay as the builder of the Spokane Falls & Northern railway, and its extensions to Nelson and Rossland, respectively, has obtained an option on some coal lands in the Crow's Nest Pass district. The property is described as being situated north of Michel creek, and consisting of five or six locations upon which sufficient development has been done to show the occurrence on them of coal of excellent quality in large quantity.

The Crow's Nest Pass Coal Co. has prepared for exhibition at the Lewis and Clark Exposition, Portland, Oregon, of block coal 3 by 4 by 7 ft. taken from No. 2 mine, Coal Creek colliery. The company is also exhibiting a sample of about 300 lb. of coke from its Fernie ovens.

Mr. Andrew Bryden, superintendent of the Wellington Colliery Co's Extension mines, on Vancouver Island, has been to the Harrison Hot Springs, to recuperate, having lately been in poor health. The Extension mines are stated to be shipping about 1,200 tons of coal to Ladysmith daily, and the demand promises to shortly increase sufficiently to warrant another shift being worked, which would mean the employment of about 250 more men, and an output of about 2,000 tons per diem.

It is reported from Fernie, where are situated the head offices in British Columbia of the Crow's Nest Pass Coal Co., that an agreement has been entered into providing that the Granby Consolidated Mining, Smelting & Power Co. shall again take all its supply of coke from the C. N. P. Coal Co. The quantity stated to be required by the smelting company is about 300 tons per diem and the term over which the agreement is to extend is one year. For some months the Granby Co. has been obtaining part of its coke from the International Coal & Coke Co's colliery, at Coleman, Alberta.

Prospecting the coal measures on the Diamond Vale Co's property at Quilchena, in the Nicola district, is being actively carried out. A third diamond drill hole is being bored, and when this shall have been completed a fourth bore will be made. This drilling is being done with the object of determining the best available place at which to make a main entry, the intention being to make such choice as shall admit of giving access to as many coal seams as practicable. Mr. W. H. Wall, the mining engineer in charge, is quoted in the provincial press as having stated that there is an aggregate of about 60 ft. of coal in workable thicknesses on the company's property.

The Crow's Nest Pass Coal Co. has shipped from its Coal Creek colliery to Seattle, Washington, by the Great Northern railway, 2,000 tons of steam coal for test purposes on the new steamer Dakota, which will shortly make her maiden trip on the Orient line recently established by the Great Northern Railway Co. It is stated that if this test prove the superiority of the Crow's Nest coal over other available steam fuel, as is confidently expected it will do, arrangements will be entered into for obtaining from Coal Creek regular supplies for this important line of ocean-going steamships, and a large bunker will be erected on the wharves of the Great Northern Co at Seattle Further, the use of this coal by other steamers plying in north-western Pacific waters may be expected, and an important new market be thus developed for the Crow's Nest product.

In connection with the labour trouble at Nanaimo, the struggle between the local branches of the Western Federation of Miners and the United Mine Workers of America, respectively, recently assumed a new phase. The latter declared work at the Western Fuel Co's Northfield No. 4 (or Brechin) mine "unfair" and called out the men. The Western Federation men took the position "that it is absolutely unnecessary to interfere with Brechin, the trouble between the men and the Western Fuel Co. being confined to No. 1 mine," so a secret ballot was taken upon the question of whether work should be continued or not, with the result that 41 voted to continue work as against 7 to stop it. The United Mine Workers claim that few, if any, miners voted, and that the number in favour of work was made up almost altogether of bosses, topmen and boys. No interference had been sought by the U. M. W. with mechanics, fire bosses, timbermen, and those engaged in the important construction work the company is doing, but only with those actually engaged in producing coal. The outcome of the want of unanimity among the men has been that the company has closed the mine and discharged all but a few men who are required to complete some construction. There is no prospect of an early settlement of the difficulties. It has been announced that the Western Federation of Miners has remitted from headquarters $2,000 for division among the miners thrown out of work by this trouble, but many have left the district.

AN IMPROVED PORTABLE TENT.

