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BRITISH COLUMBIA MINING RECORD

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BRITISH COLUMBIA
MINING RECORD

E. JACOBS.....Manager and Editor

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CONTENTS.

NOTES AND COMMENTS.

The Canadian Marble and Granite Works, Nelson, has secured several contracts for the supply of marble and granite for use at Edmonton, Alberta, in the erection of school and other buildings.

The returns received from shipments of ore from the Richard III mine at Mt. Sicker, Vancouver Island, continue to be so satisfactory that the payment of a dividend in June will result.

At Revelstoke last month it was stated that a sale may be made of part of the property of the Prince Mining and Development Company, with the object of providing funds for the further development of that company's Standard mine.

A conference of geologists who have worked on the Pacific coast of Alaska was convened to be held in Washington, D. C., in April. The purpose of the meeting was to compare the stratigraphy of the coastal region from Cross Sound to Cook Inlet.

A newspaper announcement has been made to the effect that an oil refinery with a capacity for the treatment of 1,000 to 2,000 bbl. of crude oil per day will be built in Vancouver within three or four months, by the British American Oil Refineries, Ltd., at a cost of $220,000.

White miners at Atlin have organized an association with the object of preventing Japanese from working on Atlin district mining properties. At last advices the Japanese taken in by J. M. Ruffner to work on the hydraulic mines he manages had not been induced to leave the district.

A few weeks ago the London *Mining Journal* published the statement that Lord Strathcona, High Commissioner for Canada, had been informed by cablegram that "the mineral production of British Columbia in 1906 was equivalent in value to $132 for every man, woman and child in the Province."

A new record of ore treated in any one month at the British Columbia Copper Co.'s smelter was made in April, in which month 34,239 tons of ore were smelted in two blast furnaces. The hearth area

of these furnaces is 48x240 in. Three were installed late last year, giving a combined capacity of about 2,000 tons per diem.

At Nelson early in May the action of G. B. McMillan against A. D. Wheeler and wife for $25,000 commission claimed in connection with the sale of the Krao mine at Ainsworth for $100,000, was dismissed by Mr. Justice Clement with costs against the plaintiff. This decision is generally regarded as an eminently just one.

The labour difficulties that had arisen at the Marble Bay mine, Texada Island, in connection with which the management had prosecuted four miners for breaches of the Industrial Disputes Act, have been amicably settled and an agreement reached concerning wages to be paid. Work in the mine will now be proceeded with.

The *Engineering and Mining Journal* notes that 'in the purchase of zinc ores the returning charges which have been made by European smelters on American, Canadian and Australian ores during the last two or three years have ranged from $11.40 to $13.16 per 2,000 lb., these figures corresponding to 53 to 60 marks or 65 to 75 francs per 1,000 kg.

The council of the Canadian Mining Institute has been endeavouring to ascertain the views of members concerning a proposal to hold a sectional meeting of the institute in British Columbia next September. No decision has yet been arrived at, but it is understood a majority of those who have replied to the council's circular of enquiry favour holding the meeting.

The tonnage of ore and concentrates received at the Trail smelter during April was 19,366 tons. Sources of production were as follows: Rossland, 11,346; Boundary, 4,228; Nelson, 1,750; East Kootenay, 1,747; Slocan, 183; Ainsworth, 49; Lardeau, 27; Refinery, 36. In addition 97 tons of lead-silver matte were received from Nelson. The aggregate tonnage for month was 19,463 tons.

The *Weekly Star* of Whitehorse, southern Yukon, said on May 10: Mining operations in all departments are now well under way in this locality. Surveyors are defining claim boundaries and prospectors are scouring the country in all directions. Crews are at work on several properties, notably the Pueblo, Copper King, Grafter and Arctic Chief, and summer activity may be said to be well under way.

A correspondent writing from Clinton intimates that a statement published in last month's MINING RECORD relative to platinum in the Fraser River "is all wrong." He informs us that platinum and other valuable minerals are found in the Fraser River from the mouth of the Thompson River to Big Bar, and they have been well known to occur in the sands of the Fraser River for the last 12 or 15 years. His letter shall have further notice in next month's issue.

The National Trust Company has been advertising inviting offerings of Dominion Copper Company, Ltd., first mortgage six per cent. gold bonds, in which connection the company, in accordance with the requirements of its mortgage, dated June 1, 1905, securing the afore-mentioned issue, has paid out of its earnings the sum of $170,000 to the National Trust Company, trustee under the mortgage, to be applied in the redemption of the bonds as provided by the mortgage.

The management of the Britannia Smelting Company's smelting works at Crofton, Vancouver Island, is overcoming the fuel shortage difficulty by obtaining imported coke. A shipment of 300 tons of New Zealand coke has been received and additional supplies are being obtained from other places. In future similar provision will be made so that whenever the Wellington Colliery Company shall be unable to supply coke the smelter will have from other countries enough to meet its requirements.

The Giant-California Mining Company, Ltd., has acquired the Giant and California mines at Rossland and Wm. Yolen Williams, who extensively developed the Granby Company's big copper mines in the Boundary district, has been appointed mine manager. Some years ago Mr. Williams was in charge of development work on the California, but this mine has lain idle ever since. The Giant was owned by an English company, which shipped 4,344 tons of ore from it before suspending operations in 1903. The amalgamated properties are situated a short distance west of the Le Roi and Le Roi No. 2 and are considered mines it will pay to work.

Following the settlement of the late strike of the employees of the coal mining companies of south-western Alberta and the British Columbia section of the Crow's Nest Pass, the Crow's Nest Pass Coal Company, Ltd., has resumed work at its collieries at Coal Creek and Michel, but men are not yet obtainable in sufficient numbers to allow of working to full capacity. The directors have appropriated $1,250,000 for further development of the mines and expansion of coal and coke business and arrangements will be made for carrying out their plans without unnecessary delay. Fully 500 more men will be required shortly; good coal miners in particular are needed.

Preparations are being made for the further enlargement of the ore-roasting equipment of the Hall Mining and Smelting Company's lead-silver smelting works at Nelson. The Huntington-Heberlein roaster and converters in use at these works since the end of last October have given satisfactory results so it has been decided to enlarge the plant by the addition of another roaster and more converting pots. The supply of ore during several months of the current

year has been fairly well maintained; in fact at times it has been in excess of the present capacity of the roasting plant, consequently enlargement has become necessary in order to keep the capacity of the works ahead of the ore supply.

The provincial government of Alberta has appointed a commission to investigate and report on all phases of the coal mining industry. The members are: Chief Justice Sifton, chairman; Lewis Stockett, general manager of the Pacific Coal Co., Bankhead, representing the coal mine operators; and William Hanson, president of the Coleman miners' union, representing the coal miners. The duties of the commission are to make full inquiry into all matters and conditions relating to coal mining and to report thereon. The report will be used by the provincial government as a source of authentic information for its guidance in preparing laws for the regulation of the coal mining industry in Alberta.

The Dominion Government has published in the *Canada Gazette* the new regulations for the disposal of coal mining rights in the provinces of Manitoba, Saskatchewan, and Alberta; in Yukon Territory, North-west Territories, the railway belt in British Columbia, and within that tract in the Peace River district containing 3,500,000 acres acquired by the Dominion from British Columbia. Such rights will no longer be sold but may be leased for a term of 21 years at an annual rental of $1 per acre payable in advance. Not more than 2,560 acres will be leased to any one applicant. In addition to the rent, a royalty at the rate of five cents per ton of 2,000 lb. will be levied and collected on the merchantable output of the mine.

The article on the Pacific Coal Co.'s Breaker at Bankhead, Alberta, printed on pp. 177-182 of this number of the MINING RECORD, gives a full and accurate description of this important plant and its work by the engineers under whose supervision it was installed. The prominence to which the Pacific Coal Co.'s Bankhead colliery is steadily attaining and the comparatively wide area over which its products are marketed, together attach to this installation a general interest, hence the reproduction in this journal of the article. Thanks to *The Engineering and Mining Journal* of New York, which with characteristic courtesy has kindly lent us the engraving blocks used to illustrate the descriptive matter, a clearer idea of the size and character of the big plant and of its operations is conveyed than would have been the case without the use of cuts. The establishment of this industry at Bankhead is one more significant testimony to the commercial and industrial expansion of Western Canada.

Toward the close of the exercises in dedication of the United Engineering Societies Building in New York on April 16-17, Dr. A. R. Ledoux, past-president of the American Institute of Mining Engineers and of the United Engineering Societies, was called upon to present to Dr. F. R. Hutton, past-secretary of the American Society of Mechanical Engineers; Mr. Ralph J. Pope, secretary of the American Institute of Electrical Engineers; and Dr. R. W. Raymond, secretary of the American Institute of Mining Engineers, three gold medals, severally bestowed by the three societies, in recognition of the long service of these officers. Dr. Ledoux prefaced each of these presentations with an appropriate sketch of the career of the recipient. Dr. Hutton replied for all three. The erection of the United Engineering Societies Building on its present adequate basis was made practicable through the munificence of Mr. Andrew Carnegie, who contributed $1,500,000 for the purpose.

It is reported that the management of the Le Roi mine intends substituting electricity for steam as motive power for its two air compressors which combined have a capacity of 8,000 ft. of free air per min. at sea level. This plant has proved an economical one using steam, for a test extended over a period of 30 days under ordinary working conditions showed a coal consumption of 1.9 lb. per h.p. per hour, and that air was compressed to 95 lb. per sq. in. at a cost (exclusive of interest and depreciation charges) of $1.59 per each 100,000 cu. ft. of free air compressed. Notwithstanding this, it is believed that electric power will be still more economical now that the West Kootenay Power and Light Co. has abundant generating capacity at its Bonnington Falls station for all demands likely to be made on it. Should the Le Roi Co. use electricity for its air compressors its winding engines—one of 1,000, and another of 500-h.p. capacity—will probably be run by compressed air, using steam to reheat the air.

In looking through the long list of engineering and scientific societies and institutions of learning represented by delegates present at the dedicatory exercises of the United Engineering Societies Building in New York last month, the almost entire absence of representatives of Canadian societies and institutions is particularly noticeable, the single exception being the Canadian Society of Civil Engineers, which had a delegate present. In the list published in the *Bi-Monthly Bulletin of the American Institute of Mining Engineers* for the current month mention is made of the presence of representatives of institutions in Great Britain, France and Germany, but other than the one Canadian society above-named none in Canada appear to have been represented on that important occasion. It may be that the published list before us is incomplete. If not we think it a matter for deep regret that a number of Canadian societies and institutions were so forgetful—we cannot think them intentionally lacking in courtesy—as to omit to be represented at a function of much more than ordinary interest to large numbers of professional men in the United States.

The Hall Mining and Smelting Company has arranged to extend the tunnel on the Dandy mineral

claim into Silver King ground adjoining the Dandy. The carrying out of this work will involve about 1,200 ft. of driving, probably a year's work under local conditions. The eventual result of this work will be to unwater the Silver King mine down to something like 150 ft. below the present water level, and thus reopen the mine workings down to half way between the sixth and seventh levels. Meanwhile the extraction of ore above the fifth level will be continued. The further development of the Kootenay Bonanza claim—one of the Silver King group—is in progress by means of a short cross-cut from the old Kootenay Bonanza shaft, the object being to cut the ore at about 150 ft. below the surface. The Hall Mining and Smelting Company is now working the Silver King property on its own account, the agreement with M. S. Davys for joint working having been terminated some months ago. Since winter about 800 tons of ore of good grade, obtained during three or four months mining, have been shipped to the Consolidated Mining and Smelting Company's works at Trail.

The ninety-third meeting of the American Institute of Mining Engineers will be held at Toronto, Ontario, beginning on Tuesday afternoon, July 23, 1907. Prof. W. G. Miller, provincial geologist, Bureau of Mines, Toronto, may be addressed as the representative of the local committee in charge of the programme and excursions. The following programme is provisionally announced, subject to such changes as may be found advisable: Tuesday, July 23—Afternoon, session at the King Edward hotel; evening, reception in the Parliament buildings. Wednesday, July 24—Morning and afternoon, sessions; evening, departure by special train at 9 p. m. for Cobalt. Thursday, July 25—Visits to mines, and an evening reception in the Cobalt opera house. Friday, July 26—Additional visits to mines, and optional excursions in the afternoon to points of scenic or scientific interest. Saturday, July 27—Steamboat trip up Lake Temagami, or optional trips to mining districts. Sunday, July 28—To be spent by those who so desire at the hotels at or near the lake. Monday, July 29—Visit to Sudbury, etc., to be continued on Tuesday, the party returning to Toronto by train leaving Sudbury Tuesday night.

From a well-known Similkameen old-timer the following communication has been received by the MINING RECORD: "I send you in this letter a Post Office order for $12. You sent me a bill two years ago for $8, so by this time it must be $12. You see I was hard up and have been very short of money for the past few years, but I have got a little money now and I am pleased to be able to send this to you. I thank you very much for dealing so patiently with me and will see that I do not again get behind in my subscription to your very valuable paper. I am just getting over heavy sickness of nine weeks and am still very weak. I wish you all kinds of good luck." In contrast to the honesty of this pioneer we think of many who continued to accept delivery of our journal for years but persistently ignored periodical applications for payment, and whose names now adorn the "Doubtful Debts" pages of our ledger. Among these latter are men in professional and other prominent positions, yet they seem to lack the principle exemplified by the old pioneer in thus voluntarily paying his debt, while as to an expression of appreciation or goodwill—they are entire strangers to any such sentiments. The good wishes of our Similkameen friend are heartily reciprocated.

During recent weeks two mining men well known in British Columbia have been removed by death. These were Capt. W. H. Sandiford, for years manager of the Bosun mine on Slocan Lake, and Mr. J. W. Haskins, manager for the Rosella Hydraulic Mining Company developing placer gold property in Liard mining division, Cassiar. Capt. Sandiford opened and developed the Bosun which in the summer of 1899 he bonded for an English company—the North West Mining Syndicate—he represented. He continued to work this mine from July, 1899, to October, 1903, when difficulties of mining conditions prevailing in the Slocan district at that time rendered the continuance of operations at a profit impracticable. He remained at the mine until the autumn of 1904, when he removed to Victoria and thereafter resided in that city. It is noteworthy that the Bosun mine was the first mine in the Slocan to ship zinc ore as such. This product was shipped, to the extent of about 1,900 tons, to Antwerp, Belgium. In an article contributed to the MINING RECORD about seven years ago by the late Howard West, A.R.S.M., he mentioned the success of the North West Mining Syndicate, which declared a dividend of 20 per cent. as a result practically of its first year's operations, and stated that one of the factors which contributed to this success was "the unlimited confidence which they reposed in their local representative, Mr. W. H. Sandiford, who had full power to act for the company in any emergency which might arise. To his foresight and judgment, acquired during some twenty-five years' varied experience in every quarter of the globe, they owe a large measure of praise, and if there is one gratifying feature about the whole connection it is to know that his services to the country have been fully recognized by the directors and substantially acknowledged." The optimism and enthusiastic advocacy of the Cassiar country by the late Mr. Haskins doubtless did much towards establishing confidence that after railway transportation shall have been secured the mineral and other resources of the extensive area in the northeastern part of the Province will be proved valuable and important. He was a good friend to the outlying portions of Cassiar and it is a matter of general regret among those familiar with his tireless efforts to promote its interests that he did not live to reap the substantial reward that now appears to be almost within reach. Worthy pioneers, though in different fields of mining, were these men. Their work is done. *Requiescat in pace.*

NET EARNINGS AND DIVIDENDS OF THE CROW'S NEST PASS COAL CO., LTD.

THE ANNUAL REPORT of the Crow's Nest Pass Coal Company, Ltd., for the calendar year, 1906, is printed on another page of this number of the MINING RECORD. It will be seen that notwithstanding unfavourable conditions during a part of the year, the net earnings were sufficient to admit of the customary quarterly dividend at the rate of ten per cent. per annum being paid to the shareholders for the full period under review.

The publication of the company's yearly statement of accounts appears to have had its customary effect on its old-time traducer, Wm. Blakemore, who has repeated statements we have on former occasions shown to be untrue. His periodical ebullition has this time taken the following form:

"*The Week* was severely, not to say scurrilously, criticized a few months ago for pointing out that the Crow's Nest Pass Coal Co. were paying a higher dividend than the operating profits warranted. In the same editorial *The Week* also pointed out that practically all the money utilized in the payment of dividends had been acquired by the company through the sale of treasury stock at a high commission. The general management recently announced that a further issue of treasury stock at $250 per $100 share would shortly be made. As the issue is to be half a million it will, if sold, realize $1,250,000 and a net premium of $750,000. In view of the present financial position of the company it will be interesting to know what justification there is for putting this stock on the market at such a premium."

As to the question of whence dividends have been derived, the following figures from the company's audited balance sheets show:

Balance at credit of Profit and Loss Account on December 31, 1899....	$ 47,810.42
Net earnings for year 1900.....	141,064.10
" " " 1901.....	270,848.39
" " " 1902.....	171,285.80
" " " 1903.....	310,492.28
" " " 1904.....	406,049.56
" " " 1905.....	497,898.68
" " " 1906.....	351,791.35
Aggregate of net earnings to end of 1906	$2,197,240.58
Total dividends, 1901...	$242,705.50
" " 1902...	250,000.00
" " 1903...	303,717.36
" " 1904...	347,807.25
" " 1905...	349,418.05
" " 1906...	350,000.00
Aggregate dividends to end 1906...	$1,843,648 16
Balance at credit of Profit and Loss Account on December 31, 1906..	$ 353,592.42

As explaining the smaller total of net earnings in 1906, the chairman of the adjourned annual meeting of shareholders held on April 30, said: "The company has passed a satisfactory year. Had it not been for the unfortunate strike which took place in the latter months of the year, the production would have reached approximately 1,000,000 tons, and profits of the company should have shown a betterment of $125,000, which is the estimate the directors placed upon the cost of the strike. This is made up of loss in profits, and in the actual expense of the strike."

Concerning justification for the recently-authorized issue of new stock at $250 per share, before leaving Winnipeg on May 30, Mr. G. G. S. Lindsey, managing director of the Crow's Nest Pass Coal Company, according to a press dispatch of that date, said: "My directors in Toronto have just given me an additional $1,250,000 for the purpose of expanding and developing the property of the company, and the work will be begun as soon as the necessary arrangements can be made. We will need about 500 additional men."

The company's cash receipts on capital account, the investment of its Reserve Fund, and the big and very valuable assets, practically unencumbered, it possesses need not be gone into now. It has developed one of the most important individual enterprises established in the Province, and its achievements are constructive and a distinct public benefit.

Under date May 12, the president of the Stemwinder Gold and Coal Mining Company by circular gave the shareholders of the company the following information concerning operations at the Stemwinder gold mine at Fairview, Okanagan:

"In the past two months we have done the following development work: Raised from the 300-ft. level to within 20 ft. of the first level, a shaft 9 ft.x 4 ft. 6 in. within timbers (double compartment) and completed the timbering for this distance, 180 ft. Cross-cut from the old workings to the new shaft at the 200-ft. level a distance of 60 ft. Cross-cut on the surface at the side of the mill, to connect with the shaft at first level, a distance of 75 ft., size 8 ft. x 6 ft. diminishing to 7 ft.x5 ft. within timbers. This makes 315 ft. of large tunnels and shafting completed in about two months, which is record time for this district. We are now completing the raise and will connect with the last-mentioned tunnel within a week. It will take about three weeks to raise the further distance of 50 ft. to the surface at the higher ground at the back of the mill and get the temporary gallows frame erected for hoisting while sinking the shaft, which will be continued immediately. We expect to sink at the rate of 100 ft. per month, and after the cross-cuts to the ore on the different new levels are made, we shall be in a position to extract ore with great economy through the new shaft, which is at the left hand side of the upper part of the mill. We are now driving all the machinery by water power and saving about $600 per month in steam costs. The outlook in every respect is promising.

THE MARBLE BAY COPPER DEPOSIT.

By O. E. LeRoy.

TEXADA ISLAND was briefly noticed by Mr. LeRoy in his report published in the "Summary Report of the Geological Survey Department," for 1906 and reprinted in the MINING RECORD last February. In a paper prepared for Vol. X of the "Journal of the Canadian Mining Institute," Mr. LeRoy has written on the geology of Texada Island, as well as given information relative to the Marble Bay mine. The full text of his paper follows:

INTRODUCTION.

During a reconnaissance survey of part of the southern coast of British Columbia, in the summer of 1906, the writer had an opportunity of examining briefly the ore deposits occurring on Texada Island. One type of deposit is of particular interest, both on account of its being in a contact metamorphic zone and of its economic importance in containing valuable ores of copper. These deposits have previously been described in the reports of the provincial mineralogist for British Columbia, and in several papers by W. M. Brewer. In his later papers Mr. Brewer has drawn attention to certain deposits occurring on Gribbell Island, and in the Whitehorse District, Yukon Territory,* and shown that in mode of occurrence they are very similar to those on Texada Island.

The object of this paper in describing an example of this type is to again emphasize the economic importance of these deposits lying in widely separated areas, and to show that they are worthy of the careful consideration of those interested in mining.

GEOGRAPHICAL POSITION.

Texada Island, named by Elsa in 1791, lies in the Strait of Georgia, its south-east end being about 80 miles north of Victoria, and 47 miles northwest of Vancouver. The town of Van Anda, where the chief mines are situated, is about 75 miles from Vancouver and is a port of call for the steamers of the Union Steamship Co. The island has a length of 30 miles with a maximum width of 6½ miles. High and mountainous throughout, especially in the eastern half where Mount Shepherd attains a height of 2,900 feet, it presents to the observer when viewed at a distance the appearance of part of a submerged mountain chain. The shores are very rugged, with bold cliffs fringed in part with narrow boulder beaches. Sand and gravel beaches are few and there are only three harbours, viz., Marble, Gillies and Blubber Bays, the two latter being somewhat exposed in certain winds.

GENERAL GEOLOGY.

The island is underlain by the Vancouver series of Dawson, part of which has been referred to the Triassic. There seems, however, to be an entire absence of fossils in the associated limetones, and part if not all of the series may belong to the Paleozoic era. The series admits of two divisions. The lower is composed of chlorite and hornblende schists, tuffs, amygdaloidal lavas, porphyrites and agglomerates, which show over small areas obscure bedding. The upper division consists of limestone, varying from a massive thick bedded unaltered rock to a fine-grained pure white marble.

Subsequent to the deposition of the limestone there was considerable volcanic activity, and the whole of the Vancouver series was much disturbed by intrusions of diorite, gabbro, hornblende and augite-porphyrites and diabases. The relations of these rocks with the limestones are well seen where they have intruded as dykes, sills and irregular masses faulting and marbleizing the latter.

These igneous rocks, both older and younger than the limestones, have been much altered, and a large proportion of their present mineral content consists of secondary epidote, magnetite, chlorite, pyrite and calcite. They are widely developed and underlie the greater part of the island. The limestone, with the exception of a few small outliers, appears only at the northwest end where the exposure has a length of 7½ miles, with a maximum width of two miles. In upper Jurassic times extensions of the great Coast Range batholith, consisting of granites and syenites, penetrated this older series and had a profound effect on them, producing schistose structure and shear zones in many of the igneous rocks, and converting the limestone to various crystalline types along with wide-spread faulting, as the discordant strikes and dips now show.

The coast batholith was followed by a great series of basic dykes, principally diabases and all the older rocks have been cut by them.

The Cretaceous has a limited exposure at Gillies Bay, consisting of feldspathic sandstones with calcite cement. The beds are probably basal, and are but slightly disturbed with low dips to seaward.

During the Glacial period the island was eroded by the Strait of Georgia glacier. A thin mantle of drift covers certain areas, composed of sandy boulder clay, the boulders being principally varieties of granite from the main coast.

In the general depression which followed, the island was much reduced in size, being some 400 ft. lower with respect to sea-level than at present.

ECONOMIC GEOLOGY.

In the early nineties attention was first called to the occurrence of free gold in quartz veins, and later, deposits of rich copper sulphides were found in the limestone. These latter were not considered of any great importance at the time, but subsequent development has proved the contrary. Both divisions of the Vancouver series contain valuable ore bodies, which are found in the eruptive rocks, at their contact with the limestone, and in the limestone.

In the eruptive rocks, the ores occur in shear and fracture zones with quartz and country-rock gangue. Much movement is shown by the slickensided walls, and later cross fractures are filled with calcite. The

*"Journal Canadian Mining Institute," Vol. IX, p. 39; *Engineering and Mining Journal*, 1902, Vol. 73.

ores are galena, zinc blende, copper and iron pyrites carrying as a rule low values in gold and silver. The ore is also very pockety, and solid ore alternates with barren zones. The width of the veins varies from 2 to 4 ft., and one mine only, the Surprise, has been proved to a depth of 360 ft. Other veins contain pyrite chiefly and have been noted for the rich showings of free gold in quartz. These, unfortunately, were only surface enrichments and had no depth, the pyrite immediately below being practically barren.

Contact deposits between the various igneous rocks and the limestone include the large and important bodies of magnetite situated on the south side of the island and owned by the Puget Sound Iron Co. On this property there is also a series of copper deposits —chalcopyrite and carbonates—along the contact of the limestone with the altered porphyrites or the magnetite. The ore occurs in rudely lenticular bodies lying at various angles from vertical to horizontal, the limestone being almost invariably the hanging wall or roof.

The important deposits of bornite and chalcopyrite, to which particular reference will be made, are found wholly in the limestone. At present two mines are being worked, the Marble Bay and Cornell. The Copper Queen, which was the pioneer mine of the

THE MARBLE BAY MINE.

In 1897, an insignificant outcrop of copper and iron pyrites with some bornite was found a quarter of a mile east of Sturt Bay, on a Crown-granted lot owned by Messrs. Christie and Palmer of Toronto. A shaft was sunk on the ore and drifts were run, but it was not until the 260-ft. level was reached that the ore body assumed a definite character.

In 1902, the property was purchased by the Tacoma Steel Co., for $150,000, and it was extremely gratifying to the company to have been able in three years to pay the whole of the purchase price out of the profits earned by the mine. The mine is now 760 ft. deep and 715 ft. below high tide. The ore body from the 260-ft. level to the present workings has varied in length from 75 to 115 ft., and in width from a few inches to 45 ft. On the first floor of the 760-ft. level, it is 87 ft. long with a maximum width of 32 ft.

From the 140- to the 560-ft. level the ore body pitched north at a high angle, but from there to the 760-ft. it is practically vertical.

From the data collected this deposit may be described as an ore shoot occurring in a zone of brecciation in the crystalline limestone, this zone being approximately parallel to the strike. Divided into subordinate shoots above the 360-ft. level, it has, below that, been continuous. The borders are broadly irregular, and small stringers are given off which run a few inches into the country rock. In the upper levels the walls were brecciated and weak, but in the lower they are firm, and very little work is necessary in the way of lagging. The ore is bornite with subordinate chalcopyrite, and a little pyrite, pyrrhotite and molybdenite. These occur in a gangue made up largely of pale green pyroxene ("green-felsite") and reddish brown garnet ("bull-felsite") with calcite. The ore is either finely disseminated through the pyroxene, or occurs in large rather pure masses between it and the limestone. Very little is found in the garnet. A considerable proportion of the pyroxene gangue is partially altered, and disintegrates rapidly on exposure to the air. There are also large areas of the pyroxene which are practically barren. A microscopic examination of a few prepared sections of the gangue shows that the pyroxene (variety omphacite) occurs in mosaics of clear individuals with turbid borders. The garnet, which shows zonary structure and optical anomalies, is traversed by numerous cracks filled with turbid material, in part calcite. Towards the calcite, the garnet has a tendency to develop crystal outline. Bornite and chalcopyrite occur in small grains, solitary or connected in groups by narrow stringers between the pyroxene individuals, inter-grown with them, or along cracks in them and the garnet. Calcite with the larger grains of the sulphides, well formed garnets-andradite, and vesuvianite were the last to crystallize out and filled all the interstitial spaces.

Subsequent to the formation of the ore body it was cut by one of the later dykes of basic porphyrite. Between the seventh and eighth levels it varied in width from 4 to 6 ft. with ore on both sides. This dyke dipped to the south, and in its downward extension became much reduced in size. On the 760-ft. level it is only 7 in. wide and crosses the drift some distance south of the ore body. It is highly altered with a development of numerous fissures now filled with epidote, and pyrite. This intrusion caused considerable movements in parts of the ore body, and many small fissures were formed and subsequently filled with chlorite, pyrite and calcite. Some beautiful examples of slickensided surfaces are seen, especially where molybdenite occurs. The pyroxene and garnet have both been fractured and under microscopic examination the former showed strain shadows, incipient and complete granulation, with considerable alteration. Bornite has been redeposited along these lines of fracture, between individual grains, and along cleavage planes. It occurs in solitary and connected grains and parallel bands. Calcite of the first generation shows strain shadows, and the last phase in the formation of the deposit was the filling up of all the small interstitial spaces with calcite. The order of crystallization was pyroxene and garnet, simultaneously, along with the greater part of the bornite, then the remainder of the bornite in larger masses associated with well formed garnets, vesuvianite and calcite.

ORIGIN.

This deposit is closely connected with the intrusion of the coast granite and is clearly of pneumatolytic origin, being an example of the Kristania type.*

It is well known that molten magmas give off enor-

*"Genesis of Ore Deposits"—Prof. J. H. L. Vogt, p. 648 *et seq.*; Waldemar Lindgren, p. 725 *et seq.*

"Trans. Amer. Inst. Min. Eng."—W. H. Weed, Ore Deposits near Igneous Contacts, Vol. XXXIII, p. 720.

mous quantities of aqueous vapours which in this case would have a profound effect on the limestone through which they would pass along zones of brecciation or bedding planes. The limestone has here been replaced by silicates rich in lime, and by sulphide ores with the consequent liberation of carbonic acid gas. With the exception of the lime and a small amount of magnesia, all the other constituents are foreign to the limestone and must have been brought up from below with the aqueous vapours.

An approximate analysis of the pyroxene gangue resulted as follows:

	Per Cent.
SiO_2	55.25
FeO and Al_2O_3	6.50
CaO	25.00
MgO	14.50

Garnet (andradite) averages about 31 per cent. and vesuvianite about 35 per cent. of lime oxid-

The deposition of ore and gangue went on simultaneously with the cooling of the granite magma, and the ore body was formed before the intrusion of the aplite dykes. These dykes have not been found as yet in the Marble Bay mine, but they have been noted in two instances in the neighbouring deposits.

ORE VALUES.

The ore throughout is essentially high grade and carries good values in gold and silver. The ore which is finely disseminated through the pyroxene gangue carries much higher values in gold and silver, than the purer and more massive bornite and chalcopyrite. It has also been found that the percentage of copper has steadily increased with depth.

As it is necessary to mine considerable barren gangue which is intimately mixed with the productive, the ore is hand-sorted before shipping and graded into coarse and fines. The waste, on account of its fluxing properties, is shipped in large part and sold to the smelter. At present the total production is sent to the Tacoma smelter for treament.

In order to ascertain the average value of the ore, the smelter returns for the year beginning in June, 1905, and ending June, 1906, were examined, with the following result:

Grade	Gold oz. per ton.	Silver oz. per ton.	Copper per cent.(dry)	Net value per ton.
Coarse . . .	0.498	4.138	6.765	$28.77
Fines . . .	0.1673	1.569	1.602	$6.88
Waste . . .	Tr.-.08	0.15-0.9	0.22-0.8	$0.50
Coarse. . .	1.006	5.73	11.25	.....

The last entry of coarse grade refers to a shipment of 116 tons made in July, 1906.

About 13,000 tons are mined annually, and approximately for every ton of coarse, two tons of fines and two of waste are shipped. Through the courtesy of F. C. Robinson, of the Sheffield Smelting Works, I am enabled to publish a few interesting assays which he made of the ore and gangue. The samples were taken from a stope on the 660-ft. level, and the gold and silver values are stated in ounces per long ton.

Number.	Assays—Gold	Silver.	Analyses	I	II
I.	0.40	18.60	Insoluble. . .	31.60	43.10
II.	1.05	7.85	Copper . . .	34.00	13.60
III.	0.008	0.04	Iron.	10.30	9.90
IV.	0.025	0.07	Lime.	Trace	.....

I. Bornite and chalcopyrite, (massive ore).

II. Pyroxene and garnet gangue with finely disseminated bornite.

III. Calcite after removing mineralized portions.

IV. Calcite and garnet after removing mineralized portions.

Numbers III and IV are interesting in showing the occurrence of gold and silver in what was apparently barren gangue. Free gold in distinguishable leaves and grains has been found occasionally, but it is not a common occurrence.

SIMILAR DEPOSITS.

The ore shoots of the Copper Queen and Cornell mines adjacent to the Marble Bay are associated with basic dykes, some of which are older than the ore bodies. These are very much decomposed and in places have altered to a serpentine which carries ore, and is occasionally traversed by small veins of greenish white asbestus. The former mine has been noted for certain occurrences of free gold and argentiferous tetrahedrite. The deposits in the Whitehorse district, Yukon Territory, differ from the above, in that they carry low values in gold and silver, and higher values in copper. Their mode of occurrence, however, seems to be identical.

CONCLUSION.

The past development of these mines on Texada Island has proved the ore bodies to a considerable depth, the Copper Queen being 740 ft. deep, while a winze is now being sunk to the 860-ft. level in the Marble Bay. As regards the permanence of these deposits, there seems to be very little doubt they will continue until the limestone-granite contact shall be reached.

What is known as the "H" vein in the Le Roi No. 2 company's mine at Rossland is believed to have been discovered on the 900-ft. level. Drifting at that depth is in progress, and the vein is reported to be looking most promising. Average width has not yet been determined, but it is not less than 18 in. Assays so far give lower gold value than on the 700-ft. level, but copper is about the same, viz., 0.50 per cent. This discovery is regarded as important.

The Payne mine, group of mineral claims, concentrating mill, etc., situated near Sandon in the Slocan district, have been advertised for sale by auction in Montreal, Quebec. The company has for several years been in financial difficulties and operations on its property have been restricted to mining and milling on a small scale by lessees. The Payne was one of the earliest and most valuable locations made in the Slocan and during the mine's days of prosperity an aggregate of $1,363,000 was paid in dividends.

PACIFIC COAL CO'S ANTHRACITE BREAKER AT BANKHEAD.

First Plant of Its Kind Erected in Canada.

By Lewis Stockett and Bruce R. Warden.

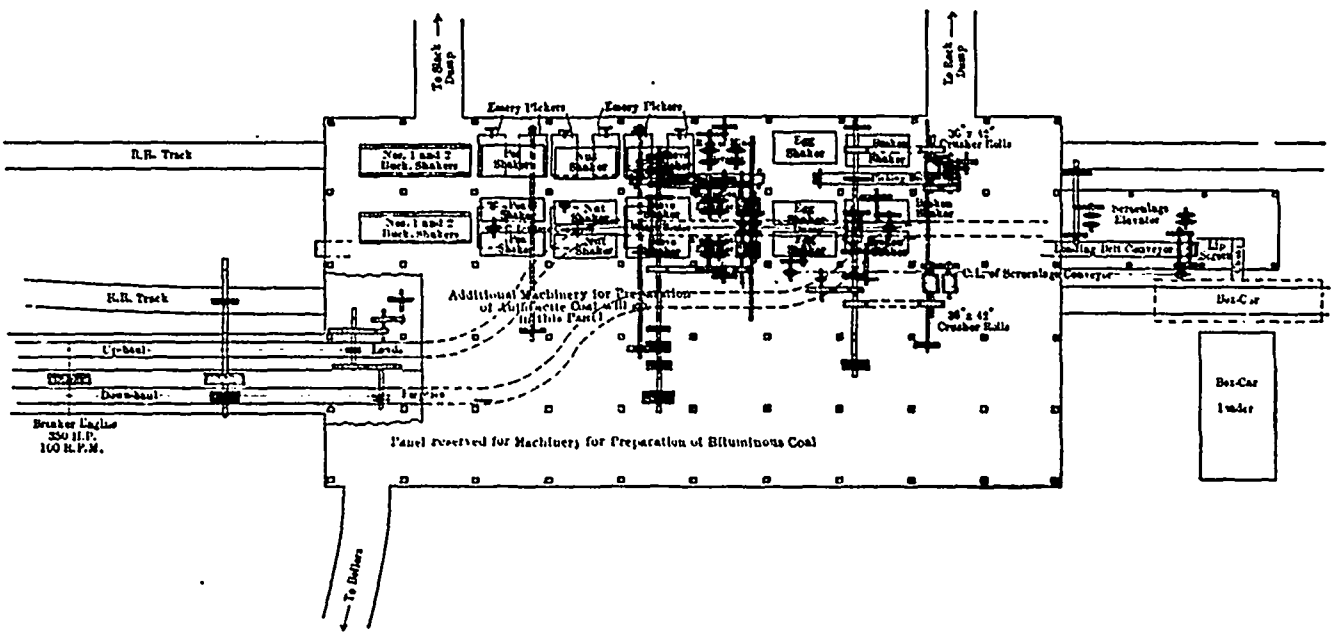
AT BANKHEAD, ALBERTA, there was erected in 1905 a modern coal breaker, which was described by Lewis Stockett, manager at Bankhead for the Pacific Coal Co., Ltd., and Bruce R. Warden, engineer, in a paper jointly contributed to the "Journal of the Canadian Institute, 1906," Vol. IX, as follows:

"The coal breaker recently erected for the preparation of the anthracite coal mined by the Pacific Coal Company may be a matter of interest to mining men, and should be a subject of pride to Canadians, as it is the first plant of this kind to be erected in Canada.

	Per Cent.
Moisture	0.50
Volatile	8.00
Fixed Carbon	83.50
Ash	8.00
Sulphur	0.40
Specific Gravity	1.40
Ash, White	
British Thermal Units	14,000

"In the preparation of anthracite coal, machinery is required to screen out all the dust, remove all the impurities, such as rock, sulphur balls, slate and bony coal, and separate it into several sizes. These sizes, conforming very nearly with the practice of the anthracite collieries of Pennsylvania, are divided as follows:

Broken, through 3-in. bars and over 3¼-in. round holes.
Egg, through 3¼-in. holes and over 2¼-in. holes.
Stove, through 2¼-in. holes and over 1½-in. holes.
Nut, through 1½-in. holes and over 1-in. holes.



Plan of the Pacific Coal Company's Breaker.

"The geology of the field in which the Bankhead colliery is situated has been described in other papers; it is not therefore the purpose of this article to give any description thereof. Seven of the seams in it have been developed up to date, and a cross-cut tunnel driven across the measures will develop the remaining beds, the prospecting work having shown that there are at least twelve seams in the basin. Of the seven opened up, four are being worked; one is used for the main haulage road and air courses and two are not being worked on account of the friability of the coal and the large percentage of the smaller sizes they make, the market for which is at the present time somewhat limited, but is being extended as the proper appliances for burning these small sizes under boilers are put in.

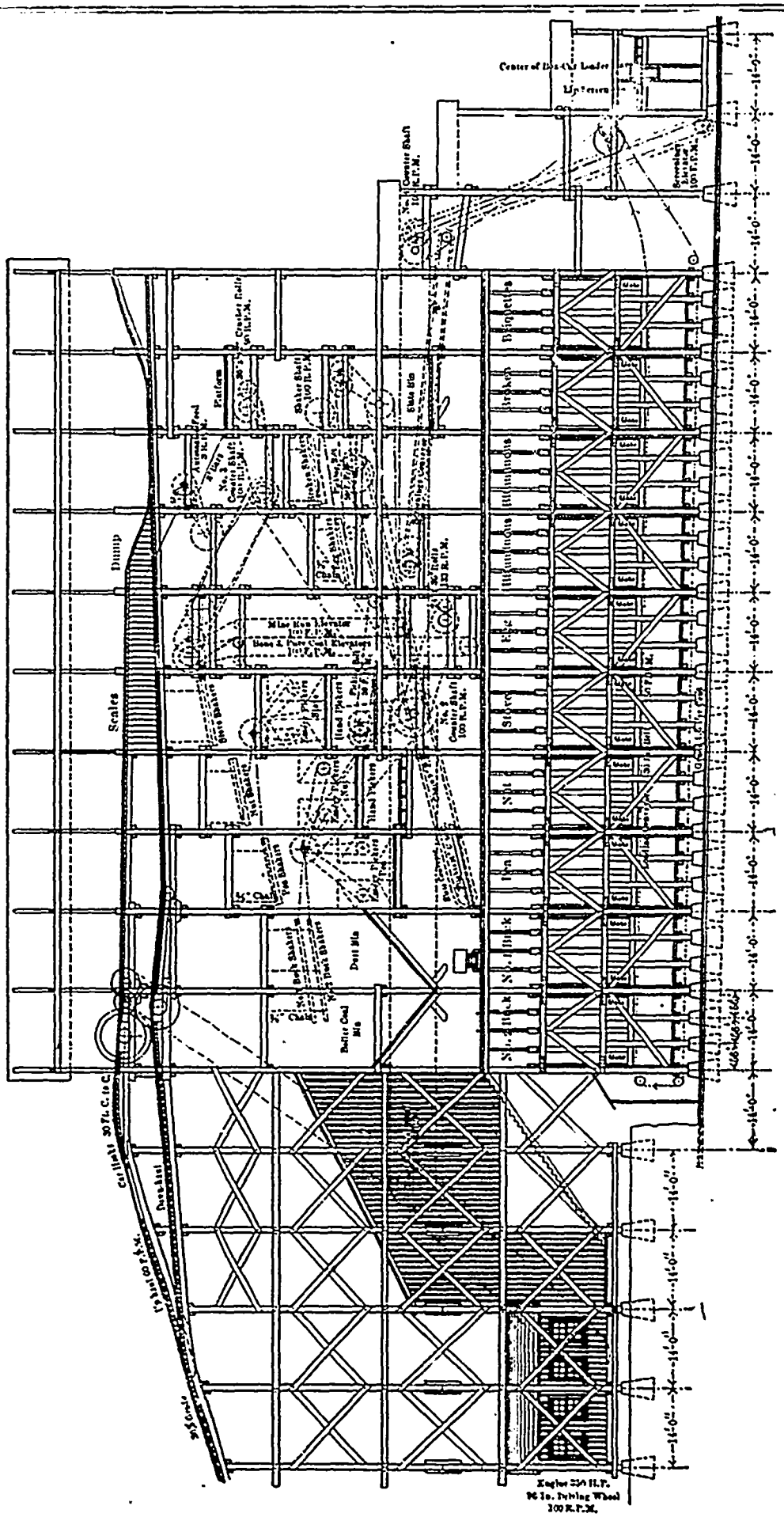
"An average analysis of the coal is as follows:

Pea, through 1-in. holes and over 9-16-in. holes.
Buckwheat No. 1, through 9-16-in. holes and over 5-16-in. holes.
Buckwheat No. 2, through 5-16-in. holes and over ¼-in. holes.
Buckwheat No. 3, through ¼-in. holes and over ⅛-in. holes.
Dust, through ⅛-in. holes.