An improved portable tent has been patented by Mr. F. H. Gotsche, of No. 416, Hoffman avenue, San Francisco, California, illustrations of which appear in an advertisement on another page of this issue. It is claimed that the convenient shape, lightness, and construction of this tent, make it unequalled for easy transportation and absolute shelter, very desirable conditions for campers, prospectors, miners, and others. The tent is also suitable for a play tent for children. It is so constructed that the cover may be readily moved from one end of the frame to the other. A door is therefore entirely dispensed with. In ordinary weather only two pegs are necessary, but when exposed to a strong wind more pegs should be used. The frame, as shown in illustration, is made up of four wooden sections, these being held together by metal couplings. When ready to pitch the tent, the frame is bent into a semicircle, the ends inserted about 6 in. into the ground twice the distance apart as the tent is high, and the cover drawn over it. Another unique feature is that a larger tent can be set immediately over a smaller-sized one without touching any part of the latter, thus leaving a compartment of air about the inner tent; this being an improvement particularly desirable, adding to comfort, especially when used in climates either extremely warm or cold.

THE PREVENTION OF SMOKE.

The complete combustion in the furnace, remarks the London *Mining Journal*, is, of course, the desideratum for steam users, providing the most economical and efficient working of the steam boiler and the abatement of the smoke nuisance. Various kinds of apparatus have been devised for this purpose, some comparatively simple, others more complicated and involving great outlay in their installation. At a demonstration in London on January 20, the Absolute Smoke Abolition Syndicate, Limited, showed what it could do with simple means and at a small expense. The plan is to do for the furnace what the iridium mantle has done for ordinary gas lighting. The idea is not altogether new, and, briefly, consists of a battery of tubes of incandescent material behind the bridge of the boiler. The tubes are in the form of bricks about 10 in. cubes, and they are built up some 3 in. apart. These tubes become incandescent and complete the combustion of the furnace gases, which pass through material at an intense white heat and are consumed. The chief novelty is in the material of which the tubes are made; it is a secret composition capable of withstanding the greatest heat with little deterioration, and lasting some two years; if made of ordinary fire-brick the tubes have been found to crumble in a few weeks. The syndicate uses in connection its patent indestructible fire bars and controllable bridge, by means of which a larger supply of air is brought to the end of the furnace where it is most wanted, resulting in greater combustion and less smoke. The demonstration went to prove all that the syndicate claimed for the apparatus. A Cornish boiler was fired with cheap small coal, and there was little or no smoke, and it would seem, so far as steam boilers are concerned, that the smoke nuisance is in a fair way of being abolished by this process. The appliance involves very small outlay, and can be fixed in a few hours without structural alterations or interference with the fabric of the boiler.

COMPANY MEETINGS AND REPORTS.

RELIANCE GOLD MINING & MILLING CO., LTD.

The Reliance Gold Mining & Milling Co,. Ltd., has passed through the first year of its existence with gratifying results to all concerned, reports the Nelson *Daily News*. The company's property is completely equipped with modern mining and milling machinery and is now in successful operation. Its financial position is excellent and its assets far in excess of all liabilities.

The second annual meeting of shareholders was held at Nelson on June 20. Reports were received from the managing director, Mr. A. H. Kelly, and the consulting engineer, Mr. W. J. Elmendorf, of Spokane. The former was accompanied by the balance sheet, which showed a sound financial position at the date of commencement of milling operations, June 15.

The managing director's report gives an account of the installation of machinery and the gradual completion of the equipment, concluding with: "The whole milling plant has been installed in as economical a manner, and with as much dispatch as the circumstances would permit, and we now have in operation a modern and complete milling and cyanide plant of a capacity of 50 tons a day." The plant has been so constructed as to permit of the doubling of its capacity. The mill and cyanide plants are in separate buildings.

"The mill building contains a Blake crusher and rolls, fed from an ore bin over a grizzly. The ore when crushed is deposited in another ore bin from which it is fed into the 6-ft. Akron Chilian mill, and after having gone over the plates is discharged into the storage tanks, 10 in number. From there the solution and pulp are conveyed by launders to the 12-ft. Hendryx agitator in the cyanide building, where such portion of the gold as is not amalgamated on the plates after leaving the Chilian mill, is electrolytically precipitated upon lead plates.

"The entire plant is lighted by electricity and will be heated by steam from the boiler, housed 30 ft. from the main building.

"The tramway is of the Riblet patent aerial system, built to connect the mouth of No. 2 tunnel with the mill, a distance of 1,700 ft., and is equipped with 8 buckets, which have a combined capacity of 20 tons per hour.

"The ore bins have a capacity of 200 tons at each terminal and the whole has been built in a substantial manner and has been successfully operated." The report closes with a reference to the large ore resources available, and the future operations contemplated by the management.

The report of the consulting engineer goes over in detail the same ground as that of the managing director. Mr. Elmendorf strongly recommends preparations for an increase in the mill capacity at an early date.