"All the sizes are marketed with the exception of buckwheat No. 3 and the dust, the latter of which, preparations are being made to briquet, and buckwheat No. 3 will be used under the plant boilers as more and more of the buckwheat No. 2 is taken by the general market.

RECEIVING THE COAL.

"The accompanying diagram gives graphically the method used in the preparation. The coal is hoisted to the top of the breaker (100 ft. above the railroad



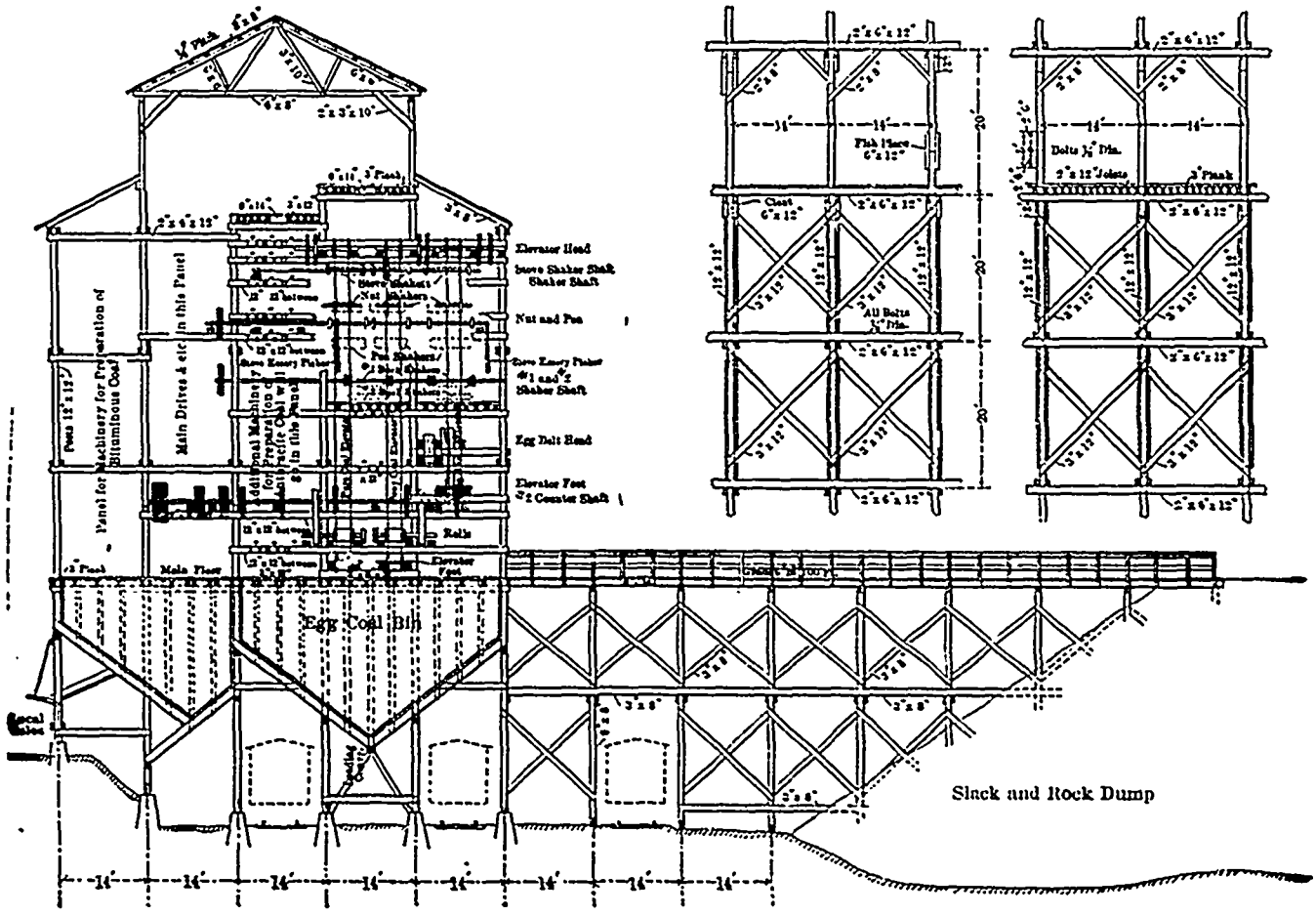
Longitudinal Section of the Pacific Coal Company's Breaker, Showing System of Drives and Location of Shakers and Pickers.

tracks) by means of an endless chain, travelling 60 ft. per min., with hooks spaced 30 ft. apart, to engage the axles of the mine cars. This will deliver two cars per min. The capacity of these cars is something over two tons, giving a capacity of 2,400 tons per day of 10 hours, which can be increased by spacing the hooks 20 ft. or even 15 ft. apart as may become necessary. The empty mine cars are returned down the incline by another endless chain, travelling at the same speed and with hooks spaced 12 ft. apart, to which they are fed by an auxiliary chain so arranged that as the cars are delivered to the main chain a hook is waiting in readiness for each car and the car is delivered to the chain without shock. The grades of the track are such that the car handles itself, from the time it leaves the top of the uphaul chain until it arrives at the top of the downhaul chain. The tracks at the bottom of the incline also have their grades arranged so that the loads feed into the bottom of the incline and the empties run away from it.

"The coal after passing over a scale which weighs it as it passes, is dumped by means of a crossover tipple, into a dump chute, and fed by an automatic feeder regularly over a set of screen bars with 3-in. spaces on to a platform. This automatic feed revolves 1½ r.p.m., and has four compartments, each of which contains about 1,000 lb. of coal, so that it has a capacity of two tons at each revolution, or three tons per min., and 1,800 tons in 10 hours.

THE FIRST SEPARATION.

"On the platform the material is sorted and the rock and slate pushed into the rock bin, the coal is separated, the lumps of pure coal going through a set of rolls and being broken up into marketable sizes, and the lumps containing a portion of bone or slate through another set of rolls to be likewise broken up and to allow the removal of the pieces of bone and slate. These rolls revolve at 90 r.p.m., are 36 in. in diameter, and 36 in. long, and have inserted steel teeth 1¾ in. square and 3½ in. long, spaced 4¾ in. apart and set diagonally.



Cross Section of the Pacific Coal Company's Breaker. Also Showing System of Framing.

"From here we have three separate and distinct streams of coal, which, on account of their different characters, require different treatment, and by keeping them separate until they reach the loading bins, to be loaded into the railroad cars, they are enabled to get the preparation they require.

"The 'pure coal' as it comes from the rolls needs only screening to take out the dust made in the breaking, and to separate it into the different sizes, any pieces of slate or bone which may appear being removed by hand.

"The 'bony coal' not only requires this, but also thorough cleaning of the pieces of slate and bone; this is accomplished in the broken and egg sizes, by pass-

ing from the screen on to a picking band, from which the impurities are removed by hand picking, the rock and slate going into a conveyer which takes it to the rock bin, and the pieces containing both coal and slate or coal and bone to another set of rolls to be broken up smaller, so that the coal can be saved in the smaller sizes.

THE SMALLER SIZES.

"What remains after the broken and egg sizes are taken out is elevated to the top of the building and, passing over another set of screens, is separated into stove, nut, pea, buckwheat Nos. 1 and 2 sizes, the dust going into the dust bin, to be hauled out and dumped on the waste bank at the present time; later on, a briquet plant is to be erected to briquet this dust. The stove coal, after it leaves the screen, goes over a mechanical picker, known as the 'Emery' picker, which removes the slate and bone. The coal from this picker and also the refuse are picked by hand to save any coal that may be thrown out with the slate, and to remove any pieces of slate which the machine has failed to remove. The coal then passes to the bins, and the refuse to a conveyer to be conveyed to the rock bin. The nut and pea coals are similarly treated, with the exception that with the pea there is no hand picking. The No. 1 buckwheat, as it leaves the screen, passes over slater bars which remove the flat pieces, and as these flat pieces are nearly all slate, cleans the coal with very little loss. The No. 2 buckwheat is found to be sufficiently clean without any further preparations, and goes direct to the bin.

"The 'mine-run' coal, that portion which passes through the 3-in. bars above the platform, is conveyed to the broken screen by means of a chute, the bottom of which has ¼-in. square perforations to remove the dust, which falls into the dust bin; the broken screen removes the broken size, the remainder passing over 3-16-in. round perforations on the bottom of the broken screen, which removes the remaining dust. This broken coal joins the broken coal from the 'bony coal' stream on the same picking band to have the refuse removed. The egg size has similar treatment, and the remainder is elevated to the top of the building, to go through a like treatment as the 'bony coal' stream, with the exceptions that, containing a larger proportion of impurities, it has double the number of Emery pickers and hand pickers, and the nut and pea sizes pass over slater bars which remove the flat pieces.

"The screens on the 'mine-run' side are 6 ft. wide and 12 ft. long, with the exception of the buckwheat screens, the No. 1 being 5 ft. wide and 15 ft. long, and the No. 2 6 ft. wide and 15 ft. long. Those on the 'pure coal' and 'bony' sides are 4½ ft. wide by 12 ft. long, with the exception of the buckwheat screens, which are the same size as those on the mine-run side. They are built of steel plates and angle iron, sus-

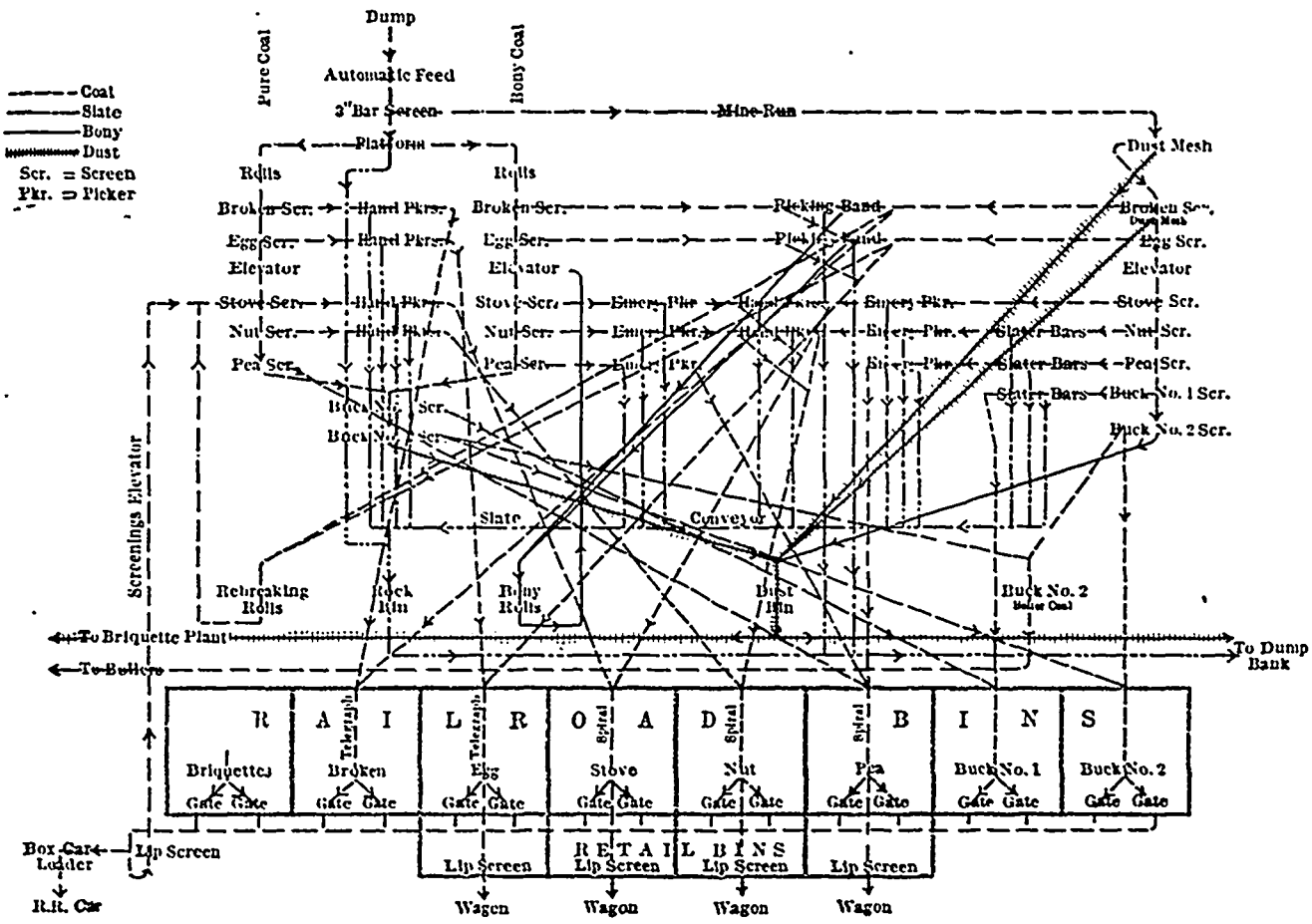


Diagram Showing Method of Preparing Anthracite at Pacific Coal Company's Breaker.

pened on ⅝-in. chains and are driven by eccentrics having 6 in. travel and running 100 r.p.m. The pitch of the screens is 2 in. per ft.

"The 'mine-run' elevator is of the continuous-discharge type, with deflecting shafts to give a more perfect discharge; having buckets 24x12 in., each bucket containing 80 lb. of coal when level full, the speed is 66 buckets per min., giving a capacity of about 2½ tons per min., or 1,500 tons per day of 10 hours. The 'pure' and 'bony' coal elevators are of the same type as the 'mine-run' elevator and both alike as to size, having buckets 16x8 in., containing 22 lb. of coal when level full, and at a speed of 100 buckets per min., give a capacity of one ton per min., or 600 tons for the 10 hours. The combined elevating capacity of the three elevators is 2,700 tons per day of 10 hours.

REMOVAL OF SLATE.

"The material to be separated is fed over the inclined chutes by feeders. The lower ends of these chutes are slate slabs, and as the material is fed over them the difference in the specific gravity of the coal and of the refuse, and also the difference in shape, causes a difference in the friction, that of slate being the greater as it passes over the slate slab, which retards the movement of the slate so that it falls into the opening and thence into the slate chute, the coal acquiring velocity enough to jump the opening at the bottom and pass on into the coal chute. Both the pitch of the slab and the width of the opening are readily adjustable by means of levers, and these are adjusted to meet the requirements of the coal and changed when found necessary. The feeders oscillate 65 times per min., and it is to this regularity in the feed that the success of the machine is largely due. The capacity of each picker is 100 tons per day of 10 hours.

"The slater bars are set on the end of a screen, or in a chute, where the coal can slide over them. The flat pieces fall through the narrow openings, and as nearly all of the flat pieces are slate, by getting the proper width of opening all of the flat slate is removed, leaving those pieces of slate which are the same size as the pieces of coal to be dealt with by the Emery picker and hand picking.

"The hand picking is done on picking bands for the larger sizes and on inclined chutes set at pitches varying from 4 to 5 in. to the foot for the smaller sizes. Chinamen and boys are employed for this purpose.

THE LARGER SIZES.

"A set of re-breaking rolls, 24 in. in diameter and 36 in. wide, with 1¼-in. square steel teeth 2 in. long, set diagonally and spaced 3¼ in., revolving at 133 r.p.m., is provided for re-breaking the broken and egg sizes into stove and smaller sizes when the market conditions are such that a larger proportion of these sizes is required than is ordinarily made.

"A set of bony rolls of the same diameter and width and running at the same speed as the re-breaking rolls, with steel teeth 1 in. square and 1½ in. long, set diagonally, and spaced 1 15-16 in., is provided to break up the pieces containing both coal and bone or coal and slate, picked from the broken and egg-picking bands.

"The material from the re-breaking rolls is elevated in the pure-coal elevator to the screens above, to be separated into sizes, and the material from the bony rolls is likewise elevated in the bony elevator to the screens above, to be separated into sizes and cleaned.

"The stove, nut and pea sizes, after preparation, are conveyed into the bins by means of spirally inclined chutes to save the breaking of the coal. These inclined chutes extend from the top to the bottom of the bins, and the coal slides down them until it reaches the pile of coal in the bottom of the bin or wherever it may be. The broken and egg sizes are conveyed to the bin by straight inclined chutes, called telegraphs; it having been found that the spirally inclined chutes would not work well with these larger sizes.

CONVEYERS.

From the bins the coal is drawn out through gates to a belt conveyer, 36 in. wide and running the full length of the building at a speed of 150 ft. per min., which conveys it to a lip screen set on an inclination, with different sized perforations for the different sizes of coal. This screens out any dust and smaller sizes that may be in the coal before it passes into open cars direct or to the box-car loader, to be loaded into box cars. From this lip screen an elevator conveys the screenings to the top of the bins, where a conveyer takes it to the pure-coal elevator, to be elevated to the screens above and separated into such sizes as it will make.

"This lip-screen elevator is of the same size as the bony and pure-coal elevators, simply not to have too many different-sized pieces of machinery, but is run at one-half the speed.

"The screenings conveyer is a flight conveyer, working in an iron trough with 16x8-in. flights every 36 in., and having a speed of 100 ft. per minute.

"The slate and other refuse from the various picking machines and hand pickers slide by gravity into a flight conveyer, similar to the screenings conveyer, except that the flights are spaced 18 in. apart, giving double the capacity.

"The box-car loader is the Victor loader, and is run by its own engine with steam from the main boiler plant.

"Power is furnished for all the rest of the machinery, including the hoisting on the incline, by a 16- and 28x36-in. cross compound horizontal engine, running at 100 r.p.m., using steam at 120 lb. pressure in the high-pressure cylinder and capable of developing 350 h.p.

"All of the drives are 1½-in. Manila rope, except a few short drives where rubber belting is used. The main drives are continuous ropes with tension carriages, and the side drives are loops, the plan being followed of putting one more loop on each drive than was necessary, so that in case of one coming off or breaking, the plant could still continue to run. Splicing and shackles of different kinds have been tried

on the ropes with the result that the splicing, while troublesome until a rope gets stretched, and taking longer to make, has been found the most satisfactory. All of the main lines of shafting in the breaker run at 100 r.p.m., from which the required speeds for the different machinery are made by a difference in the size of the pulleys or rope wheels, and where a very slow speed is needed, by pinions working into larger spur wheels.

BUILDINGS, ETC.

"The foundations of the building and machinery are all of concrete, the gravel and sand for which were had from the excavations. Eight hundred and fifty barrels of cement were used. The posts of the building and inclines rest directly upon piers.

"The timber used was coast fir, about 1,000,000 ft. b.m. being used; no mortises and tenons, gaining or dapping were used, and the style of framing may be described as continuous posts, spliced together, with all cross timber, braces, etc., bolted on, these timbers when necessary being further supported by wooden brackets bolted on. As a square, crosscut saw, auger, hammer and monkey wrench were the only tools used, it gave a quicker and cheaper method of erecting. There is not the settling due to rotting of mortises and tenons, the drying out of the timber or the load being carried across the grain of the wood. There is also a great stiffness, which in a building of this kind, where there is so much moving machinery and vibration resulting therefrom, is necessary. As the timber dries out, all that is needed is to go over the bolts and tighten them up. The building has proved to be solid and free from shaking, either from the movement of the machinery, or the wind pressure from some severe winds which have occurred since erection.

"The building is heated by direct steam in coils of 2-in. pipe, about 5,000 lin. ft. being used for the purpose. The lighting is done with 16-c.-p. incandescent electric lights, about 200 being used. For fire protection there are two fire plugs on the outside of the building, with two connections on each plug for 2½-in. fire hose, the water pipes having a head of 400 ft. Also two stand pipes, one at each end of the building, with hose connections at three different heights, having a hose and nozzle always attached and requiring but the opening of a valve. Sixty fire buckets set in convenient racks and standing full of water are ready for immediate use on the breaking out of a fire.

"The rock and dust are hauled out over trestles in iron dump cars holding 1½ tons each by a 6x10-in. compressed air locomotive, weighing 5 tons, to the waste bank. The dust will later be taken by a flight conveyer to the briquetting plant, and the resulting briquets returned to the breaker by the same method.

"Every car of coal is sampled and tested for the percentage of slate, bone and small sizes contained in it; if it does not come within the following table of standards adopted by the Pennsylvania anthracite market, it is unloaded into the breaker to be re-cleaned:

	Slate	Bone	Undersize
Broken	1	2	0
Egg	2	2	0
Stove	4	3	0
Nut	5	5	15
Pea	10	..	15
Buckwheat No. 1	15	..	20
Buckwheat No. 2	..	..	30

Duplicates of all the pieces of machinery which are liable to break or wear out have been provided and are kept conveniently placed so as to be quickly put in.