Both reports were approved and adopted. The following officers were elected: President and managing director, Mr. A. H. Kelly; vice-president, Mr. J. A. Turner; secretary-treasurer, Mr. R. S. Lennie; additional directors, Messrs. W. P. Tierney, Nelson; R. J. McPhee, Slocan; D. C. Johnson, Spokane; T. A. Noble and D. S. Bissell, Pittsburg.

BOUNDARY IRON WORKS, LTD.

The first general meeting of shareholders in the Boundary Iron Works, Ltd., was held at Grand Forks on June 20, when the following board of directors was elected: Messrs. Chas. Brown, John McKie, Wm. Spier, H. E. Woodland and M. S. Martin.

At a meeting of directors held subsequently, Mr. John McKie was appointed president and treasurer; Mr. H. E. Woodland, vice-president; Mr. E. C. Moe, secretary, and Mr. Chas. Brown managing director.

It was arranged to take over the plant and real estate at Grand Forks formerly owned by Messrs. Brown and McKie.

SPYGLASS MINING CO.

The annual meeting of the shareholders of the Spyglass Mining Co. was held in Nelson on July 11, when the old directors were re-elected. At a subsequent meeting of directors the officers were re-appointed. The principal officials are: President and general manager, Bruce White; vice-president, J. A. Magee; secretary treasurer, R. G. McLeod.

COMPANY CABLES AND NOTES.

CABLES.

U. S. A.

Alaska Mexican.—May: 120-stamp mill 29 days, 18,926 tons; estimated realisable value of bullion, $30,452. Saved 357 tons sulphurets; estimated realisable value, $25,143. Working expenses, $30,790.

Alaska Treadwell.—May: 240-stamp mill 29½ days, 300-stamp mill 28¼ days, 78,323 tons; estimated realisable value of bullion, $84,322. Saved 1,588 tons sulphurets; estimated realisable value, $68,906. Working expenses, $92,427.

Alaska United.—May: Ready Bullion claim: 120 stamps 28 days, 18,450 tons; estimated realisable value of bullion, $22,354. Saved 314 tons sulphurets; estimated realisable value, $10,632. Working espenses, $26,766.

British Columbia.

Cariboo Consolidated.—Cable received on June 2 from this company's resident engineer in Cariboo: "Pleased to inform you that we have already commenced to breast out in the gravel upper part of Block A—gravel in good condition to work—will send result as soon as possible—No. 2 east crosscut is now in 130 ft."

Le Roi.—May: Shipped from the mine to Northport, 9,220 tons of ore, containing 3,344 oz. of gold, 3,550 oz of silver, and 198,100 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realisation, and depreciation, $10,500. Expenditure on development work during the month, $8,900. Development of the mine is being pushed; have nothing special to report.

Le Roi No. 2.—April: Josie mine: Output—16 cars of ore were shipped; a total of 548 tons. Of these, 144 tons went to the B C Copper Co.'s smelter, Greenwood, and 404 tons to Canadian Smelting Works, Trail. Of the latter 65.89 tons consisted of ore taken from the fines dump, and assayed 0.41 oz. gold, 1.3 oz. silver, and 2.3 per cent copper.

Le Roi No. 2.—May: Shipped to Trail 440 tons. Net receipts from Trail are $15,807, being payment for 734 tons shipped, and $1,872 for 30 tons concentrates shipped. Net receipts from Greenwood are $6,448, being deferred payment on 1,844 tons previously shipped. Total receipts, $24,127.

Slough Creek Gravel Gold.—Mr. Russell, the new manager, cabled on June 8: "I arrived at the mine on June 1. Have been through the works, and find everything in excellent order. Have taken over the management, and am pleased with the property and general outlook. Now pumping 1,100,000 gallons of water per 24 hours."

Tyee.—May: Smelter ran eight days during month, and smelted: Tyee ore, 1,510 tons; custom ore, 136 tons; total, 1,637 tons. Matte produced, 187 tons; gross value of contents after deducting costs of refining and purchase of custom ore, $23,070. Note—Short run of smelter caused by installation of hot-blast, now being completed.

Ymir.—May: 30 stamps, 28 days, 1,950 tons, 460 oz. bullion; estimated realisable value, $4,900; concentrates, 125 tons shipped; estimated value, $3,250; cyanide plant, 1,500 tons of tailings, producing bullion, estimated gross value of $1,050; sundry revenue, $80; total, $9,280. Working expenses, $9,639. Loss, $359. Expended on development, $525.

DIVIDENDS.

Alaska Mexican.—A dividend of 75 cents per share was declared in June, payable forthwith.

Alaska Treadwell.—A dividend of $6.30 per share was declared in June, payable forthwith.

Alaska United.—A dividend of 50 cents per share was declared in June, payable forthwith.

St. Eugene.—Provincial newspapers report payment by this company on July 1 of another dividend, stating amount at $70,000. Amount paid in April was $64,040, so July dividend was probably a like total.

NOTES.

Le Roi No. 2.—From the mine manager's report for May: Output—11 cars of ore were shipped, making a total of 440

tons. Development—300 ft. level—The ore exposed in diamond drill hole No. 67, supposed to be the upward continuation of stope H ore, was opened up by a cross-cut. We drifted on the vein, first east until the fault was reached, then west, but in each case the showing was too poor to justify further working. In all 91.6 ft. were driven. 500-ft. level—The west drift from the north cross-cut was continued for a distance of 84.9 ft. The country is still broken up. Nothing of importance had been met with. May Day tunnel—81.5 ft. have been driven. The ore encountered at this point is very promising, being 5 ft. in width and assaying: (1) Gold, .10 oz. per ton; copper, 2 per cent; equal to $7.60 value. (2) Gold, .12 oz. per ton; copper, 3.5 per cent.; equal to $12.20 value. (3) Gold, .44 oz. per ton; copper, 4.7 per cent; equal to $21.96 value. (N.B.—A cable has since been received stating that the tunnel has been extended to 100 ft., at which point ore assays $44.) From the 100-ft. level, by means of the diamond drill, we shall, in the near future, explore for the downward continuation of this vein.

The officers and directors of the Laclede Mining Co., incorporated last month with a registered capital of $150,000 in 1,500,000 shares at ten cents each, are: President, H. I. Wiegar, Laclede, Idaho; vice-president, W. F. Henderson, Spokane, Wash.; secretary-treasurer, E. L. Masterton, Poplar; managing director, John Y. Cole, Poplar; other directors, E. L. Morand and A. Hanson, Poplar, and Andrew Christensen, Spokane. The *Lardeau Mining Review* says the company has acquired the Mother Lode property at Poplar, has a good property, money for development, and every chance of success.

During June the Tyee Copper Co's smelter ran 13 days and treated 1,988 tons of Tyee ore giving a return, after deduction of freight and refining charges, of $30,950.

The Phoenix *Pioneer* states it to be understood unofficially that Mr. Samuel Newhouse, of Salt. Lake City and New York, will be managing director of the new Dominion Copper Co. that is taking over the Boundary mining and smelting interests of the Montreal & Boston Consolidated Mining and Smelting Co. Mr. T. R. Drummond is named as resident manager, and Mr. W. C. Thompson as smelter manager. Both of the new officials have been connected with the Newhouse properties in Utah.

At a meeting of shareholders in the B. C. Standard Mining Co., Ltd., held at Nelson on 8th inst., it was unanimously decided to recommend the directors to accept a proposal received from the Hall Mining & Smelting Co., of Nelson, to lease the former company's Hunter V. group of mines. It is understood the Hall Co. will at once ship lime-silver ore from the surface quarries of the mines, which are situated near Ymir.

For the month ending June 30, the output of the St. Eugene was 2,750 tons of concentrates, says the Moyie *Leader*. There are about 300 men on the payroll. The machinery for the new 30-drill air-compressor is being installed as rapidly as possible and an effort will be made to have it running by August 1. The company is behind with development work and as soon as this machinery shall be ready to run, 100 more men will be employed in the mine.

The approval of the proposed undertaking of the Stave Lake Power Co., Ltd., according to amended design filed with the Clerk of the Executive Council, has been gazetted. The company proposes to erect works for generating power and light; to construct a dam at Stave lake, New Westminster district; and to transmit power and light by wire to New Westminster and Vancouver. The amount of capital to be paid up before the company shall commence the construction of a cofferdam across the mouth of the east branch of the Stave river, has been fixed at $50,000, and the further amount to be paid up above the cost of the above-mentioned first portion of the undertaking in respect of the remainder of the undertaking shall be $200,000. The said amount of $50,000 is to be subscribed and the works commenced by June 1, 1906. A portion of the work is to be completed so as actually to furnish and deliver 1,000 electrical horse-power by November 1, 1906, and the works shall be in operation by November 1, 1908.