Excavation was commenced	April	3,	1905
Foundations were commenced	April	14,	"
Framing was commenced	May	27,	"
Erection was commenced	May	31,	"
First machinery placed	July	24,	"
Foundations finished	July	25,	"
Erection finished	Oct.	14,	"
Machinery finished	Oct.	28,	"
Breaker tried	Nov.	6,	"
Breaker started up	Nov.	13,	"

The cost of the breaker and incline is shown in the table below:

General expense	$ 3,076.73
Labour	34,829.35
Lumber	15,709.97
Cement	4,238.90
Iron and Hardware	6,209.34
Machinery	30,262.45
Freight	17,414.19
Duty	4,740.08
Power, tools, etc.	815.66
Pipe and fittings	1,561.72
Electric supplies	317.19
	$119,175.58

"The force required to man the breaker is as follows:

Breaker engineer	1
Oiler	1
Bottom man	1
Car oiler	1
Spragger	1
Top man	1
Weighman	1
Dumpers	2
Platform men	5
Screen men	6
Emery picker men	3
Hand pickers	35
Dirt bank men	4
Locomotive engineer	1
Locomotive switchmen	2
Laborers	5
Box car loader engineer	1
Box car loader men	4
Foreman	1
Carpenter and repairman	1
Weighman	1

"The breaker will not be complete until another side of mine-run machinery shall have been installed, which will require another dump, bar screen, platform, screens and elevator; it will then be abundantly able to handle 2,000 tons of material per day of 10 hours. After the additional mine-run machinery shall be installed, there will still be a vacant panel in

the breaker and also a set of bins; these are being reserved for bituminous coal, the prospecting having shown that there are bituminous veins on the property which will be reached in time. We will then have something unique in coal preparation; that is, both anthracite and bituminous coal from the same mine and loaded from the same building."

UNUSUAL FEAT IN TRANSPORTATION.

Packhorses Convey Long Cable Up Mountain Side.

PACKING LONG CABLES up steep mountain sides is not work to be lightly undertaken. The attendant difficulties and risks are by no means small with loads that can be carried by two or three horses or mules, but when as many as thirty-one animals have to be used to convey a single cable the task is indeed a formidable one, more particularly with such a load, or series of loads, as an aerial tramway cable which must not have a "kink" in it or it would be unsuitable for elevated tramway purposes. E. J. Branford & Co. of Camborne, which is situated in that part of northern Lardeau known

Pack Train of 31 Horses Carrying Aerial Tramway.
Length of Cable 3,600 ft.; Weight 7,600 lb.

The total value of the gold produced in British Columbia to 1906, inclusive, is officially stated at nearly $110,000,000—placer $68,000,000 and lode $41,000,000.

The Mining Society of Nova Scotia has decided to ask the government to employ a competent man for one year to report upon copper and fire clay deposits of the province.

as Fish River camp, last autumn successfully accomplished what may fairly be regarded as a series of unusual feats in transportation. Brief particulars of that firm's successful conveyance of several cables from Camborne to the terminals of the aerial tramway from Camborne up to the Silver Dollar mine were obtained by the editor of the MINING RECORD when he visited that camp last October, but it was only recently that permission was obtained to reproduce a photograph of the long pack train shown in the accompanying illustration, so publication of the following information has been delayed from month to month until the photograph should be received.

Last summer the Crawford Double Rope Aerial Tramway System, Ltd., of Nelson, B. C., contracted with the Elwood Tinworkers Gold Mining Co., of Elwood, Indiana, U. S. A., to supply and erect the aerial tramway above-mentioned. The construction of this ropeway involved more difficulty than is ordinarily met with, since all material other than timbers for the derricks had to be packed up the mountain from Camborne, there not being wagon-road or other suitable means of communication. Messrs. Branford & Co. undertook to convey this material to its destination, and some idea of the magnitude of the work may be obtained from the following facts: On one day a traction cable weighing 1,814 lb. gross was conveyed on nine packhorses about six miles to the site of the upper terminal of the tramway, the altitude of which is about 2,000 ft. above Camborne. On the two following days two ⅝-in. cables, length 6,900 ft., weight 4,900 lb., were taken on 20 horses, also to the upper terminal. The fourth day's achievement was the packing on 23 horses of 3,400 ft. of 1-in. cable, weighing 5,000 lb., to the site of the lower terminal of the tramway. On the fifth day 3,600 ft. of cable, weight 5,700 lb., was taken to the upper terminal on 25 horses. The sixth day's work was the delivery at the lower terminal of 3,400 ft. of 1⅛-in. cable, with 27 horses, carrying the 7,200 lb. weight. On the last day the pack train of 31 horses, shown in the illustration, carried 3,600 ft. of 1⅛-in. cable, weighing 7,600 lb., to the upper terminal. All these cables were taken over a rough mountain trail and delivered in good order.

The photograph here reproduced is one of several taken for the Crawford Double Rope Aerial Tramway System, Ltd., by E. F. Tucker of Arrowhead, whose courtesy in placing it at the disposal of the MINING RECORD is acknowledged with thanks.

TAMARAC GROUP, HIGHLAND VALLEY.

HIGHLAND VALLEY, in the Ashcroft district, has mineral showings which have attracted the attention of a number of mining men from time to time. As yet, though, there does not appear to have been much development work done in that camp. The locality was visited lately by a representative of the Ashcroft *Journal*, who thus describes the Tamarac group:

"The Tamarac group of copper properties is situated about three miles from Fish Lake, up Highland Valley. The group consists of 8 claims: The Tamarac, Star, Shamrock, May L., Duke, King, Billy and Major.

"Outside of the yearly assessment work the bulk of the development has been done on the Tamarac, where three shafts have been sunk, aggregating about 85 ft.

"At first the Tamarac was worked as a molybdenite proposition and a considerable quantity of that mineral was taken out and shipped, while several tons are still lying in the dump. At about 30 ft. down, however, the molybdenum is playing out and its place is being taken by copper. Work was suspended here, and another shaft sunk at a different point and on a different vein, in which there is a 3-ft. vein of copper sulphides exposed. The two veins on which this work was done cut the formation at right angles.

"The shaft now being sunk is on still another vein which cuts the formation diagonally. The shaft is about 6x8 ft., and at the bottom the ore is 4 ft. in width, lying 3 ft. from another paystreak occurring toward the hanging wall of the vein. It is not known just how thick this second paystreak is, but the quartz which forms it is heavily impregnated with bornite and copper glance and runs 16 per cent. copper.

"The other vein which lies toward the footwall projects 4 ft. into the shaft and is of unknown extent. The material composing this is solid sulphide ore without a trace of quartz in it—that is, at the bottom of the shaft—where three ore sacks of samples were taken. This vein does not show on the surface, but comes in about 7 or 8 ft. below.

"On this property there are seven ledges, all within a width of 300 ft., but until more work has been done it is not possible to say whether they are all one enormous vein reaching the surface through cracks at different points and all springing from the one parent vein, or parallel veins. Not one of them, however, is barren—all contain ore.

"On the Shamrock which lies about 400 ft. from the shaft on the Tamarac an open cut of 6 ft. exposes a streak of ore which runs 9.6 per cent. copper. The vein on the Shamrock is a continuation of the Tamarac veins and would indicate that the values hold out to a remarkable distance.

"Besides having a showing of copper ore, the Tamarac group is well supplied with mine timber; a wagon road can be built to the property at very small cost; and within a mile of the shaft-house there is one of the best water-powers in this section of the country. A good wagon-road already extends to within a mile of the workings, and the mine is located about 15 miles from the Canadian Pacific Railway. It is about 30 miles from Coutlee, where coal mines are located. This will mean much to the operators of this mine in the future."

Zinc Resources of West Kootenay.

Particulars of Occurrences of Zinc Ore in a Number of Mines Worked for Silver and Lead.

PRODUCTION OF ZINC in British Columbia may be expected to hereafter show a substantial increase consequent upon the decision of the United States board of general appraisers, made public early in the current year, that the market of that country is to be open to foreign zinc ores free of duty. There are numerous mines in East and West Kootenay districts to which this decision is of much importance. Most of these were visited by one or other of the experts to whom was entrusted the work of investigating the zinc resources of British Columbia and reporting thereon to the Dominion government. From time to time the MINING RECORD has reprinted from the "Report of Zinc Commission" descriptions of some of the mines officially reported on. Last October descriptions of the Highlander at Ainsworth, and several properties on the south fork of Kaslo Creek, were in this way given additional publicity, while the Lucky Jim mine, situated in the eastern part of Slocan mining division, had similar notice last February. This month the report of Mr. A. C. Garde, assistant engineer in the field, to the chief commissioner on a number of mines and prospects examined by him independently in connection with the zinc resources investigation, is reprinted, as follows:

SLOCAN DIVISION.

The group of mines on Reco Mountains includes several well-known silver-lead mines, situated at elevations ranging from 5,000 to 7,000 ft. above sea level, on the southern slope of the steep mountains directly north of Sandon and Cody. Of these properties I visited the American Boy, the Noble Five, the Reco, and the Goodenough—Grey Copper. My examination was limited to the properties wherein the production of zinc blende promises to become of economic value.

Broadly speaking the veins of this district parallel each other at distances generally not over 500 ft. The formation consists of the usual Slocan slate series, rather thinly bedded and frequently interrupted by intrusive dykes older than the veins and varying in thickness from a few feet to several hundred feet. The general strike of nearly all the veins is very much the same throughout the Slocan, viz., from 30 to 60 deg. east of north, dipping at angles rarely less than 50 deg. toward east, and more frequently approaching the vertical. Bearings stated in the following refer to astronomical north. The deviation varies in the Slocan from 24 to 25 deg. to the east.

AMERICAN BOY MINE.

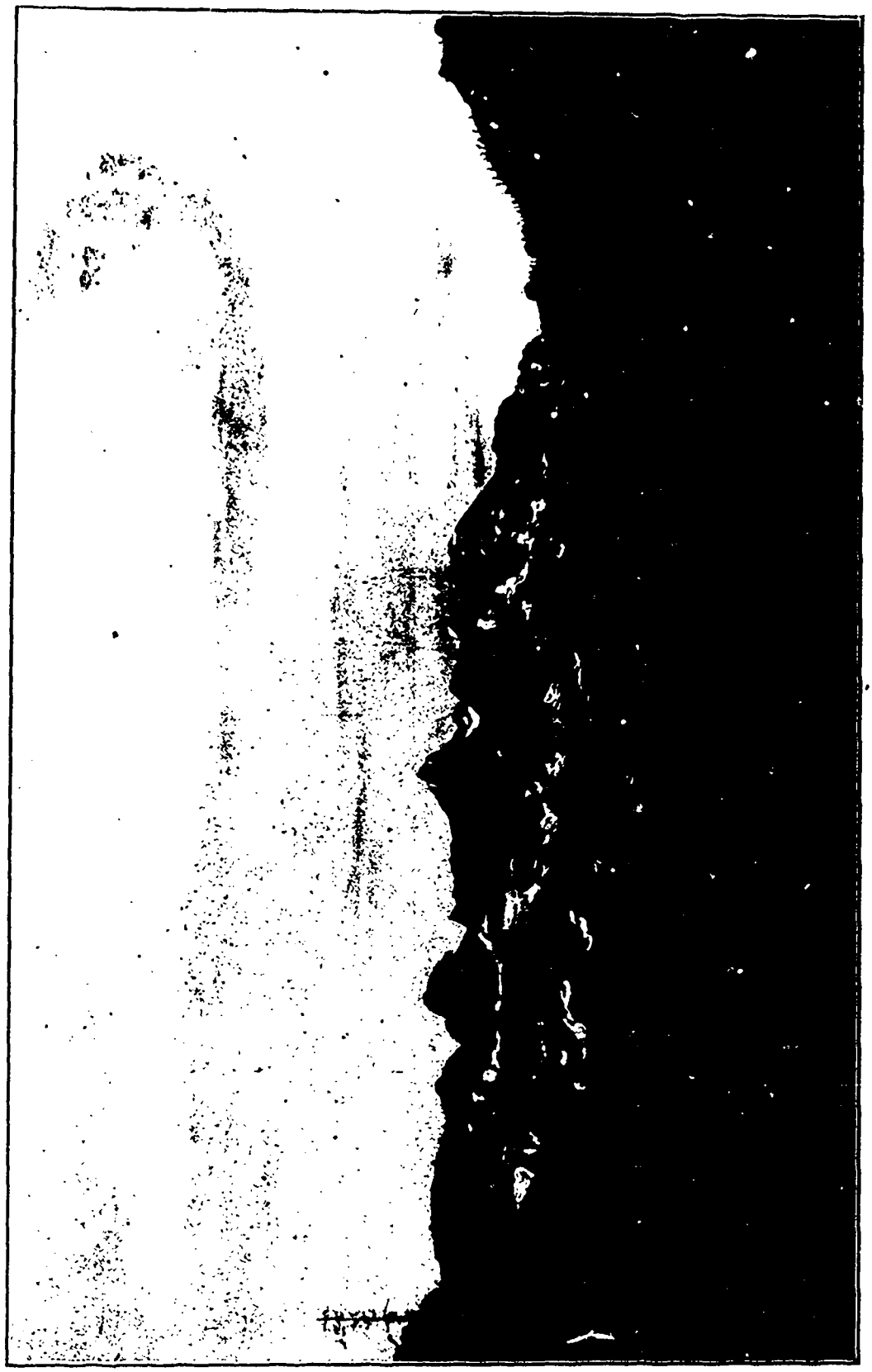
There are seven levels on the American Boy property, but only four of these are being worked at the present time. I went through Nos. 3 and 4; also a raise connecting them. The vein can readily be followed, having strong walls and being generally well defined. In places it widens out to a thickness of several feet, but in the two levels visited it averaged about 2 ft. All levels are driven along the vein, which dips at an angle of about 50 deg. to the southeast, and has a strike of about 40 deg. east of north. In common with the other mines of the same vicinity the principal mineral production has been a high-grade silver-lead ore, containing some blende. Occasionally lenses of rather clean blende are met with. During 1905 a quantity (170 tons) of zinc ore was mined and hand-sorted from the galena and shipped to the Prime Western Spelter Company of Iola, Kansas. Thomas McGuigan, manager of the mine, stated that the average grade of the zinc ore shipments had

Kaslo and Slocan Railway at Payne Bluff, 1,000 ft. up Mountain-side.

been from 45 to 47 per cent. zinc, with about 15 oz. in silver to the ton. The first 130 tons was fairly low in lead, and realized $11 net per ton, while the last 40 tons contained 8 per cent. lead, on which a penalty was levied by the smelter.

In the floor of No. 3 level I took a sample in two cuts, showing 18 in. of blende in the floor and 21 in. above this place in a raise. This was pointed out as one of the best showings in the mine. The sample assayed 39.8 per cent. zinc and 3 oz. silver per ton. The extent of the lens of ore disclosed at this point

could not be determined with any degree of accuracy from the present developments. I was informed by the manager that in addition to the ore body referred to there were others showing in the lower levels. All shipments are brought down to Cody over the Noble Five aerial tramway, which is leased for the purpose and is only a short distance off.



Typical View of Mountain Ranges in Slocan District.

While the American Boy has never been a heavy

producer, its output of high-grade silver-lead ore has for several years been a steady one. It is only within the last year or so that the management has taken up the zinc question, in which considerable interest is displayed.

NOBLE FIVE GROUP.

This group, owned by Hon. James Dunsmuir of Victoria, adjoins the American Boy on the east. On account of litigation the property has not been operated for several years, but at one time it produced a considerable tonnage of high-grade silver-lead ore, which in some cases changed into zinc blende. On one of the claims, called the Deadman, three levels have been driven on a 2 to 3 ft. vein. The strike of the vein is 55 deg. east of north, dipping at an angle of 70 deg. to the southeast and flattening somewhat in a winze sunk from the second level. This level, being the only one of interest from the zinc point of view, was examined. It was first driven 85 ft. along a slip in the slate formation. At this point a crosscut was made into the hanging wall toward the east for a distance of 20 ft., where the main vein was encountered, and explored in a north-easterly direction a distance of 120 ft. Next the hanging wall and along the floor of this drift a lens of zinc blende averaging 12 in. in thickness has been exposed for nearly the whole distance. About 20 ft. from where the vein was first encountered a winze has been sunk to a depth of 100 ft., proving the existence of the ore body all the way down, but decreasing somewhat in size at depth. About half-way down the vein flattens out to an angle of 55 deg. and here the winze fails to make connection with the lower level, No. 3.

In this winze I took a three-cut sample averaging 12 in. in width. It assayed 55.6 per cent. in zinc and 15.1 oz. in silver and represented the best part of the lens. The vein itself is from 2 to 3 ft. wide, and a little galena is occasionally mixed with the vein matter. The zinc occurs, however, essentially as a clean blende. From present developments no considerable tonnage of ore can be estimated, but I believe that the showings warrant the owner in developing the property and blocking out the ground between Nos. 2 and 3. The first step should be to effect a connection between these levels and then explore further by raising on the vein from below. Present work on the property was done some time ago by lessees who extracted all the galena in sight. They discontinued working as soon as the ore changed into zinc and left the mine in anything but a workmanlike condition. I noticed a few inches galena in one or two of the short drifts running off from the winze in a southerly direction. Such places could conveniently be developed in connection with prospecting for zinc.

The Noble Five properties are opened through the third tunnel of the Last Chance mine. This tunnel is of considerable length, and enters the portion of the Noble Five ground known as the World's Fair claim. A dispute in regard to this ground has existed between the two companies; it is now being worked by them jointly. In this ground there is a stope from which the Last Chance mine recently shipped two carloads of ore assaying 52 per cent. zinc. This stope, which is immediately above the tunnel, is approximately 9 ft. high and 50 ft. long. It appears to have been an isolated lens of blende. Its presence was known ever since the tunnel was driven, several years ago, but the ore was not removed until zinc became of value as a shipping product. It is possible that similar lenses will be met with in depth in the ground referred to, and there are indications of such at a point further on and nearer to the face of the tunnel, where a winze is being sunk on the vein at an angle of 65 deg. The ore uncovered here appears to be more of a concentrating nature, and is a mixture of galena, blende and slate. The discovery is of such recent date that no trustworthy opinion as to its value can yet be expressed.

Exposures of zinc ore were reported on other claims belonging to the Noble Five group, in which, however, the workings are now unsafe on account of caving in, and consequently these were not examined.

The Noble Five has good accommodations for the men working at the mine; also at Cody a 100-ton concentrator, which is connected with the mine by aerial tramway. The tramway is at the present time under lease to the operators of the American Boy mine. The concentrator, which is now idle, is not arranged for saving zinc ore, and would require remodelling, but it is conveniently situated for handling concentrating ores from various adjacent properties, and the machinery is being kept in good repair.

RECO MINE.

This property, which adjoins the Noble Five on the east, is one of the oldest and best known of the local mines. It consists of five Crown-granted mineral claims and has a total of 150 acres. I was informed that the company at the present time was not attempting to hand-sort any of the zinc ore associated with the high-grade galena. On account of the blende containing high silver value, it is found more profitable to leave it with the galena, even if it be at times necessary to incur a penalty on the excess of zinc. Past experience with zinc ore shipments to Swansea, Wales, was very discouraging. For a 67-ton lot of blende containing 50 per cent. zinc and 99.5 oz. of silver to the ton the Hafod smelter refused to pay anything for the silver content.. This was in 1898, but even at the present time the prices offered for high-grade silver-zinc ores in the Slocan are by no means satisfactory.

One of the Reco veins (No. 3), which is narrow but of very high grade, was worked in connection with the adjoining property (the Goodenough), for some time on account of the vein running into the latter. The description of this vein further on will therefore pertain to both properties. The Reco has produced a considerably larger quantity of ore from it than the Goodenough, and is being operated extensively at the present time. There are three veins in the Reco property, which strike parallel to each other. About 25 men find steady employment. The property is one of the constant dividend payers of

the Slocan and so far has distributed approximately $300,000.

Ore shipments are made over the Reco trail to the railway siding—a distance of four miles—in a unique and cheap manner during the winter season, this being "sliding" or "rawhiding" on the snow. A one-ton parcel of ore, consisting of about one dozen sacks, is wrapped and laced into a raw cow-hide; this is dragged by one horse down the mountain trail, which has a down-grade of about 17 per cent. Besides the raw-hides the same horses, on their return trip, pack provisions and supplies to the mine. Two men are able ordinarily to attend to 12 horses; occasionally a few more. Rough-locking is done with common log-chains. A hide usually lasts one season, but if well taken care of and provided with wooden runners, it will last longer than that. This method of transp ting ore is also employed by other mines around Sandon, located similarly to the Reco. In a ruggedly mountainous country, such as this, where the snow-fall attains a depth of several feet each season, a more economical way of handling galena ores in small quantity could not be introduced. Tramming, by means of gravitation, is certainly cheaper, but it involves a considerable investment, which is seldom warranted where the tonnage is small.

GOODENOUGH MINE.

Grey Copper Claim.—This property owned by the Goodenough Mines, Ltd., is situated to the east of the Noble Five group and adjoins the Reco mine to the south. It consists of the Grey Copper claim, which is of full size (600x1,500 ft.) and two fractions, the Goodenough and the Purcell, all Crown-granted, having a total of 50 acres. It has two parallel veins, of which the upper one on the Goodenough is known as the continuation of the Reco vein No. 3, in conjunction with which it was worked from 1894 to 1902. During this period 450 tons of hand-sorted galena was shipped, averaging 45 per cent. lead, 2 per cent. zinc and 300 oz. silver to the ton. The average thickness of this vein is only 8 in. and its greatest thickness 30 in. Four levels, respectively 66, 225, 600 and 775 ft. long, have exposed the vein to a vertical depth of 450 ft., with a total stoping area of 3,300 sq. ft. Since 1902 the property has been shut down, but during the last year the company has resumed development work on its second vein, which is known as the Grey Copper. This vein, while so far not productive of the same high grade of ore as the upper vein, has the advantage of being considerably wider and more regular. It promises to become of importance as a zinc producer.