The West Kootenay Power & Light Co., having its headquarters in British Columbia at Rossland, and its hydro-electric power station at Bonnington Falls, on the Kootenay river and distant about 11 miles from Nelson, has placed an order with an eastern Canadian manufacturing firm for a large quantity of copper cable for the electric transmission line it is building from the power station to the Boundary district, where it will supply electric power and light to mines, smelters and towns in and about Grand Forks, Phoenix and Greenwood. The Rossland *Miner* states that the order mentioned above is for 25 carloads of copper wire cable, the weight of which will be about 728,000 lb., and the cost $131,000. The wire will be stretched on a pole line of 6,000 poles. In the construction of the transmission line and the enlargement of the power plant some 250 men are employed, and rapid progress is being made. The expectation is that the plant and line will be completed and in working order before the end of next winter.

Notice of increase of the capital stock of McLennan, McFeely & Co., Limited Liability, of Vancouver, B.C., has been gazetted. The capital of the company has been increased from $150,000 to $500,000, by the issue of 3,500 new shares of $100 each, ranking for dividend and in all other respects *pari passu* with the existing shares. The Vancouver *News-Advertiser* refers to this company, which has interests in the Yukon as well as in Vancouver, as "the largest hardware dealers in the Canadian West," and adds that: "The contract for the supply of hardware to be used in the construction of the branch line of the C. P. R. from Spence's Bridge to Nicola has been awarded to this company which also expects to do a large business in connection with the construction of the Grand Trunk Pacific. Some time ago the company purchased a block of land, 175 by 125 ft., on the northwest corner of Columbia Avenue and Cordova Street, Vancouver, and it is the intention to cover the whole of this with warehouses, the total cost of the new premises to be about $125,000. This is a very convenient location, as one side of the big warehouse will be alongside the C. P. R. track."

NEW REGISTRATION IN ENGLAND.

Fraser River Gold Dredging Co. (1095), *Ltd.*—Registered June 9, by J. Zillhardt, 39 Lombard Street, London, E.C. Capital, £40,000, in £1 shares. Objects: To acquire the undertaking of the Fraser River Gold Dredging Company, Limited (in liquidation); to adopt an agreement with the said old company, and to carry on the business of dredgers for gold, etc. No initial public issue. The first directors (to number not less than two nor more than three) are to be appointed by the signatories. Qualification, one share. Remuneration, £100 each per annum and 5 per cent of the net profits after 10 per cent dividend has been paid, divisible. Registered office: 39 Lombard Street, London, E.C.

LICENCES TO EXTRA-PROVINCIAL COMPANIES.

The Canadian Fairbanks Co., Ltd., is authorised and licensed to carry on business in British Columbia. The head office of the company is situated at Montreal, Quebec. The capital of the company is $500,000, divided into 5,000 shares of $100 each. The head office of the company in British Columbia is situated at Vancouver, and John E. Botterell, mechanical engineer, whose address is 153 Hastings Street, Vancouver, is attorney for the company.

Kamloops Mines, Ltd., is authorised and licensed to carry on business in British Columbia. The head office of the company is situated at London, England. The capital of the company is £135,000, divided into 135,000 shares of £1 each. The head office of the company in British Columbia is situated at Kamloops, and Joseph Argall, mining engineer, whose address is Kamloops, is attorney for the company.

MINING MEN AND MATTERS.

Mr. Francis A. Thomson, formerly of the Northwestern Smelting & Refining Co's smelter, at Crofton, Vancouver Island, but now metallurgist for the New Western Reduction Co., which lately erected a sampler and reduction mill at Goldfield, Nevada, U.S.A., has been visiting his parents at Victoria, B.C.

Mr. Norman Carmichael, manager of the Highland mine at Ainsworth, has returned to West Kootenay after spending a fortnight in Victoria and vicinity. While on Vancouver Island he paid a visit to the Tyee Copper Co's mine at Mt. Sicker, where he was the guest of the superintendent, Mr. E. C. Musgrave.

Mr. J. T. Laidlaw, of Cranbrook, came down from East Kootenay to attend the meeting in Victoria of the American Institute of Mining Engineers.

Mr. A. B. W. Hodges, of Grand Forks, general superintendent for the Granby Con. M. S. & P. Co., is one of the A. I. M. E. excursion party now visiting the Canadian Yukon.

Mr. W. M. Brewer, ore buyer for the Tyee Copper Co., is again in south-eastern Alaska and Yukon Territory. *En route* to Whitehorse he served as a travelling encyclopedia, giving the visiting members of the A. I. M. E. abundant information relative to the coast of north-western British Columbia and south-eastern Alaska, particularly in regard to the known extent and development of their mineral resources.

Mr. Paul Johnson paid a visit to the Van Anda mines, Texada Island, last month. Later he spent a short time in the Boundary district, going in at the time the A. I. M. E. party was there.

Mr. John Flewin, of Port Simpson, gold commissioner for the Skeena district, was in Victoria and Vancouver early this month.

Mr. Chas. Simister, superintendent of the Crow's Nest Pass Co's Carbonado colliery, was at Cowley, Alberta, recently on a business trip.

Mr. Edmund B. Kirby was in Denver, Colorado, last month, *en route* to Nevada.

Mr. E. Chipman, of Kaslo, gold commissioner for the Slocan district, visited the coast cities late in June.

Mr. E. C. Reeder, who after graduating as a mining engineer at the Michigan College of Mines, Houghton, Michigan, U.S.A., had several years of practical mining and smelting experience in Montana and Utah, is now the Kootenay representative of an eastern machinery manufacturing company, with office at Nelson.

Mr. Howard W. DuBois, of Philadelphia, Pa., U.S.A., a mining engineer giving special attention to platinum and similar minerals, is making his third visit to Cariboo to investigate the prospects for the production of platinum in that district.

Mr. H. M. Stevenson, manager of the Highlander mine, Ainsworth, has returned to Ainsworth after having been absent about six months in the Eastern States and Mexico.

Mr. W. H. Aldridge, chief of the Canadian Pacific Railway Co's mining and metallurgical department, returned to Trail early in July after an absence in the east of several weeks.

Mr. B. P. Little, of Sandon, Slocan, the *Mining Reporter* states, has gone to Helena, Montana, to erect and supervise a concentrator for the East Pacific Mining & Milling Co.

Mr. R. W. Brigstock, who has been in charge of the B. C. Standard Co's Hunter V. mine, near Ymir, is stated to be about to leave the Kootenay for the Temiskaming district of north-western Ontario, to there take charge of the Timmins mine.

It has been announced that Mr. Paul S. Couldrey is to resume charge of the Le Roi No. 2 mines, at Rossland, Mr. Ernest Levy retiring in his favour.

Mr. Charles H. Hurter, for some time assayer at the Tyee Copper Co's smelter, Ladysmith, has gone to Boston, and Mr. H. Collinson has succeeded him at Ladysmith.

Mr. John Morton, of Minneapolis, president of the Metropolitan Gold & Silver Mining Co., is in charge of the company's Triune mine, in the Ferguson district, northern Lardeau.

Mr. Jules Labarthe, superintendent of the Canadian Smelting Works, Trail, last month visited the Sullivan Co's smelter, at Marysville, East Kootenay, where the Huntington-Heberlein process of roasting lead ore is stated to be in successful operation. Mr. H. Harris, assistant superintendent at the Hall Mining & Smelting Co's smelter at Nelson, was also a recent visitor at Marysville.

Mr. C. Hungerford Pollen, of Fort Steele, on his return to East Kootenay from Montreal, Quebec, was reported by the local press to have stated that the construction of the Kootenay Central railway will shortly be commenced. Mining development in the valley of the upper Kootenay and Columbia rivers will be greatly stimulated by the provision of the better transportation facilities this railway will afford.

Mr. D. John, of the combination silver mill at 5-mile camp, owned by the Ferguson Mines, Ltd., of Ferguson, Lardeau, is visiting Sudbury, Ontario.

Mr. John Kiddie, who is accompanying the provincial mineralogist on a three months' trip in northern Cariboo, Omineca and Skeena country, returned last month to his parents' home at Ladysmith after having been for some time in western Alberta, first at the Pacific Coal Co's Bankhead colliery, near Banff, and afterwards on the survey of C. P. R. Co's coal lands, along the line of the company's Calgary-Macleod branch.

Mr. J. C. Gwillim, professor of mining at the Kingston School of Mines, Ontario, has been occupying part of the field-work season in examining the coal lands of the West Canadian Collieries Co., in the Blairmore-Frank district, south-west Alberta.

Mr. D. W. Moore, of the Canadian Smelting Works, Trail, spent part of June and July in Victoria.

Mr. D. R. Forbes, who about eight months ago resigned the general managership of the Lardeau companies operating in Ferguson camp and now merged into the Ferguson Mines, Ltd., has been to Western Australia. He speaks favourably of the gold mining in that country and may again go there after his return from Dawson, whence he went with fellow members of the American Institute of Mining Engineers.