There are two levels, of which the upper one is 50 and the lower one 120 ft. long. Those levels have been driven on the vein which is from 5 to 6 ft. wide, and crops plainly on the surface. The strike of the vein is north 55 deg. east. The dip is to the southeast at about 70 deg. The vein cuts through a large porphyry dyke at nearly right angles, and has in every respect the appearance of a well-defined and true fissure. The porphyry dyke can be followed across the Grey Copper, Texas and Deadman claims and has a width of nearly 1,000 ft. Above the dyke the usual slates and shales make their appearance. They have a bedding-strike of about northwest and southeast, and can be seen on the surface as well as in the workings of the upper Reco-Goodenough vein. It is expected that an additional 50 ft. of tunnelling will take the Grey Copper vein into these slates, and it will be of much interest to observe what influence this change will have on it. The same grade and character of ore is found in both levels, but the pay-streak in the lower one is twice the size of that in the upper one. In the upper level

Mining Camp in Slocan Mountains in Winter.

the pay-streak averages 12 and in the lower level 24 in. in width. Approximately 1,000 tons of ore has been blocked out on three sides between the two levels, which are 85 ft. apart, measured on the dip of the vein. A five-cut sample was taken in the lower tunnel. It represented an average of 24 in. in width and assayed 42.6 per cent. zinc, 18.8 per cent. lead and 33.2 oz. in silver to the ton. As will be seen from the above analysis the ore is of a heavily mineralized character, and requires to be separated more than to

be concentrated. Hand-sorting would be of little use, unless it were followed by concentration of the "sortings." A lot of 40 tons of the ore, which was extracted while developing the levels, was tested at the Payne concentrator, near Sandon. The following data on the results of the test were kindly furnished me by the managing director of the company, J. A. Whittier:

	Silver. Oz.	Lead. Per Cent.	Zinc. Per Cent.
Assay of original ore	17	4.6	41
Assay of lead product.....	100	61.0	13
Assay of zinc product.....	12	1.5	50.4

Mr. Whittier was unable to furnish me the exact weights of the different products, wherefore the efficiency of the process cannot be calculated.

The zinc product of this mine has been contracted to the Canadian Metal Company, of Frank, Alberta.

A sample of the average ore was secured for testing at Denver, Colo.

By trail, the Grey Copper camp is four miles from the nearest railway shipping point (Reco Siding.) The present cost of transporting ore by means of pack horses is $3 per ton, but with a larger output the rawhiding system will no doubt be introduced during the winter season, thereby lowering the cost of transportation materially. The mine crew consists of five men, engaged in driving the two levels ahead.

From its upper vein, the Goodenough Mines, Ltd., extracted at one time $80,000 worth of galena and paid in dividends $45,000, while the second vein on the Grey Copper claim is still only in a prospecting stage; it is very promising, and is the most interesting prospect in the locality referred to.

AINSWORTH DISTRICT.

UNION MINE.

A prospect in Ainsworth, known as the Union, is located slightly to the northwest of the United and Glengarry properties. The vein on this claim appears to strike north and south, bedded between quartzite and slate, and dipping at an angle of about 45 deg. On the foot-wall there are several inches of crystalline calcite next to the quartzite. A prospecting shaft has been sunk on the vein, which is stated to be 35 ft. deep. This shaft was partly filled wtih water and could not be examined. The vein at the collar of the shaft shows a width of 5 to 6 ft. A fair amount of zinc blende and galena is mixed through the vein matter, and a quantity of the material excavated from the shaft can be seen on the dump. On each side of the shaft two or three open cuts have been made on the vein, showing it to be continuous for a distance of about 200 ft. From all appearances it must have been a good many years since the first assessment work on this claim was recorded. The claim is owned by Frederick McLeod of Ainsworth.

BUCKEYE MINE.

This is situated at an elevation of about 2,500 ft. above Kootenay Lake in the northern mineral belt, and like many of the properties in Ainsworth has not been worked for several years. It is approximately two and a half miles from the town. For the first one and one-half miles an excellent wagon road, passing by the Highland mine, is followed. The remainder of the distance is by way of a fair mountain trail.

Development work on the Buckeye consists of two inclined shafts 100 ft. apart, each about 40 ft. deep, and one tunnel 200 ft. long driven in under the shafts. The surface showing of zinc ore is considerable, but the work done does not seem to have been carried sufficiently far to expose the ore at depth. The two shafts are located on a northeast and southwest line, while the trend of the vein appears to be more north and south. There was too much water in both shafts to permit examination of the bottom. To the south of the first one a distinct mineralization is visible on the surface. The second shaft was started outside of the vein, with a view of intersecting it at a depth of about 70 ft., but it was never sunk to that depth.

The tunnel, which is about 75 ft. below the surface showings, was driven as a cross-cut for 70 ft. At that point a body of zinkiferous ore has been intersected and followed for 45 ft. The ore body only shows in the roof and has not been raised upon. Drifting in the tunnel was continued for an additional 150 ft. through country rock, when a second shoot of zinky ore was encountered at the breast, where it can be seen. This exposure appears to correspond with the principal surface showings and seems worthy of attention. In order to learn its extensions the tunnel should be continued. The work was evidently left immediately after ore was broken into, as it was considered of no value by the owners, who at that time were looking for clean silver-lead ore, and not for a matrix of zinc and iron ore with more or less galena mixed through it. A sample of the face (top and bottom), taken on the vein for width of 18 in. assayed 23 per cent. zinc, but carried less than 1 oz. silver to the ton.

The property is owned by W. C. Dalglish of Slocan City.

GALLAGHER MINE.

This is a Crown-granted claim, also situated in the northern mineral belt, one-half mile beyond the Buckeye and approximately 3,000 ft. above Kootenay Lake. The distance from Ainsworth is about three miles. It was at one time a producer, and according to the owner, A. D. Wheeler, 300 tons of lead carbonate ore, carrying silver, were shipped during the early days of the camp. These shipments were obtained immediately from a surface deposit, and a good deal of the same class of material is still scattered around the workings.

Close to these and apparently following the mineralized zone a vertical shaft has been sunk to a depth of 60 ft. At 30 ft. below the collar of this shaft a level has been driven 60 ft. toward the west. At the breast of this drift a fair amount of zinc-lead-iron ore can be seen. At the bottom of the shaft another

drift has been run for about the same distance, and the same ore body broken into. A sample was taken here for a width of 2 ft., representing the best portion of the mineralization. This sample assayed 22.7 per cent. zinc, 3.2 per cent. lead and 24.6 oz. silver. On the surface the vein shows a width of 5 ft., but it is difficult from present developments to connect this surface showing with the ore sampled in the lower level. The strike of surface deposit is approximately north and south and it occurs in a limestone country rock.

NELSON DISTRICT.

MOLLY GIBSON MINE.

This property, owned by the LaPlata Mines Co., is located near the divide between Nelson and Slocan mining divisions, immediately at the head water of Kokanee Creek. By wagon road the main camp is 10 miles from the nearest shipping point, which is on Kootenay River, and is known as Molly Gibson Landing. The mine is tributary to Nelson; the landing is approximately 12 miles from that town by water.

The group consists of four full-size mining claims and two fractions, all Crown-granted, representing a total of about 240 acres. The lower or main camp, where the office and principal buildings are, is at an elevation of 4,600 ft., while the No. 5 level of the mine is 2,400 ft. higher, or approximately 7,000 ft. above sea-level. These terminals are connected by an aerial tramway, 8,000 ft. long, over which all shipments are made to and from the mine. Ample accommodations for the men are found at both terminals. The wagon road from the steamer landing to the lower mining camp is well built and of uniform grade.

The mine is located entirely in a massive, crystalline grey granite, known as the "Nelson granite," which contains large crystals of feldspar. This rock is readily traced to the shores of Kootenay Lake. The veins have a general strike of 30 to 40 deg. west of north and dip to the southwest at an angle of about 75 deg. The vertical depth from the outcrops to the lowest point of development is approximately 800 ft. There are five main and three intermediate levels, of which levels No. 4 and No. 5, and two intermediate ones are by far the most important workings and represent a vertical depth of more than 300 ft. My examination therefore covered these in particular.

A total of about 3,500 ft. of tunnelling has been done along the veins, and, in addition thereto, 750 ft. of raises and winzes. Two veins have been developed, viz., the Florence and the Aspen, of which the former is the larger and more important. It averages from 4 to 5 ft. in thickness, while the Aspen is less than one-half of that width. The policy of the management has been to develop the property in preference to making shipments, and the tonnage shipped so far has therefore not been very large. During 1905 the monthly production has been 110 tons. At the present time all the ore is hand-sorted, and averages, according to smelter returns, about 12 per cent. zinc, 8 per cent. lead and 47 oz. silver to the ton. As it comes from the mine, before sorting the average, according to the manager, is about 7 per cent. zinc, 4 per cent lead, and 20 to 35 oz. silver to the ton. It is classed as a "dry" ore. The cost of hauling the ore by wagons to the landing is $4 per ton, by contract; tramming the ore from the mine is figured at 75c. per ton, and stoping at $2. All the ore is shipped to the Hall Mining and Smelting Co., Ltd., at Nelson, by way of steamer from the Landing.

The first 270 ft. of level No. 4 was driven on the Aspen vein as an adit, and exposed a shoot of ore for a distance of 110 ft. from the portal. This lens has been stoped to the surface above the level, but can be seen here and there for about 175 ft. in the floor. At this place it is narrow and does not represent a very large tonnage. The vein itself which is correspondingly narrow was left at a point 220 ft. from the portal. Here a cross-cut at nearly right-angles was started and driven into the foot-wall for a distance of 60 ft. At this point the Florence vein was intersected and followed at a course of north 35 deg. west. There is a strong and well-defined ledge from 5 to 6 ft. wide, with a seam of talc on the foot-wall, but nothing of particular interest until a distance of 380 ft. is reached. At that point an ore shoot was struck and followed for 330 ft. The width of this pay-streak in this shoot, known as the "big stope," averages 24 in. It has been stoped for a distance of more than 100 ft. above the level, and at the present time there is a good showing of 2 ft. 6 in. of ore in the upper stope. The general assay of the ore after hand-sorting is about as stated previously, according to the smelter returns. A long raise connects this level with No. 3 level and represents a vertical distance of 250 ft.

Following the Florence vein beyond the big stope for an additional 100 ft. it appears to be lean. Here a small fault occurs and a heavy flow of water was struck, the water pouring from a talc gouge on the hanging wall. About 25 ft. further on a new ore shoot is met and pay ore begins to make its appearance again. This can readily be followed in the tunnel, and considerable zinc ore can be seen in the roof; also in the present face. This ore-shoot is from 250 to 300 ft. long. Its average width is about 2 ft. 6 in. In places the vein narrows down to 18 in., while in others it widens out to 6 ft. Coming back 30 ft. from the fore-breast a raise has been put up above the level to a height of about 100 ft., and has proved the existence of the ore very well all the way. The intention is to connect this raise (No. 14) with an intermediate level, which is being driven toward the same at a height of 100 ft. above the level. This intermediate was started from raise No. 11, which is 375 ft. from the main face.

The intermediate level follows the same general direction as the main level, and for the first 150 ft. is correspondingly lean, but a change took place when it reached a point directly above the place where ore had reappeared in the main level. From here onward the ore is continuous for 60 ft., or as far as the north face had been driven up to the date

of my visit (Oct. 12, 1905). It is undoubtedly the same shoot, and the vein shows a very strong and distinctly banded structure for a width of 5 ft., dipping slightly to the southwest. A two-cut sample was taken here (top and bottom) on four parallel stringers representing a total width of 30 in. of ore. It assayed 19.6 per cent. zinc.; 17.4 per cent. lead and 74.4 oz. silver to the ton.

The intermediate level will have to be continued for about 120 ft. before connection is effected with raise No. 14. This work is being done as rapidly as possible. At the same time the main level is also being driven ahead.

From the intermediate level to the next level, No. 3, the vertical distance is 150 ft., but as this level has not yet been extended beyond a point corresponding with raise No. 11, any ground here will have to be regarded as unexplored, except as to that portion which is situated immediately above the big "stope," from where it is reasonable to expect a considerable tonnage of both shipping and concentrating ore. The total length of No. 4 adit is 1,400 ft., of which 800 ft. has exposed ore in paying quantity.

Level No. 5, which is the lowest working on the property, was started at a distance of 225 ft., vertically, below level No. 4, and driven as a cross-cut tunnel for about 420 ft. The object in going so far away from the vein was to bring the portal outside of the danger limit of a snow-slide that scours the mountain each spring, and has left its marks distinctly in a draw following the side hill not far from the entrance. At the end of this cross-cut the Aspen vein was struck, and here the ore-shoot, which corresponds with the first one in No. 3 level, was intersected. This shoot, following the general strike of the vein for 200 ft., is not much wider than the one corresponding with it above, and cannot therefore be considered of the same importance as the ore-bodies of larger dimensions further ahead. For a distance of 30 ft. above the level the ore has been stoped. The levels at the end of this shoot have been turned off at nearly right angles for 50 ft., where the Florence vein was encountered. Evidently the prospect here did not come up to expectations, for immediately afterward the level was again turned off, and within a distance of 100 ft. the Aspen vein was struck for the second time. A body of ore was disclosed and was followed for 195 ft. The pay streak is of the average size and grade. A sample was taken along the roof in several places where short stopes have started for a distance of 20 ft. or so above the level. The sample represented a width of 2 ft. 6 in. It assayed 18 per cent. zinc, 6 per cent. lead, and 34 oz. silver to the ton. The general average of the ore body, as stated by the manager, is 7 per cent. zinc, 4 per cent lead and 20 to 35 oz. silver.

The stopes sampled and described in the foregoing appeared to be quite characteristic of the vein. Their content in zinc is higher and in composition they would be better suited for concentration than any other ore shoot exposed in the mine at the present time.

Following No. 5 level through the last mentioned ore-shoot, there is a short break or fault, from which onward the Florence vein appears to come in, indicating that the two veins may unite. About 50 ft. further ahead a fourth ore shoot makes its appearance and can be measured for a distance of 90 ft. along the level. This ore body is perhaps one of the most valuable in the mine, although not from a zinc point of view. A very good grade of silver ore, fairly high in lead, but less so in zinc, is being extracted for a width of 2 ft. immediately above the level. From the end of this ore body to the face of No. 5 level there is about 100 ft. of lean ground, but the fore-breast looked favourable, and I have since my visit to the mine, been advised by one of the owners, Bruce White, that a new shoot of ore was uncovered after driving a short distance ahead. The only upraise of any consequence in No. 5 level is the one which has been put up into the first ore-shoot on the Aspen vein to a height of 125 ft. An intermediate level has been started 100 ft. above the main level by running two short drifts off in a northerly and southerly direction. A fair quality of ore has been uncovered in doing this work, and it is expected to continue to the floor of No. 4 level, where it shows in places. The management therefore intends to carry the raise up higher and extend the intermediate level toward the north. By that time several other raises will be necessary both for ventilation and handling of ore from the large block of ground between the levels, which are 225 ft. apart.

The property is being developed at the present time by a crew of about 20 men. All the workings of importance are being carried forward, and it will readily be seen from the longitudinal section of the mine that by continuing the lower level a large section of ground will be opened up; also that the proving in depth of such ore bodies as have been exposed ahead of No. 5 (in No. 4) are of great importance to the future of the property. The manager estimates that about 50,000 tons of concentrating ore are now blocked out, beside about 25,000 tons partly blocked out.

The company has now under construction at the lower terminal a concentrator of 75 tons daily capacity. The intention is to do away with the hand-sorting at the mine, which will be specially arranged for at the mill. The mill will be driven by water-power, which is being developed. The company has erected a saw mill and all the lumber required for construction work is being cut from standing timber, of which there is no lack on the property.

The problem of concentrating the Molly Gibson ore and effecting a high saving of the silver is by no means a small task, and will require a very careful study. However, the company experimented freely with the ore before it was decided to erect a concentrator. A small lot of the average grade of concentrating ore was obtained for testing at Denver, Colo.

This property is managed by Capt. T. H. Trethewey.

BLACK PRINCE MINE.

This is a prospect, located near the wagon road on the hillside, a mile or so from the Molly Gibson

landing. The vein, which is from 3 to 5 ft. wide, is in the Nelson granite, but is not very clearly defined. Its strike is north 20 deg. west. Development work consists of an open-cut, exposing the vein for a vertical distance of 10 or 12 ft. In the vein a few stringers of zinc-blende can be seen, but an average sample across the face would not have given any satisfactory results. I selected a few pieces of the blende found in the excavated material on the dump in order to obtain an idea of its purity. The result of this sample was 50.4 per cent. zinc and ½-oz. silver to the ton.

Apparently on the same vein, but 200 ft. below the wagon road, I noticed that some work had been done on the extension of the Black Prince claim. A sample taken in a similar way gave 16.8 per cent. zinc, 5.5 per cent. lead and 2.7 oz. silver to the ton.

KASLO DISTRICT.

BISMARK MINE.

This mine is situated on Briggs Creek, which is one of the tributaries emptying into the south fork of the Kaslo River from the east. It is about 12 miles from Kaslo and seven miles from the Kaslo & Slocan railway station at South Fork. With the exception of the last mile or so of mountain trail there is a good wagon road leading to the property, following the fork.

Three adit tunnels have been driven on the vein, which is well-defined, averaging 2 ft. 6 in. in width. The two upper levels, which are respectively at 6,700 and 6,588 ft. elevations, are of interest only in reference to silver-lead ore. The ore from them is principally lead and zinc carbonates, with considerable iron oxide and quartz, thus furnishing a very desirable smelting product. The lead carbonate averages from 6 to 10 per cent. in lead, with 135 oz. silver per ton, while the zinc carbonate ore has run up as high as 15 per cent. in zinc, but is usually considerably lower. The production from the mine has never been large, but the property has paid its way. During 1904, about 110 tons of ore were extracted with a crew of three or four men.

The general strike of the vein is 55 to 65 deg. east of north, and it dips at an angle of 70 deg. toward the north. Level No. 1 is 290 ft. long and No. 2 is 200 ft. long, exclusive of 50 ft. of cross-cutting into the hanging wall on each level. In the upper one there is an ore shoot of lead carbonate 30 ft. long, near the portal, while the second one has two ore shoots, viz., 40 and 20 ft. in a direction leading toward the upper tunnel. By keeping up the present development work there are fair prospects for continuing shipments at the same rate. The two above-mentioned levels are connected by means of a raise.

The lowest level, which is really the only one of interest from a zinc point of view, is 440 ft. long and 238 ft. vertically below No. 2. The vein was not struck until a distance of 135 ft. from the portal had been reached. A cross-cut of about 20 ft. was made here into the foot-wall. The ledge at this point shows plainly for a width of 36 in. A narrow but well-defined and high-grade streak of blende and galena can be seen in the face of the drift. Apparently this ore is just coming in as a new shoot different in character from anything found in the upper levels of the mine. It is a heavy mixture of sulphides, assaying, taken at its full width of 6 in. in two cuts (top and bottom) 38.4 per cent. zinc, 26.8 per cent. lead and 196.3 oz. silver to the ton. Of this class of ore there is at present practically no tonnage developed in the mine, but work on the discovery is being kept up, and the company is justified in continuing exploration work by drifting as well as raising on it. No connection between this level and the upper one exists.

Beyond the cross-cut the level was continued along a slip in the formation, but the ledge referred to in the foregoing was not exposed again until a distance of 245 ft. from the first place was reached. At this point another cross-cut was made intersecting the vein and showing it from 2 to 3 ft. wide. From here onward the ledge was followed to the present face, for a distance of 60 ft., without any further difficulties. It here shows a similar composition and bunches of galena and blende are met with, although not to the same extent nor as regular in occurrence as in the first place. At the fore-breast I measured the ledge for a width of 24 in., leading off at a course of north 55 deg. east. It is of interest to notice the proximity of a large dyke, which can be seen at the face of a third cross-cut, run into the foot-wall, 35 ft. back of the face. This dyke, I was informed, can be traced plainly on the surface.

BLACK FOX MINE.

This property is owned by the Black Fox Mining Co. It is situated below the Bismark, slightly to the northeast of the latter, and adjoins the Cork mine to the south.

The principal vein of the Cork and Province mines, which has been extensively developed and is the most important in the South Fork district, is generally supposed to traverse the Black Fox claim, and also the Daisy, belonging to the same company. From a brief examination of the workings, which consist of a cross-cut tunnel 150 ft. long, I obtained the impression that while there has been a vein cut in the Black Fox tunnel, 100 ft. from its portal, it is not the principal vein of the Cork, but a parallel one of secondary importance, which can be seen in the Cork at 700 ft. from the portal of the main tunnel. There are several parallel veins in this district, and the identification of a particular one, in the absence of absolute connection, is chiefly a matter of surmise and is always doubtful.

In the vein exposed in the Black Fox tunnel only a few inches of zinc blende can be seen. The vein is about 4 ft. wide and crosses the tunnel. A sample consisting of a few selected pieces of blende taken from here gave the following assay: 36.6 per cent. zinc., 2.3 oz. silver. The quantity of ore exposed is so small that the sample cannot be regarded as of

much importance. The surface showing on the property, (approximately 100 ft. further up the hill), is on the other hand quite strong and can be followed for over 200 ft., disclosing a width of several feet. The vein dips at an angle of about 50 deg. to the southeast. Several pits have been dug, exposing the vein and the same character of ore as in the Cork and Province mines, that is to say, a mixture of blende, galena and spathic iron.

In order to intersect this surface vein the tunnel would, in my opinion, have to be driven for some distance further, as the vein is dipping away from the cross-cut into the hill.

B. & A. MINE.

This property is situated approximately three miles south of the Bismark, at an elevation of about 5,000 ft. It is reached from the Kaslo & Slocan railway station by the excellent South Fork wagon road for the first 8½ miles; thence by following the mountain trail for an additional mile and a half along the tributary to the South Fork, known as Lake Creek.