Mr. J. B. Kendall, who about six months ago succeeded Mr. Phil. Hickey as manager of the Minnesota Silver Co's Ivanhoe mine, at Sandon, Slocan, has resigned that position and returned to the Coeur d'Alene district, Idaho, U.S.A.

Mr. A. J. McMillan, general manager and managing director of the Le Roi Mining Co., Rossland, is proceeding to England. It is probable the annual general meeting of shareholders of this company will be held in the autumn—several months earlier than has been customary in recent years.

Mr. Joseph Hunter, of Victoria, retired from the management of the Esquimalt & Nanaimo railway on July 1, on which date that system was formally taken over by its recent purchasers, the Canadian Pacific Railway Co. Mr. Hunter arrived in British Columbia in 1864, and thereafter, for eight years, followed mining in Cariboo. In 1872 he joined the engineering staff of the C.P.R., and for years was engaged in engineering and exploration in that company's service. In 1876 he was selected by the Canadian government, on the recommendation of Sir Sanford Fleming, to define the international boundary line on the Stikine river between the Dominion of Canada and the Alaska territory of the United States, which important work involved the interpretation of the Convention of 1825. Later he explored and reported on the Pine river pass as a railway route through the Rocky Mountains. In 1883 he commenced the location of the E. & N. railway, which was constructed under his supervision. On its completion he organised the operating and traffic departments and from then until his recent retirement, as general superintendent and chief engineer, he has been responsible for the management of the railway. It is understood he will continue to be connected with the Dunsmuir interests, which include the important collieries of the Wellington Colliery Co., at Extension and Cumberland, Vancouver Island, the operation of which has heretofore been closely associated with that of the E. & N. railway.

The appointment of the following mining recorders and deputy mining recorders for the several mining divisions named, has been gazetted:

Ainsworth.—Robert James Stenson, Kaslo, mining recorder; William John Green, Kaslo, deputy.

Nanaimo.—John Stewart, Ladysmith, deputy.

Similkameen.—Perley Russell, Granite Creek, deputy.

Skeena.—Bart E. Daily, Unuk River, deputy.

TRADE NOTES AND CATALOGUES.

The Canadian Westinghouse Co. lately issued an artistic publication, freely illustrated, and describing briefly the lines of apparatus manufactured at its works at Hamilton, Ontario. Copies of this pamphlet can be obtained on application to the general offices of the company at Hamilton. Another recent publication of this company is a booklet on the Westinghouse Protective Apparatus for outdoor circuits requiring protection from lightning.

The Westinghouse Electric & Manufacturing Co., Pittsburg, Pa., has issued Folder No. 4047, Type B Westinghouse Integrating Wattmeters, single-phase 7200 and 16000 alternations for two and three-wire circuits.

The Wellman-Seaver-Morgan Co., of Cleveland, Ohio, has published a pamphlet descriptive of its mine cages, skips, ore cars, etc.

The Jeffrey Manufacturing Co., of Columbus, Ohio, has had printed a Supplement to Screen Catalogue No. 69, showing numerous classes of screens the company manufactures, excavating machinery for sand and gravel, cylinder dryers, etc. Folders, illustrative of coal tipple equipment; contractors' portable outfits for sand, gravel and earth, excavating, conveying, elevating and screening; and of crushers and pulverisers manufactured at the company's works, have also been sent out lately.

The Canadian Foundry Co., Ltd., of Toronto, Ontario, is exhibiting at the Vancouver office of the General Electric Co. a number of large, handsome photographs, showing the company's factory buildings and some of its manufactures. Among the latter are pictures of the great ornamental iron staircase in the Toronto City Hall; a new style of air compressor; a fine locomotive, one of the number recently completed for the C.P.R., and like twenty others being built for the Canada Northern. The company has made arrangements with Mr. E. T. Hanna, of Philadelphia, to manufacture in Canada the water tube boiler of which he is the patentee. This boiler has been made in the United States under the name of the "Atlas," and it is understood that the name to be adopted in this country will be the "Canada" water tube boiler.

Mr. E. W. Monk, Kootenay agent for the Hamilton Powder Co., has been conducting a series of tests with "geligNite," a new safety blasting powder. He reports that the experiments have been even more successful than he anticipated, and he thinks the new explosive will be adopted for general use. He considers it safer, easier to handle and more economical than dynamite; he calculates that the saving is at least 30 to 40 per cent as compared with dynamite. GeligNite is manufactured at the Hamilton Co's mills at Nanaimo, Vancouver Island, B.C.