When this property was operated, several years ago, it was entirely for silver-lead ore. The lower tunnel being the only one of interest to the Zinc Commission, was alone examined. The vein has a strike of north 45 deg. east, and a dip of 85 deg. to the southwest. It is of considerable width and appears to be a crushed zone in which lenses of both zinc blende and galena are found. The first 35 ft. of the tunnel, which has a total length of 158 ft., was driven through "wash" until the true hanging-wall was found in place. At this point the tunnel was turned off slightly to the east, and within 18 ft. the true foot-wall was encountered and followed to the present face, representing a distance of 110 ft. The foot-wall, which is perpendicular, is remarkably well-defined as far as it has been developed. The hanging-wall, which can only be seen in places, appears to be equally well-defined. It has a slight dip to the southwest. The vein matter is soft and considerably crushed. It contains much slate and calcite. Two short cross-cuts have been made across the vein. The first one, which cuts through to the hanging-wall at a point 98 ft. from portal, shows the vein to be 16 ft. wide. From 3 to 4 in. of zinc blende can be seen here close to the wall. In the next cross-cut, 55 ft. further ahead, the vein is 20 ft. wide, and apparently the same streak of blende continues through and can be seen 6 ft. from the hanging-wall. The pay-streak here has widened out to 15 in. and a sample which was taken in two cuts(top and bottom) gave the following result: 45 per cent. zinc and 16.2 oz. silver to the ton.

I think there is little doubt that the zinc showing in the two cross-cuts is the same shoot of ore. At the present time there is not sufficient ore developed to warrant any estimate of tonnage. So far as can be seen, the exposure of zinc in the second cross-cut is of more importance than in the first. By driving further ahead, and by keeping closer to the hanging-wall than has so far been done, the present showing of ore might possibly improve in width and importance. The vein is well defined and wide; the vein matter is soft and readily mined. Timber and water are plentiful in the immediate vicinity.

SILVERTON DISTRICT.

EMILY EDITH MINE.

The Emily Edith mine is situated 800 to 1,100 ft. above Slocan Lake, and is three or four miles north of Silverton. It is reached over a good wagon road. The country rock in the immediate vicinity consists of shales and slates, and the Emily Edith lode impressed me as being a considerably crushed and widely-mineralized ore zone in that formation. It shows much irregularity in its width, course and dip. Its general strike is about north 65 deg. east. It ranges in width from a few feet up to 30 ft. Its dip in the upper levels is about 45 deg., while in the lower ones it is from 60 to 75 deg. to the southwest. There are altogether on the property six adit tunnels, from which many drifts and cross-cuts extend in the direction of one or other of the walls. The total footage of work is probably at least 8,000 lin. ft. I visited four of the tunnels and located the principal zinc ore shoot of the mine in each of them. These represent a vertical depth of 173 ft., or about 250 ft. measured on the dip of the vein. The ore-body is no doubt continuous for this distance, and of importance as a concentrating ore. Recently a mill test was made on a 100-ton lot at the Wakefield concentrator, and a representative sample of the zinc concentrate, produced from the ore, was secured for experimental purposes.

In the upper tunnel No. 02, the ore body referred to above shows for a distance of 60 ft., averaging about 2 ft. in width. In the next tunnel No. 01, which is 57 ft. below No. 02, the ore can be seen to better advantage and measures in one place 6 ft. in width. A sample was taken here across the face in a short upraise, and in three other cuts, representing an average width of 4 ft. for 30 ft. along the level; it assayed 34.2 per cent zinc, 7.7 per cent lead and 7.2 oz. silver to the ton. This was apparently the best grade of ore showing in the mine. Beyond the 30 ft. sampled the same character of ore can be seen and followed for 100 ft. or more, but the pay-ore for this distance would hardly average over 2 ft. in width. The vein itself is of considerable width, and the pay ore appears to lie on both walls, which are from 10 to 30 ft. apart. This feature holds good throughout the mine, and during development work in many cases there has been a drift run on the foot as well as on the hanging-wall. Moreover, many intermediate cross-cuts have been made in the ore zone in all of the tunnels.

In tunnel No. 1, which is 53 ft. vertically lower than No. 01, the same ore body can be observed immediately below its exposure in No. 01, and a sample in a 30 ft. raise along the foot-wall in three cuts (top and bottom) was taken for an average width of 3 ft. This assayed 29.2 per cent. zinc, 12.4 per cent.

lead and 13.2 oz. silver to the ton. The ore shoot has been exposed intermittently along the supposed foot-wall for 250 ft.; also in a drift back of the supposed foot-wall for about 75 ft. The pay-ore in both drifts is from 2 to 3 ft. wide, and fairly continuous. At one place along the level, about 150 ft. from where the last-mentioned sample was taken, the ore body widens out to 6 ft. 6 in. A raise has been put up here, proving its extension for a certain distance. Complete examination could not be made here with safety. The blende is of fine grain, and lies on the foot-wall. A sample was taken here for a width of 6 ft. 6 in. in three cuts, 10 ft. apart. It assayed 26.2 per cent zinc, 8.7 per cent. lead and 10.4 oz. silver to the ton.

While there is no tonnage of ore actually blocked out in this property there is undoubtedly a considerable quantity of concentrating ore to be relied on. I should estimate this roughly at 10,000 tons of ore, carrying 22 per cent. zinc, 6 per cent. lead and 6 oz. silver to the ton. Systematic development work is likely to increase this tonnage materially.

In tunnels No. 3 and 4 there has been considerable drifting and cross-cutting done, but so far it has not proved successful in locating the above-mentioned ore body or any others. Tunnel No. 3 is entirely off the course and must have been driven for other purposes than the one of showing up existing ore bodies. All work on the property, including cross-cutting and drifting is distributed in the levels about as follows:

Characteristic View of Country and Mines in Silverton District.

The next level, No. 2, is 63 ft. vertically below No. 1, and exposes the ore shoot for about 75 ft. along the level; also in a drift 10 ft. above the level, where a sample was taken in three cuts covering a distance of 25 ft., representing a width of 3 ft. It assayed 24.6 per cent. zinc, 10 per cent. lead, and 10.3 oz. silver to the ton. In a cross-cut about 40 ft. from where this sample was taken the ore-body shows a distinct width of 10 ft. This showing has, however, not been followed up, because the original company was not developing the property for zinc. The galena associated with the ore could evidently not be mined and sorted at a profit and would require concentration. Conditions at the present time are somewhat different, and the property has been for the last year or so under lease to M. S. Davys of Nelson, who is planning to work it for its combined zinc and silver-lead values.

No. of Level.	Elevation above sea-level. Feet.	Approx. Amount of Development Work. Feet.
02	2879	700 to 800
01	2822	1200 to 1300
1	2769	1500 to 1600
2	2706	1800 to 1900
3	Not observed.	400 to 500
4	2561	1500 to 1600

The elevation of Slocan Lake above sea-level is 1,761 ft.

The Emily Edith property is equipped with an aerial tramway for handling shipping ore; also a number of good buildings, such as office, bunk-houses, stables, ore sheds, etc., all of which are located below the main workings and go to make up a complete and well-arranged camp. So far the shipments from the property have not been extensive. The group consists of six Crown-granted claims and comprises 150

acres. It is owned by the Emily Edith Mines, Ltd., of London, England.

GALENA FARM MINE.

This property, formerly known as the Currie group, comprises several Crown-granted claims in the Silverton district, which are owned by an English company. It contains 193 acres of mineral land, situated about 1,000 ft. above Slocan Lake, 1¾ miles southeast of Silverton, with which it is connected by a good wagon road. The vein has a strike of about south 60 deg. east and a dip of 50 deg. north. It is in granite formation and outcrops strongly on the surface for several hundred feet. It can be seen in places with a width of 9 to 10 ft. It shows quartz, spathic iron, galena and blende mixed with fragments of granite and slate.

All workings except two or three surface pits are at the present time under water, which prevented examination at depth. A sample was taken 15 ft. under ground in the original prospect shaft. This assayed 38.4 per cent. zinc, 13.4 per cent. lead and 32 oz. silver to the ton. Another sample taken in two or three places on the surface croppings assayed 42 per cent zinc, 6.8 per cent lead and 14.6 oz. silver. These results should not be considered an average of the ore, but will convey an idea of its composition.

About 175 ft. west of the shaft mentioned above, a perpendicular two-compartment working shaft has been here sunk to a depth of 220 ft., and levels 100 ft. apart have been run off from here for the purpose of intersecting the vein. Considerable work has been done under ground. I had no means of ascertaining the result of this work.

The machinery plant is well arranged and has, during the long shut down, been taken good care of. It consists of a first-class geared hoist driven by a 4-ft. Pelton water wheel, one standard cage and hoisting equipment, and one 4-drill air compressor driven by a 6-ft. Pelton water wheel. Beside the above machinery there is a steam hoist and boiler plant, which was used before water-power was installed, still in position; also several pumps apparently in good order. The water-power is obtained from Gold Creek, where a dam has been constructed. A 3,500-ft. pipe-line conveys 100 miners' inches of water to the water-wheels under a head sufficient to furnish a pressure of 110 lb.

In its notes on the mining market the London *Mining Journal* said, on May 18, "the most marked improvement in the American section is in Le Roi No. 2, which have further put on 3-16 at 2 5-16 (£2 6s. 3d.). The manager cables that he is confident he has discovered the H vein on the 900-ft. level. So far the values are not as good as they were at the 700-ft. level, where, at the last report, they averaged 2.75 oz. gold. On the 900-ft. level the latest assay is only 0.58 oz. gold, but the discovery is said to look promising."

WHITEWATER CAMP, SLOCAN DISTRICT.

Two Well-known Mines in Ainsworth Division.

WHITEWATER AND WHITEWATER DEEP are adjoining mines, situated in the western part of Ainsworth mining division, yet usually regarded as Slocan district mines. Nearly eleven years ago the Whitewater mine was visited by Mr. Wm. A. Carlyle, then provincial mineralogist, who in his Bulletin No. 3, "Report on the Slocan, Nelson and Ainsworth Mining Districts," (see "Annual Report of the Minister of Mines for 1896") said of it: "This property has paid for itself since its discovery, high-grade silver ore having been mined from the grass roots without ever a demand for money being made upon the owners; and this year a dividend will be paid of $25,000." (The total of dividends paid to 1903 has been stated as $209,500.) After describing the property as he saw it Mr. Carlyle concluded his comments with the following information relative to its ore: "Six lots of ore sent from this vein were the first sent out of the Slocan *via* Kaslo, and in the early days it cost $100 per ton before any returns were received. Much of the ore shipped is of the 'carbonate' class, with the silver value ranging from 72 to 298.5 oz. per ton, the lead from 11 to 30 per cent., while the galena ore yielding 35 to 65 per cent. lead, assays in silver from 75 to 362.6 oz. per ton, or an average of the whole output of the mine for 1896 of 114 oz. silver per ton and 30 per cent. lead. This ore carries from 16 to 17 per cent. zinc, and the smelter charges vary from $9 to $13 per ton—$9 if the lead is below 20 per cent.; the cost of the freight being $1 per ton to the railway, and $11 to the smelter."

The Whitewater and Whitewater Deep are now being jointly operated under lease by a small syndicate, at the head of which are Messrs. S. S. Fowler of Nelson, and J. F. Retallack of Kaslo. It is understood that the lessees are doing well though not working on a large scale. Last year's production was 800 to 900 tons of ore and concentrates shipped to the smelter. The following report, by Mr. Philip Argall, of Denver, Colorado, made in his capacity of a member of the Zinc Commission appointed by the Dominion Government to report on the Zinc Resources of British Columbia, has been taken from the "Report of the Commission," pp. 174-177:

WHITEWATER MINE.

This property, owned by the Whitewater Mines, Ltd., consists of five claims and a fraction, aggregating 113 acres. It is situated within 1¼ miles of the Whitewater Station on the Kaslo & Slocan Railway, over an excellent wagon road. The ore is delivered from the mine f.o.b cars, for 75 cents per ton.

There is but one vein opened. It was discovered in 1892, and worked vigorously for silver-lead for several years, but for the last three years intermit-

tently under lease. The first shipment of zinc ore was made in 1904, though the vein contains large quantities of zinc, as is well shown by the analysis of the lead concentrates. The zinc blende is for the most part rich in silver.

The Whitewater mine is developed by seven tunnels. The vein varies in width from 8 ft. down and may be said to average 5 ft., the pay streak about 8 in. The mine has produced 12,548 tons of lead concentrates and 8,435 tons of hand-sorted lead ore, which averaged 84.4 oz. silver per ton, 33.9 per cent. lead, and 18.5 per cent. zinc. The average price received for this ore, covering a period of 10 years was approximately $37 per ton.

The first zinc shipment of 38 tons assayed as follows:

Silver	33.4 oz.
Zinc	46.0 per cent.
Lead	4.5 per cent.
Iron	7.2 per cent.
Silica	8.0 per cent.

Net price received, $16.92 per ton.

The second lot amounted to 61 tons, assaying

Silver	17.6 oz.
Zinc	43.2 per cent.
Lead	3.7 per cent.
Iron	8.0 per cent.
Silica	9.0 per cent.

Net price received, $8.37 per ton.

Mill.—A concentration mill was erected in 1898, having a capacity of 8 tons per hour and costing approximately $45,000. It is of the usual roll and jig variety, operated by water-power and designed to produce a lead concentrate only. The operating cost when worked up to its capacity in 1900 was 36.33 cents per ton, the following year 33.4 cents, and in 1902, 31.59 cents per ton of ore milled. A sample of mixed zinc ore was taken from the bed of a third compartment jig, to show the composition of the zinc ore; it assayed: silver 28.4 oz., lead 6.7 per cent., and zinc 27.8 per cent.

Mine.—The vein with an east and west strike and southerly dip of 35 deg., has been followed from its outcrop above No. 1 tunnel to No. 7 tunnel and quite extensively stoped for a vertical depth of 500 ft. The mine, at the time of my visit, was being operated by three sets of lessees: one was working around the pillars and in the old stopes, and the other two advancing No. 6 and No. 7 tunnels westward in the continuation of the ore shoot and with fairly good results.

The map of the workings shows a regular and rather a long ore shoot for the Slocan. The No. 2 tunnel, for example, is stoped for a distance of 400 ft., while No. 6 tunnel has been stoped for a length of 450 ft. on the same ore shoot, and all the intervening ground between these levels is also stoped within the lines of the main ore shoot, which appears to average 450 ft. in length. These old stopes are said to be crushed, caved and inaccessible between the first and sixth levels. The stope map indicates a second, or eastern, shoot extending from No. 4 to No. 7 level, showing by the stoping a length of 250 ft. on No. 6 and 100 ft. on No. 7 level. Towards the end of No. 7 tunnel, which by the way is situated at an elevation of 4,150 ft. above sea level, the drift follows the foot-wall too closely, and the lessees have recently cross-cut into the hanging, proving the vein, according to Mr. A. C. Garde, to be 8 ft. wide carrying 3 ft. of zinc and lead ore from which he took a sample, which assayed: silver 57.4 oz., lead 26.2 per cent., zinc 29.6 per cent.

From the best information obtainable it would appear that a considerable quantity of zinc ore has been left in the old stopes, in the form of broken ore and pillars, much of which may be recovered by the lessees. While in a moderate depth below the seventh level, the Whitewater vein will pass into the Whitewater Deep property, yet there is much ground to the west of the Whitewater Deep covering the strike of the vein, on which no attempt has been made to open up the main vein, though the prospect of finding pay ore in that neighbourhood is promising.

WHITEWATER DEEP MINE.

The Whitewater Deep, as the name would indicate, covers the Whitewater vein on its dip after passing outside the lines of the Whitewater Mines, Ltd.

The Whitewater Deep Co. has an extensive establishment in the town of Whitewater, consisting of a palatial residence for the manager, sumptuous offices and well arranged assay office, together with a large and well-furnished hotel, now in the hands of a caretaker, as are also the other buildings of the company at this place.

Mine.—The mining operations of this company consist of a main tunnel with some cross-cuts and three raises on the vein, from which a slight amount of drifting has been conducted. The main tunnel starts at an elevation of 3,779 ft., and is advanced 1,500 ft. westerly from its portal. For the greater part of the distance the tunnel has advanced in faulted ground, broken and crushed slate, with only one small ore lens showing on the tunnel horizon. In the face of the tunnel the vein consists of 18 to 24 in. of siderite dipping south at 40 deg. A little quartz is showing in the foot-wall, but no zinc or lead is visible. A short cross-cut at the tunnel face exposes what is probably the hanging wall, but the vein should be cross-cut thoroughly at this point, and the true hanging-wall determined. On the east side of this cross-cut about 1 in. of mixed galena and fine-grained blende occurs on top of the siderite. The vein in the face while barren is well defined and looks to me a good prospect, more particularly as by extending the drift it would pass under the points where ore is now being mined in Nos. 6 and 7 tunnels of the Whitewater mines, which is undoubtedly on the same vein. I examined two of the raises over the main Whitewater Deep tunnel: the western one

showing a lens of siderite standing almost vertical in the vein, and containing a little galena. Passing the next raise to the east, I went up the second one and in a branch drift saw a fair vein of siderite with a little blende and lead, averaging 15 in. wide in the aggregate. Near the head of the raise a drift extended west about 50 ft. and carried a fair vein, averaging 18 in. wide of siderite, with occasionally a seam of mixed lead and zinc ore from 2 to 6 in. in width. This also looks a good prospect, but the company having expended the bulk of its capital in the acquisition of the property, and the erection of buildings, the actual development of the property has been apparently lost sight of.

There is abundant evidence of crushing and folding, resulting in slight faulting along the greater part of the distance in the main tunnel. It is well illustrated in one of the cross-cuts, where an intrusive dyke has been crushed and folded along with the enclosing slates. The vein occurs, at least in some parts of its strike, practically in the cleavage of the slate and shows evidence of faulting to some extent, and I rather suspect that slight movement is still taking place. An important feature of this vein is the strong lens of siderite that occurs near the face of the main tunnel and continues for some distance easterly. The point to determine is: Does this siderite form the bottom of the pay ore? In other words: Do the zinc and lead minerals, which occurred so extensively in the workings of the Whitewater mine immediately above, give way in depth to barren siderite?

About 600 ft. from the portal of the main tunnel a dyke of basic rock was encountered, which in all probability cuts the vein, but on account of the lagging and rotten condition of the ground and timbers I could not determine the fact. A drift was here extended into the foot-wall, following the dyke for some distance, then passing through it and entering the ground of the Whitewater mine, but no ore was encountered in this drift.

A lower tunnel, at elevation of 3,375 ft., say 400 ft. below the main tunnel, was also commenced in the early days of this property, but no serious attempt was made to push it ahead. The distance to be covered in order to intersect the vein is very great, and doubtless the showing made on the main tunnel discouraged the running of another tunnel at so much greater depth. An air compressor operated by a Pelton wheel was erected near the lower tunnel, and the air pipes were brought up to the main tunnel, although the ground there was so soft that machine drills could not be used to advantage.

Concentration Mill at Whitewater Mine, Erected in 1898.

No connection has been made between the main tunnel of the Whitewater Deep mine and the workings of the Whitewater mine immediately above. Three raises were put up on the vein and some drifting conducted from them, as previously described, but none of these has communicated with the workings above. It is obvious that the two properties could best be operated as one mine; then the raises could be connected with the old workings of the Whitewater, establishing good ventilation, and I believe they would open up good stoping ground. In this direction, and in the advancement of the main tunnel further westerly, lie the principal hope of future production from the Whitewater property.

COAL MINES OF INTERIOR AGAIN IN OPERATION.

Agreement Between Coal Mine Operators and Miners.

CROW'S NEST PASS COLLIERIES and other coal mines that were also compelled to close down, owing to their employees having declined to continue at work pending a settlement of wage and other matters in dispute, are again in operation, a mutually satisfactory settlement having been arrived at between the employers and their men. In the March number of the MINING RECORD (pp. 115-118) were published particulars of the differences between the two parties. As the lengthy conference held at Calgary, Alberta, did not result in an agreement, the men stopped work and application was made to the Dominion Government for the appointment of a board of conciliation under the recently-passed act making provision for such a situation as had arisen. The board was duly constituted and its members gathered at Fernie in readiness to take such action as should be found necessary. Representatives of mine owners and mine workers, respectively, however, resumed negotiations for a settlement and finally came to an agreement.

TEXT OF AGREEMENT.

The full text of the agreement, which is dated May 4, 1907, follows:

It is hereby agreed between the Western Coal Operators' Association (consisting of the Pacific Coal Co., Ltd.; the H. W. McNeill Co., Ltd.; the Breckenridge-Lund Coal Co., Ltd.; the West Canadian Collieries, Ltd.; the Canadian-American Coal and Coke Co., Ltd.; the International Coal and Coke Co., Ltd.; and the Crow's Nest Pass Coal Co., Ltd..) of the one part, and the employees of the said companies, as represented by the United Mine Workers of America, District No. 18, of the other part: That the agreements existing prior to April 1, 1907, respecting general provisions and scales of contract prices and wages shall govern the parties hereto for the period of two years commencing April 1, 1907, and ending March 31, 1909, in so far as the same may not be modified nor affected by the provisions of this agreement, it being understood and agreed that the parties thereto will meet in conference 60 days prior to the expiration of this agreement to discuss a renewal thereof.

This agreement covers all the mines, coke ovens, and outside plants operated by the companies and all persons accepting employment at these mines agree to be governed by the following rules and regulations:

Settlement of Local and General Disputes.

(a) In case any disputes or grievances arise under this agreement or any local agreement made in connection therewith, whether the dispute or grievance is claimed to have arisen by the company or any person or persons employed or by the men as a whole, then the parties shall endeavour to settle the matter as hereinafter provided. But before any grievances or disputes shall be submitted to the pit committee, the person or persons affected shall endeavour by personal application to the pit boss to settle the matter and in the event of their agreeing their decision shall be final.

(b) In case of any local dispute arising in any mine and failure to agree between the pit boss and any employee the pit committee and mine superintendent shall endeavour to settle the matter and if they agree their decision shall be final.

(c) In the event of the failure of the pit committee and the mine superintendent to settle any dispute so referred to them, as well as in the event of any other dispute arising, the matter in dispute shall be referred to the general superintendent or general manager of the company and the officers of District No. 18, U. M. W. of A., for settlement, and if they agree their decision shall be final. Should they fail to agree it shall be referred to a joint committee, said committee to be made up of three operators appointed by the Western Coal Operators' Association and three miners, appointed by District No. 18, of the U. M. W. of A., for settlement. If they agree their decision shall be binding upon both parties. A majority of the full committee must vote in favour of any action before it can be declared carried. In the event of a failure to agree the committee shall endeavour to select an independent chairman and failing to agree upon an independent chairman the Minister of Labour shall be asked to appoint such chairman. The decision of the committee thus constituted shall be binding upon both parties. The joint committee when necessary shall meet on the second Monday of each month.

(d) In the meantime and in all cases while disputes are being investigated and settled, the miners, mine labourers and all other parties involved must continue to work pending investigation and until final decision has been reached, but where miner or miners, mine labourer or mine labourers, has or have been discharged by the company, he or they shall not remain in the employ of the company while his or their case is being investigated and settled. If a claim be made within five days where a man or men has or have been unjustly discharged, the case shall be dealt with according to this article and if it is proven that he or they have been unjustly dealt with, he or they shall be reinstated. If claim is made for compensation for time lost in cases where reinstatement has followed it shall be left to the joint committee to decide what amount, if any, is to be paid.

(e) Any breach of the agreement by any of the parties thereto is not to void the said agreement but same is to continue in full force and effect. It is not intended, however, by this sub-section to abridge the right of the men to suspend work after final settlement as herein provided it any operator or operators refuse to be bound by any decision given against him or them under this article.

New Work.—Whenever any new work arises, a price for which has not been provided for in this agreement, on the request of the company or the

miners, the joint committee of the Western Coal Operators Association and District No. 18 of the U. M. W. of A. shall meet within 30 days after the said request and arrange a price. Meantime and until such price has been arranged all men shall be paid upon the day wage scale.

Hours of Work.—It is understood that nothing herein shall be held to afford any grounds against the enactment of legislation respecting hours of labour in the province of Alberta.

Contract Mining Rates.—There shall be added a 5 per cent. increase on contract mining rates at the following mines: No. 9 Coal Creek, No. 3 Michel, Lundbreck and Canmore. See Schedule A.

Outside Labour.—There shall be added an increase of 25 cents per days to all $2 rates, and an increase of 5 per cent. to all rates of $2.50 and over. See Schedule B.

Inside Labour.—There shall be added an increase of 25 cents a day to drivers, tail rope riders and hoistmen. See Schedule C. At Bankhead, Canmore, Lundbreck and Lille there shall be added an increase of 5 per cent. to all other transportation men, and those connected with the handling of coal, this increase being given on account of the longer hours of work at those mines. See Schedule D.

Schedule A—Mining Rates.—Coal Creek No. 9 mine, 52½ cents per gross ton.

Michel, No. 3 mine, 57¾ cents per gross ton.

Lundbreck mine, main and counter gangways, 63 cents per cubic yard; angle work, 57¾ cents.

Canmore mine No. 1, seam breasts, $5.77½ per lineal yard; pillars, $6.30; skips, $2.62½; No. 2 mine, seam breasts, $1.05 per lineal yard for each foot in thickness; pillars, $1.31¼; skips, $2.52½; No. 3 mine, seam breasts, $5.77½; pillars, $6.30; skips, $2.62½; No. 4 mine, seam breasts, $6.30; pillars, $6.30; skips, $3.15.

Schedule B—Day Rates and Hours.—Bottom men, per day, $2.62½, 10 hours.

Slate picker boys, $1.25, 10 hours.
Slate picker men, $2.25, 10 hours.
Car oiler men, $2.25, 10 hours.
Car oiler boys, $1.50, 10 hours.
Tally boys, $1.25, 10 hours.
Teamsters, $2.62½, 10 hours.
Blacksmiths, $3.67½, 10 hours.
Blacksmith's helpers, $2.62½, 10 hours.
Carpenters, $3.67½, 10 hours.
Carpenters' helpers, $2.62½, 10 hours.
Power house engineers, $3.67½, 12 hours.
Power house engineers, $3.15, 8 hours.
Fan men, $2.62½, 12 hours.
Hoisting engineers, $2.89, 8 hours.
Tailrope engineers, $3.36, 8 hours.
Tailrope engineers, $3.67½, 10 hours.
Box car loader engineers, $3.15, 10 hours.
Tipple engineers, $3.15, 10 hours.
Locomotive engineers, outside, $3.15, 10 hours.
Locomotive engineer's helper or switchman, $2.75, 10 hours.
Firemen, $2.67½, 8 hours.
Firemen, $3.67½, 12 hours.
Railway car handler men, $2.36, 10 hours.
Tipple dumper man, $2.62½, 10 hours.
Tipple dumper boys, $1.50, 10 hours.
Car repairers, $3.15, 10 hours.
Breaker engineer, $3.15, 10 hours.
Fan fireman, $3.15, 12 hours.
Lampman, depending upon number of lamps and skill of man, $2.25 to $3.15, 12 hours.
Lampman, $2.25 to $2.62½, 8 hours.
Machinist, $3.15 to $3.67½, 10 hours.
Machinist's helper, $2.62½, 10 hours.
Ashman, $2.25, 10 hours.
Ashman, $2.62½, 12 hours.
Wiper man, $2.62½, 12 hours.
Coupler man, $2.25, 10 hours.
Coupler boys, $1.50, 10 hours.
Breaker oiler, $2.62½, 11 hours.
Washer or tipple oiler, $2.62½, 11 hours.
Breaker picker boss, $2.62½, 10 hours.
Timber framer men, $3.15, 10 hours.
Box car shoveller men, $2.62½, 10 hours.
Breaker platform boss, $2.62½, 10 hours.
Breaker platform men, $2.36½, 10 hours.
Breaker screen men, $2.25, 10 hours.
Rock bank men, $2.25, 10 hours.
Dirt bank men, $2.25, 10 hours.
Finisher after box car loader, $2.25, 10 hours.
All other outside labour, $2.25, 10 hours.

Schedule C.—Drivers, $2.75, 8 hours.
Drivers in wet places, $3, 8 hours.
Hoistmen, $2.75 to $3, 8 hours.
Rope riders, $2.75, 8 hours.
Main and tail rope riders, $3, 8 hours.

Schedule D.—Coupler men, $2.62½, 8 hours.
Coupler boys, $1.57½, 8 hours.
Pushers, $2.62½, 8 hours.
Loaders, $2.62½, 8 hours.
Buckers, $2.62½, 8 hours.
Locomotive engineers or motormen, $2.89, 8 hours.
Locomotive switchers or motormen helpers, $2.62½, 8 hours.
Cagers, $2.62½, 8 hours.
Cager in shaft, $3, 8 hours.

The schedule rates under this agreement are to be the minimum rates paid, but nothing in this agreement shall be construed to prevent the companies from paying higher rates should they so desire. It is also understood that where higher rates have prevailed no reduction shall take place.

Beehive Coke Ovens.—Levelling and drawing 61-ton charge, $1.

Levelling and drawing 50-ton charge, $1.80.

Loading into box cars, over 200 tons per month, .17.

Loading into box cars, less than 200 tons per month, .16.

Steam locomotive engineers, $3.15.
Motormen, $2.89.
Larrymen, $2.25.
Plasterers, $2.25.
Carters and cleaners, $2.25.
All other labourers, 10 hours, $2.25.

All charges to be large or small, at the discretion of the coke-oven superintendent.

Belgian Coke Ovens.—Ram enginemen, $3.15.
Chargers, $2.62½.
Clayers, $2.62½.
Drawers, $2.62½.
Loaders, $2.36.

Briquette Plant.—Engineers, $3.67½, 10 hours.
Briquetter, $3.78, 12 hours.
Briquetter's helpers, $3.15, 12 hours.
Tar melter, $2.62½, 12 hours.
Labourer, $2.62½, 12 hours.

(Signed)—The Western Coal Operators' Association, G. G. S. Lindsey, president; Lewis Stockett, vice-president; W. F. Little, secretary. The Pacific Coal Co., Ltd., L. Stockett, general manager. The H. W. McNeil Coal Co., Ltd., H. W. McNeil, general manager. The Breckenridge-Lund Coal Co., Ltd., J. Breckenridge, president. The West Canadian Collieries, Ltd., O. E. S. Whiteside, general manager. The Canadian-American Coal and Coke Co., Ltd., S. M. Moore, general manager. The International Coal and Coke Co., Ltd., H. N. Galer, vice-president. The Crow's Nest Pass Coal Co., Ltd., G. G. S. Lindsey, general manager. The United Mine Workers of America, District No. 18, F. H. Sherman, president; John Galvin, vice-president; A. McDonald, secretary; P. Patterson, international board member.

LAPLATA MINES, KOKANEE, NELSON MINING DIVISION.

Continued Development Resulting in Enlarged Output.

LAPLATA MINES is the new name of the old Molly Gibson property, situated at the head of Kokanee Creek and distant about ten miles from the west arm of Kootenay Lake. A description of the property as it was toward the close of 1905 is printed on pp. 190-191 of this issue of the MINING RECORD. Since that time there has, however, been much additional development work done and a concentrating mill erected. It is not intended to at this time give full particulars of developments and new equipment, but rather to briefly outline the progress made, give some information concerning the value of the mine product, and indicate the further permanent improvements requisite to place the mines in a position to produce ore and make shipments under conditions less costly and disadvantageous than is practicable at the present time.

In the mine the extension of several levels, the discovery of new shoots of ore, and the working of productive stopes comprise much of the progress made in 1906-7. The completion and decidedly successful operation of the concentrating mill facilitated production by providing for the treatment on the property of much ore of a lower grade than is usually shipped to the smelter. While the concentrator was designed to treat about 75 tons of ore in 24 hours, in actual practice it has been found equal to 60 tons in 12 hours. The mill was constructed by Chas. Culver, an expert mill man well known throughout the Slocan. It is equipped with rock crushers, rolls, picking belt, five stamps for fine crushing, trommels, Hartz jigs (two, three, four, and five-compartment), Overstrom tables, Frue vanners, etc. The mill is water-driven, the machinery being belt-connected with a Pelton wheel. The installation of a duplex air compressor is in hand.

As to values—the following table will show what the smelter returns were from five separate shipments made a few months since:

Lb. of Ore.	Value of contents.
63,891	$1,755.28
41,221	805.57
46,495	1,194.82
26,634	322.68
96,505	1,883.75
274,746	$5,962.10

This gave an average value for 137 tons of rather better than $43 per ton. This of course was shipping ore of higher grade than that now sent to the mill.

On April 15 last, the mine manager's report showed a production of 45 tons per day, all of which was being concentrated. Earlier in the month he reported as follows: "I would not care to state the quantity of ore in sight in the mine because it is very difficult to estimate, but I will say that notwithstanding the amount of ore that has been extracted since we started the concentrator in May, 1906, we now have more ore in sight than we had at that time because development has been steadily proceeded with. There is certainly a very large tonnage of ore available in the mine. In my opinion the most valuable portions of the ore bodies have not yet been reached and the ore already in sight is sufficient to run the plant for ten years. We have had many difficulties to overcome since installing the concentrator, but this has done better work than was claimed it would do and it is in excellent condition at the present time. The buckets and running gear of the aerial tramway have been practically rebuilt. The question of less costly transportation of ore to Molly Gibson landing, on Kootenay Lake, remains to be solved. A light aerial tramway would cost not less than $5,000 per mile, while the cost of a teaming outfit would be between $6,000 and $8,000 with repair of road before the latter could be put in passable condition for heavy traffic. This would be in addition to the Government aid towards repairing the wagon road, and perhaps under present conditions would be the better course. The foundation for compressor plant is about ready and the compressor will be placed in position at once, but owing to there being 7 to 8 ft. of snow there will be some delay, for we shall have to wait until the ground is nearly free from it before the pipe line can be completed and the plant put into commission."

COPPER PLACERS IN WESTERN YUKON AND ALASKA.

NATIVE COPPER in the form of alluvial or placer deposits has for some time past been known to occur at the head of White River, which takes its rise in some high mountains in southeastern Alaska and flows through the western part of the Canadian Yukon until it reaches the Yukon River. In August of last year the MINING RECORD published a paragraph stating that the *source of the fine specimens of native copper* obtained at the head of White River and exhibited in Dawson in 1905 had been reported to have been discovered by M. C. Harris and partners, and that Harris, who was believed to be truthful, had stated "they found the vein some 700 ft. up the side of a steep mountain and that at a depth of 10 ft. there was a width of 30 ft. of copper ore between well-defined walls; further, that in the centre of the ledge where opened there was a streak of native copper from which a slab estimated to weigh about two tons had been taken out." The following month this journal reprinted from the "Summary Report of the Geological Survey Department of Canada for 1905" Mr. R. G. McConnell's report on "Head Waters of White River." Concerning copper in this locality Mr. McConnell said:

"Native copper is almost as widely distributed in the creeks of the district as gold. It is found on Bullion, Sheep and other creeks flowing from the St. Elias Range, and also on Burwash, Tatamagouche and Arch Creeks, in the region between Kluane River and the Donjek. It is not found on Ruby, Fourth-of-July, nor any of the streams cutting the old schists of the Ruby Range.

"The principal copper creek in the White River district is Kletsan Creek. This stream is situated in Alaska, about four miles west of the International Boundary. It was examined by Mr. A. H. Brooks of the U. S. Geological Survey, in 1898. Brooks found that the stream copper, in part at least, was derived from calcite veins cutting a dioritic rock exposed along the valley. These copper-bearing rocks do not extend far in an easterly direction, as they are soon buried beneath a great accumulation of young volcanic rocks."

Seemingly the discovery of Harris and partners, which was followed by a stampede of between 100 and 150 men from the head of Tanana River, Copper River down to Valdez, in Alaska, and Kluane, in the Whitehorse district of Yukon, has not been lost sight of, for quite lately the *Engineering and Mining Journal* of New York published the following under the heading "Copper Placers":

There is prospect of a new development in mining, which is of great interest both technically and commercially. This is the exploitation of alluvial deposits of native copper. In Alaska, at the head of White River, and at the head of Copper River, above Fairbanks, there are gravel deposits containing native copper in large nuggets, the latter comprising some huge masses. The amount of copper available in this form appears to be large, but the extent of the deposits has not yet been accurately determined. On Copper River these placers run up into the copper deposits in place. On White River, the sources of the placer copper appear to be covered by the glacial ice, and the erosion seems to be still going on from the flow of the glaciers.

It is expected that steps to work these copper placers will be taken in the near future. The working season will be rather short, but the means for working, either by dredging or by ordinary hydraulic mining, can be quickly installed, and upon the completion of the railway, which is planned to open the Copper River country, a considerable supply of copper may be quickly looked for from this source. The technical interest in the subject pertains to the fact that, so far as we are aware, these are the only copper placers of the world, and their exploitation will extend to copper a class of mining which heretofore has been practically confined to gold and tin stone.

MINERAL OUTPUT OF THE PROVINCE OF QUEBEC.

QUEBEC'S MINES do not as yet contribute largely to the total of the annual mineral production of Canada, as will be seen from the statistics given below. These were contributed to the London *Mining Journal* by its Ottawa correspondent who, under date February 25, 1907, wrote:

The report of Mr. J. Obalski, director of the Bureau of Mines, Quebec, for the year 1905, is but just to hand. The Province produced no silver or gold in 1905, and its output of iron ore shows only the small figure of $140,000. Asbestos was the principal mineral produced; of that substance 48,960 tons, and of asbestic 19,220 tons were raised, the aggregate value of which is placed at $1,507,550. Copper ore, mica, and phosphate are the other considerable items. The following is the mineral list:

Iron ore, tons.....	12,374	$ 35,268
Chromic iron ore, tons...	8,528	104,565
Copper ore, tons.....	48,560	128,850
Asbestos, tons	19,220	1,476,450
Asbestic, tons	189	31,100
Mica, tons	1,475	95,460
Phosphate	....	8,875
Calcined ochre	....	22,675
		$1,897,653

Add to this the total of metallic products, the $1,845,000 worth of mineral mentioned above, and an aggregate of $3,742,653 is reached, which seems no great sum when the undoubted wealth of the Province in minerals is borne in mind. Almost nothing is now heard of gold mining operations which a few years ago caused much activity in the Beauce district, in the south-east of the Province. Apatite or phosphate of lime, which promised well not long ago,

shows the small output of 1,475 tons. And iron ore deposits, considering the growing enquiry for them, have not revealed themselves as marketable to the degree which might have been expected. The two furnaces at Drummondville and Radnor use generally the local bog ore and charcoal for smelting purposes. These produce a superior iron, but only in moderate quantity, the output for the year being 6,774 tons, of a value of $166,267.

SUMMARY OF THE MINERAL OUTPUT OF ONTARIO IN 1906.

ONTARIO'S MINERAL OUTPUT, for the year 1906, according to the report prepared by the officials of the Department of Mines, represented a total value of $22,221,808, as compared with $17,854,296 in 1905. This is estimated on the value of the minerals in the form in which they leave Canada, not at average market prices, less certain deductions, as in British Columbia. The net value of the metallic output was $13,179,162 and of the non-metallic $9,042,646. The most noticeable gains during the year in the metallic group were those of silver, which was $2,170,212; nickel, $481,485; copper, $309,555; pig iron, $644,720. In the non-metallic the increases in values produced in 1906 over 1905 were: Portland cement, $595,563, and natural gas, $216,970. The output of crude petroleum was worth $136,999 less than in 1905. The output of the mines at Cobalt for the year was: Silver, 5,357,830 oz., worth $3,543,089; cobalt, 312 tons, worth $30,819; nickel, 156 tons and arsenic, $1,558. Up to the close of 1906 Cobalt camp had produced 8,016,061 oz. of silver, valued at $5,015,479; 446 tons of cobalt, 245 tons of nickel, and 1,919 tons of arsenic. For the three last-named constituents mine-owners receive little or no return, but they are estimated to be worth $150,779, $13,467 and $3,596, respectively.

Following is the table of metallic products. Its gross value is $13,422,928, from which $243,766, the value of 101,569 tons of Ontario iron smelted into pig iron, is subtracted, making the net value $13,179,162:

Gold, oz.	3,519	$ 59,274
Silver, oz.	5,357,830	3,543,089
Cobalt, tons	312	30,819
Nickel, tons	10,932	3,836,419
Copper, tons	5,940	998,548
Lead	.....	93,500
Iron ore, tons	128,099	301,032
Pig iron, tons	275,558	4,554,247
Zinc ore, tons	400	6,000
		$13,422,928

The output of the non-metallic group was:

Arsenic, tons	1,208	.....
Brick, common, No.	300,000,000	$2,157,000
Tile, drain, No.	17,700,000	252,500
Brick, pressed, No.	39,860,000	337,795
Brick, paving, No.	3,000,000	45,000
Building and crushed stone	.....	660,000
Calcium carbide, tons	2,626	162,780
Cement, portland, bbl.	1,598,815	2,381,014
Cement, natural rock, bbl.	8,453	6,000
Corundum, tons	2,914	262,448
Feldspar, tons	20,373	43,849
Graphite, tons	1,772	15,000
Gypsum, tons	3,265	6,605
Iron pyrites, tons	11,095	40,583
Lime, bush.	2,885,000	496,785
Mica, tons	355	69,041
Natural gas	.....	533,446
Peat fuel, tons	300	900
Petroleum, Imperial gallons	19,928,322	761,546
Pottery	.....	65,000
Quartz, tons	3,856	3,586
Salt, tons	50,414	367,738
Sewer pipe	.....	365,000
Sodalite, cu. ft.	200	6,000
Talc, tons	1,235	3,030
		$9,042,646

PLACER GOLD MINING IN BRITISH COLUMBIA BY THE GUGGENHEIMS.

NUMBERS OF MEN are being taken into the Cariboo district to work at hydraulicking on placer gold properties acquired from the Consolidated Cariboo Hydraulic Mining Company last year by Guggenheim interests which afterwards incorporated the Cariboo Gold Mining Company. Others are being employed in excavation and construction work on an enlarged water supply system for these properties. Special stages convey the men from Asheroft, on the Canadian Pacific main line of railway, to Bullion, the company's headquarters in British Columbia, the distance being about 190 miles. The old company obtained water for gravel-washing from Morehead, Bootjack, and Polley's lake reservoirs, but the ditch that connected with the mine having been cut away for nearly a mile and three-quarters, it will not be practicable to commence washing this season until after the lower section of the new ditch, from the Spanish Lake system, shall be completed, which will be some time in July. The snowfall on the water-shed supplying this mine was greater last winter than for several previous winters, so a proportionately large recovery of gold the ensuing washing season is looked for. The mine is equipped with a gravity tram, hydraulic elevator, and Loveridge derrick, and much preparatory work has been done in readiness for the removal of the gold-bearing gravel. A profitable season is, consequently, expected with confidence.