The Canada Foundry Co., Ltd., of Toronto, Ontario, is exhibit at the meeting of the Canadian Electrical Association, held at the Hotel Windsor, Montreal, Quebec, last month. The exhibit included induction motors, direct current motors, OD transformers, series and multiple AC arc lamps, lightning arresters, fuse blocks, portable testing instruments, etc. Distribution was made of the company's literature illustrating and describing its products, and of a striking souvenir folder, prepared for the occasion. The following officials and representatives of the company were in attendance at the convention: Mr. Paul J. Myler, general manager; Mr. N. S. Braden, general sales manager; Mr. H. D. Bayne, manager Montreal office; Mr. R. J. Dunlop, Toronto office; Mr. T. F. Dryden, manager Toronto office, and Mr. Wm. Bradshaw, engineer, from Westinghouse Electric & Mfg. Co., East Pittsburg, Pa.

BOOKS, ETC., RECEIVED.

Gold Dredging. By Capt. C. C. Longridge, London, England. Publishers, *The Mining Journal*, London. Pages, 178; illustrated. Price, 10s. net.

The Copper Mines of Lake Superior. By T. A. Rickard, New York. Publishers, *The Engineering and Mining Journal.* Pages, 164; illustrated. Price $1, postpaid.

The Copper Handbook. A Manual of the Copper Industry of the World. Vol. V, for the year 1904. By Horace J. Stevens, Houghton, Michigan, U.S.A. Pages, 879.

Coke. By John Fulton. Second edition. Publishers, The International Textbook Co., Scranton, Pa., U.S.A. Pages, 498; illustrated. Price $5.

Geological Survey of Canada.—Report on the Pictou Coal Field, Nova Scotia. By Henry S. Poole, F.R.S.C. Pages, 38; with geological map.

Mines Branch, Department of the Interior, Canada.—Preliminary reports: (1) *On the Industrial Value of the Clays and Shales of Manitoba.* Pages, 41; illustrated. (2) *On the Limestones and the Lime Industry of Manitoba.* Pages, 68; illustrated. Both by J. Walter Wells.

Royal Colonial Institute, London, England.—Journal of the Institute; No. 7, Session 1904-5.

Eight-Hour League of North America.—Constitution of the League. By Wm. H. Campbell, West St. John, N.B. Pages 16.

United States Geological Survey.—

Cement Materials and Industry of the United States. By Edwin C. Eckel. Pages, 372; illustrated with 15 maps.

Index to the Hydrographic Process Reports of the U. S. Geological Survey, 1888 *to* 1903.—By John C. Hoyt and B. D. Wood. Pages, 253.

Contributions to Mineralogy from the U. S. Geological Survey.—By F. W. Clarke, W. F. Hilldebrand, F. L. Ransome, S. L. Penfield, Waldemar Lindgren, George Steiger, and W. T. Schaller. Pages, 144; illustrated.

Reports of Progress of Stream Measurements for 1904. Parts I, III, IV and V.

Contributions to Devonian Paleontology, 1903. By Henry Shaler Williams and Edward M. Kindle. Pages, 133; illustrated.

BOOKS REVIEWED.

Gold Dredging.—By Capt. C. C. Longridge, M. Inst, M.E., etc., London, England. Publishers, *The Mining Journal,* London. Royal 8 vo. 178 pp. Text and numerous halftone illustrations, diagrams, tables, etc. Price 10s. net.

It is claimed for this book that it is the only complete work on Gold Dredging. It is comprehensive, containing 31 chapters, a copy of dredge regulations in force in New Zealand, and a list of the principal English-owned dredging companies. A full index is also given.

A brief introductory review of the history and evolution of dredging for gold concludes as follows: "The experience gained from these and similar appliances, added to increased mechanical facilities, speedily resulted in the designing of more practical dredges, which, under the type of the "dipper," the "suction," the "grab," and the "bucket ladder," find their application in modern dredging. These several styles of dredges are treated on in separate chapters, and information relative to them, respectively, obtained from sources local to places at which they have been operated, is presented. Following chapters successively describe construction, equipment, gold recovery appliances, process of cleaning up, etc, and give much detail concerning horse power required in dredging, separation of material dredged, percentage of gold saved, quantity of water required for washing and separating gold, disposal of the tailings, capacity and cost of dredges, dredge crews, working costs, and most other matters connected with gold dredging. The selection and working of dredges, the difficulties attending their oper-