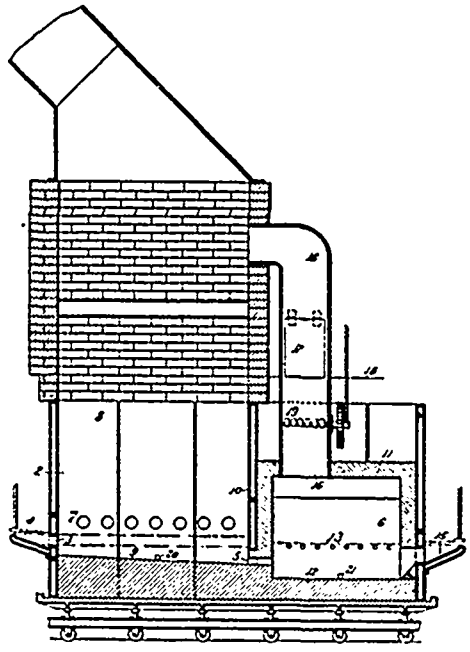
In connection with the new water supply system,

known as the Spanish Lake system, which is designed to overcome the chief difficulty under which the old company operated, viz., an insufficient supply of water, much preliminary work throughout and some excavation and construction on the Bullion section, were done before the coming in of the winter necessitated a suspension of operations until spring. Steam shovels are on the ground, so excavation work will be greatly facilitated by use of these machines. It is intended to, if possible, complete the system before next winter. The total expenditure on the Spanish Lake system last season was nearly $100,000; to complete it a further expenditure of $450,000 to $500,000 will be required. The much enlarged supply of water it will provide should admit of a larger recovery of gold during future seasons than in any past year.

WATSON'S IMPROVED SMELTING FURNACE.

WILLIAM J. WATSON of Ladysmith, Vancouver Island, manager of the Tyee Copper Company's smelter, has been granted United States Patent No. 836,548, under date November 20, 1906, for his invention of an improved smelting furnace. The following illustrated description has been taken from *Mines and Minerals*, a widely-read mining journal published at Scranton, Pennsylvania, U.S.A.:

This invention consists of an improved smelting furnace designed for the production of a high-grade matte or a blister copper direct from sulphide ores without the necessity for preliminary roasting or subsequent resmelting. Fig. 1 is a vertical longtitudinal section through both divisions of the furnace. In the drawing, 2 represents the matting division of the furnace, the walls of which are water-jacketed, bronze sections being introduced where apertures are required, as at 3, for the water-jacketed slag spout 4 and at the passage 5 to the secondary or refining division 6. The customary blast tuyeres 7 are introduced in the jacketed side walls 8, and the bottom 9 is downwardly sloped from the slag outlet 3 to the passage 5 in the opposite side, which passage may be arched and lined with firebrick. The secondary or refining division 6 is merely a continuation of the matting furnace 2, separated therefrom by the water-jacketed partition 10; but as the combustion conducted therein is derived merely from the oxidizable constituents of the matte, this refining division is lined throughout with basic firebrick to reduce radiation, and the arched roof 11 is kept down as low as possible to hold the heat in close proximity to the charge of matte within. The bottom 12 is below the level of that of the furnace 2, either dropped, as shown, or the slope of the bottom of the furnace 2 is continued uniformly to the farther end of 6. The side walls of 6 are penetrated with high-pressure blast tuyeres 13, downwardly directed inward, so that the inner ends of them are just beneath the level of the matte, so as to effectually act upon it for purposes of oxidation. Opposite to the passage 5 is a water-jacketed spout 15, the level of which is as much below the slag spout 3 of the matting division 2 of the furnace as the balance level of the more dense matter in the division 6 is below that of the lighter matte and slag in the division 2. In the roof 11 of the division 6 is a flue 16 for the escape of the furnace gases, and through this flue silica or silicious ore to form the desired flux is charged through a door 17 in the level of the charging floor 18. The ore charged through this door is deposited upon a tilting grate 19, on which it is allowed to rest until required. The ore thus becomes heated and all moisture expelled by the passage of the furnace gases through it before it is dropped into the furnace. In



W. J. Watson's Improved Smelting Furnace.

the operation of this furnace the ore under the low-pressure blast will be matted or without the use of fuel in the furnace 2, and the matte will flow through the passage 5 into the division 6, where, under the action of the high-pressure blast the sulphur, iron, etc., will be oxidized and will be respectively vaporized or slagged off by the silicious flux added through the door 17, combustion being maintained by the oxidation of the sulphur and iron and the combination of the iron oxide with the silicious flux. The matting slag will flow off through the slag spout 4, while the refined matte and the slag made in refining will overflow at the spout 15. Tapping holes 20 and 21 may be furnished in the divisions 2 and 6 for drawing off the contents of the furnace when required. The furnace may be used for the production of blister copper by a suitable increase in the use of the high-blast tuyeres 13 to insure more complete oxidation of the impurities in the matte, in which case the copper will be drawn off through the tapping hole 21 and the slag made in refining will be allowed to flow out at the spout 15.

COMPANY MEETINGS AND REPORTS

TEL-KWA MINES, LTD.

By an oversight the following was omitted from the MINING RECORD last month: The annual meeting of the Tel-Kwa Mines, Ltd., was held at Nelson on March 18, with H. E. Macdonell, president, in the chair. The directors submitted a brief report, showing the financial statement to date, and a list of the shareholders. T. F. Sutherland, formerly of Greenwood, who has been engaged as superintendent for the coming season, was present, and at the suggestion of the chairman reviewed the situation at the property in the north, when he left there last fall. J. J. Campbell explained that it was intended to Crown grant the company's eight claims and smelter site this year and all the properties would be surveyed. In addition more surface exploratory work would be done in order to get a better idea of the value of the company's holdings. The directors elected for the ensuing year were H. E. Macdonell, J. J. Campbell, R. S. Lennie, J. E. McNaughton and Col. Topping. Subsequently the board re-elected H. E. Macdonell president and J. J. Campbell, vice-president and secretary-treasurer. G. Player was appointed auditor.

ALASKA-MEXICAN MINING CO.

This company owns a large low-grade gold property on Douglas Island, Alaska. It also works under lease the 700-ft. claim owned by the Alaska United Mining Co. The property is equipped with a mill of 120 stamps. The report is for the year 1906. The capital stock authorized is $1,000,000; issued, $900,000, in shares of $5 par value.

The statement of earnings and expenses for 1906 is as follows, with the averages per ton milled:

	Amount	Per ton
Free gold	$392,773	$1 6512
Sulphurets	382,696	1.3819
Interest	2,759	0.0116
Total receipts	$724,228	$3.0447
Mining expenses	$332,645	$1.3985
Milling expenses	62,200	0.2615
Sulphuret treatment expenses	25,705	0.1081
Bullion charges	3,229	0.0136
General expenses	12,117	0.0542
Construction	6,424	0.0269
Total expenses	$443,100	$1.8628
Net earnings	$261,127	$1.1819

From these net earnings dividends amounting to $216,000, or 24 per cent., were paid, and $50,000 charged off for depreciation, leaving a balance of $15,128. Adding $111,995 brought forward from previous year, made a total undivided surplus of $127,123.

The mill statement shows that the average value of the tailings was $0 1882, which would bring the value of the ore up to $3.2223 per ton. Of the bullion saved 51.8 per cent. was in free gold from the mill, and 48.2 per cent. in sulphurets saved by concentration and afterward smelted. The quicksilver fed in the mill was 0.2519 oz. per ton crushed; the loss of quicksilver for the year was 18,422 oz., or 30.7 per cent. of the total fed. The distribution of the clean-up in the mill was: Barrel, 6.2 per cent.; vanner, 2.1; tanks and tail-boxes, 11.6; blocks, 2; tables, 75.3; traps, 2.8 per cent. The average duty per stamp per 24 hours was 5.69 tons. The total milled was 237,862 tons.

The running time of the full mill for the year was 348 days, 4 hours, 21 minutes, during which time steam was used for power 223 days, 47 minutes, and water for power 125 days, 3 hours, 34 minutes. During the year, 1 lb. of chrome steel in the shoes crushed 2.42 tons of ore, and 1 lb. of iron in the dies (which are made at the Treadwell foundry) crushed 4.80 tons of ore, at a total cost of $0.0298 per lb. for the iron and steel consumed in crushing one ton of ore.

The mine statement shows 328,627 tons broken, of which 10,860 tons were rejected as waste; 237,862 tons were sent to mill, the balance remaining in stock. Development work included 182 ft. shaft-sinking; 1760 ft. raises; 441 ft. stations and skip-chutes; 4,857 ft. drifts and crosscuts. The ore reserves in sight December 31 were 856,390 tons, of which 240,129 tons were broken in stopes, and 619,261 tons blocked out. All these reserves were below the 440-ft. level.

There was an average of 17.66 machine drills in use. The average work done per drill shift was 36.04 ft. of holes, and 26.28 tons broken; an average of 0.73 ton broken per foot drilled.

A new double-drum, 48x20-in. hoist has been installed at the main shaft Following out the general plan of substituting crude oil for coal as fuel for the mines on Douglas Island, all the piping for pumping the oil to the storage tank and supplying the boilers has been completely installed and the foundation for the oil tank finished. The feed pumps and the steel oil tank are on the ground.

CROW'S NEST PASS COAL CO., LTD.

On February 8 the tenth annual general meeting of shareholders in the Crow's Nest Pass Coal Co., Ltd., was held at the head offices of the company in Toronto, Ontario, but owing to the necessary attendance of the general manager at the mines, was adjourned until April 30. On the latter date the adjourned meeting was held, and at this 80 per cent. of the stock was represented, either in person or by proxy.

The vice-president, Hon. Robert Jaffray, having taken the chair, the secretary, after reading the notice calling the meeting, read the tenth annual report of the directors and the accompanying financial statement:

DIRECTORS' REPORT.

"The directors beg to submit to the shareholders of the company their tenth annual report, including statement of assets and liabilities, as of 31st December, 1906.

"The balance at the credit of Profit and Loss Account brought forward from 1905 amounts to $351,801.07. To this has been added the sum of $351,791.35, being the company's net profits from the operations for the year, so that the aggregate of the Profit and Loss Account is $703,592.42. From this amount, the directors have paid four quarterly dividends of 2½ per cent. each, making 10 per cent. for the year, and amounting in all to $350,000, and have carried forward to 1907 $353,592.42 to the credit of Profit and Loss Account.

"The coal mined this year amounts to 806,901 tons as against 831,249 tons mined in 1905. The production of coke amounted to 213,295 tons as against 257,702 tons in 1905. The difference in production is due to the strike which commenced on September 22, and lasted practically two months. Had the strike not occurred, and the average been maintained, the output would have reached the 1,000,000-ton mark for the year.

"During the year there has been spent on improvements the sum of $137,292.69 by the Coal Company,, $11,880.28 by the Electric Light and Power Company, and $20,996.58 by the Morrissey, Fernie and Michel Railway Company, or a total on improvements of $170,169.55.

"The contract existing between the company and its employees expired on April 1, 1907. Seven of the operators in the Crow's Nest Pass and on the main line of the Canadian Pacific railway in Alberta met their men at their request in joint conference in the month of March, with a view to renewing their agreements. After more than twenty days of patient labour in the consideration of the subject, it was found impossible to reach an agreement, the question of the closed shop being the point

upon which the parties were unable to come together."

Accounts to December 31, 1906, were submitted, as follows:

GENERAL STATEMENT.

Assets.

Mines, real estate, plant, development, etc....	$5,481,323.39
Securities owned	578,296.98
Accounts receivable	423,495.56
Cash on hand and in bank.....	10,519.96
	$6,493,635.89

Liabilities.

Capital stock fully paid up.....	$3,500,000.00
Reserve fund	1,800,000.00
Bills payable	536,787.59
Accounts payable	215,755.88
Dividend No. 24, payable Jan. 1, 1907.....	87,500.00
Profit and loss	353,592.42
	$6,493,635.89

Profit and Loss Account.

Balance at credit, Dec. 31, 1905.....	$351,801.07	
Net profit for 1906.....	351,791.35	
		$703,592.42

Appropriated as Follows:

Dividends paid	$350,000.00	
Balance carried forward to 1907....	353,592.42	
		$703,592.42

THE PRESIDENT'S ADDRESS.

In moving the adoption of the report, the Hon. Robert Jaffray, vice-president of the company, said:

"Gentlemen,—I beg to move the adoption of the report, but before proceeding with the address in connection therewith I wish to express my deep regret at the absence of the president, through the sudden death of his son, Mr. F. G. Cox. I am sure Senator Cox has the sincere sympathy of all of us in the sad circumstances.

"Fortunately, the president's remarks upon the report *had been prepared, and with your permission I will now* read them to you.

"In connection with the resolution, certain information has been prepared, which, I think, will be of interest to the shareholders, and after giving that, any questions which you may ask in connection with the report will be gladly answered.

"The directors' report and financial statement, which you have just heard read, indicate that the company has passed a satisfactory year. Had it not been for the unfortunate strike which took place in the latter months of the year, the production would have reached approximately one million tons, and the profits of the company should have shown a betterment of $125,000, which is the estimate the board place upon the cost of the strike. This is made up of loss in profits, and in the actual expense of the strike.

"This strike was brought about as the result of a direct breach of undertaking by the local officers of the United Mine Workers of America, District No. 18. Mr. John Mitchell, president of the United Mine Workers of America, later on sent his representative, Mr. Thomas Burke, to look into the matter, when the following declaration was made by him:

"'I, Thomas Burke, acting for President Mitchell, and sent to Fernie by him to settle the strike, find that the Crow's Nest Pass Coal Company were promised by the Conference Committee which framed and signed the Agreement of May 23, 1905;

"'(a) That there would be no refusal to work with non-union men.

"'(b) That the issue of the closed shop would not be raised.

"'(c) That President Mitchell would not permit a strike for any such purpose.

"'(d) That it was relying on the faith of those promises that the discrimination clause in previous agreement was omitted from the agreement of May 23, 1905.

"'I further say that President Mitchell, had he been advised of the aforesaid promises, would not have ordered a strike nor sent his telegram dated September 11, 1906.

"'It is therefore agreed between myself and Mr. Lindsey, acting for the Crow's Nest Pass Coal Company:

"'1. That there shall be no discrimination by union men against non-union men or refusal to work with them.

"'2. That all men who *joined the United* Mine Workers of America since September 11, 1906, and signed to deduct dues under Article 5 on or after the said date are released from the said organization and their signatures to such orders shall be and are cancelled, and they may re-join and re-sign at their option.

"'3. That the monies collected for the union by the company for dues in October from the September pay-roll shall be paid over to the Union.

"'4. That inasmuch as the present check-off order does not last for the life of the agreement, a new check-off order is to be prepared and substituted for it, which will last for the life of the agreement, and this, when signed, the company will accept.

"'5. All men are to go back to work.

"'Dated, Fernie, November 12, 1906.

(Sgd.) G. G. S. Lindsey.
" Thomas Burke.

"'Witness
"'(Sgd.) R. W. Coulthard.'"

"While speaking of the closed shop question which was the question on which the strike took place it is well to recall that the same question was the point on which the parties were unable to agree at the conference held at Calgary in March of this year. Seven contracts with the miners in the Crow's Nest Pass and on the main line of *the Canadian Pacific railway expired on April 1, and the* parties met in joint conference at Calgary, to endeavor to find a basis of renewal, but failed, only upon the question of the closed shop.

"Since that date the operators and their men have been in almost constant negotiation, and we are now advised that an agreement extending over two years has practically been arrived at between the delegates of the men and the Western Operators Association. This agreement, which is subject to ratification by the men, will be voted on shortly, and it is believed their vote will be favourable to resumption of work.

"Of the tonnage produced, in 1906, 340,530 tons of coal were sent to the coke ovens, and produced 213,296 tons of coke, while the balance, 427,454 tons were shipped as merchantable coal; 2,674 tons sold locally, and 36,241 tons consumed under the boilers.

"During the year the company's pay roll amounted to $1,436,401.

"The operations of the year were at times retarded by the insufficient car supply, and by the very severe weather in December last, which hampered the operations of railways and mining companies, as it did to an even greater extent in the early months of the present year.

"The strike at the Lethbridge mines, extending over six months, and the unprecedentedly severe weather of last winter, caused a shortage of coal at times, which the strike at our collieries added to, but far more was made of it than the situation warranted, and it by no means indicates that under normal conditions any shortage would have occurred, provided the railway companies had been unhampered with such severe weather conditions as to make the handling of traffic at times impossible. Such a set of adverse conditions is not likely to again arise.

"The Crow's Nest Pass Electric Light and Power Com-

pany and the Morrisey, Fernie & Michel Railway Company have made necessary improvements, and require a considerable amount of expenditure on capital account.

"The new office building at Fernie was completed in May, 1906, and immediately occupied. It is a spacious and commodious building, admirably suited to the requirements of the different departments.

"In looking over our balance sheet for the year, I find that the statement of our assets and liabilities has changed very little, and I would again recall to your minds that these assets are made up almost entirely of the cash investment in plant and development.

"The reorganization of the company, to which reference was made at the last annual meeting, was not proceeded with on account of the disturbed labour conditions and their results, it not being thought wise to reorganize in a year in which finances were affected to the extent to which they were in this way.

"There have been no changes in the office staff during the year, and I take pleasure in testifying to the capability and zeal of the various officers.

"I have every reason to believe, notwithstanding the increased competition in coal and coke operations, that the company's business will expand rapidly and satisfactorily. At the present time all are bending their energies towards the production of a larger tonnage. While the strike of last year unsettled conditions for a time, and retarded development somewhat, your directors have every reason to believe that the growth of the West is such as to justify a very considerable increase in development work, and a greater output of both coal and coke.

THE VICE-PRESIDENT'S ADDRESS.

Lieut.-Col. Sir Henry M. Pellatt, vice-president of the company, in seconding the motion to adopt the report, said:

"The subsidiary companies continue to expand their operations and become more useful to the parent company.

"The Morrissey, Fernie & Michel Railway Company has built a large amount of new yard trackage at Fernie, and will this year have to purchase two new locomotives.

"The Electric Light and Power Company has added considerably to its water works system at Fernie; has extended its telephone lines and improved its power plant. There has also been considerable extension of the electric light lines during the year. It has also acquired a water power with considerable potentialities at Elko, and the board has under consideration the question of using this for the generation of electrical energy.

"The sale of lots in the Fernie Annex continues. Miners are for the most part the purchasers, and are to a very considerable extent building their own houses.

"Of the improvements made by the Coal Company, the ever increasing demand for house accommodation by the men has to be taken care of.

"A second box car loader has been installed at Coal Creek and a third is being put in at Michel. It has been found necessary to add new steam and electric locomotives to the outside haulage plant and materially increase the steam power at the collieries.

"At Coal Creek three new seams of coal have been opened up. No. 6 seam, near the present tipple, is in 5 ft. of good coal, and will add considerably to the company's producing powers. Another seam, at the rock cut, about three miles from Fernie, has developed into a good 6-ft. producing seam. A seam of cannel coal at an altitude of 2,000 ft. above the level of the Coal Creek valley, is being prospected, and promises to be a good producer of this very valuable coal.

"The underground improvements have also been considerable. Development work at the older mines, both at Michel and Coal Creek, is being pushed ahead, so as to increase the company's producing capacity, and an increased tonnage is assured. All the railways are doing a large business, and the price of metals is and has been for some time unprecedentedly high, so that the smelters are running at full capacity and there is every reason to believe that orders will steadily increase."

The report was unanimously adopted.

On motion duly made the following by-laws were confirmed:

By-law No. 107, being a by-law to give the land commissioner power with the secretary to execute deeds in favor of purchasers of land from the company.

By-law No. 109, being a by-law to amend By-law No. 98, to abolish the office of third vice-president and re-establish the office of managing director.

By-law No. 110, being a by-law to amend By-law No. 17, as to the business to be transacted at a directors' meeting held immediately after an annual meeting.

On motion it was resolved that the thanks of the shareholders are due, and are hereby tendered to the general manager, general superintendent, comptroller, land commissioner and other officers of the company for their services to the company in the fulfilment of their respective duties during the past year. This was responded to, in the absence of the general manager, by the comptroller, Mr. Davies.

On motion it was resolved that the number of directors for the ensuing year be 15.

The ballot was then taken, and the scrutineers reported the following gentlemen elected as directors for the year 1907: Hon. Geo. A. Cox, Hon. Robert Jaffray, Lt.-Col. Sir Henry M. Pellatt, K.B., Lt.-Col. J. D. Chipman, Thomas Walmsley, C C. Dalton, James W. Woods, W. J. Morrice, E. C. Whitney, E. R. Wood, Lt.-Col. James Mason, G. G. S. Lindsey, K.C., Elias Rogers, Frank H. McGuigan, Francis McLennan, K.C.

At a subsequent meeting of the directors the following officers were elected: President, Senator Geo. A. Cox; Vice-Presidents, Senator Robert Jaffray, Lt.-Col. Sir Henry M. Pellatt, K.B.; Managing Director, G. G. S. Lindsey, K.C.; Treasurer, E. R. Wood; Secretary, G. G. S. Lindsey, K.C.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.

Le Roi.—April: Shipments amount to 9,685 tons, containing 1,958 oz. gold, 4,200 oz. silver and 206,900 lb. copper. Estimated profit on this ore after deducting cost of mining, smelting, realization and depreciation, $5,000. Expenditure on development work during the month, $16,500. Ore shipments to Trail smelter now finished. In future all shipments will be sent to th smelting works at Northport.

Le Roi No. 2.—April: Josie mine report: Shipped 1,740 tons. Net receipts are $31,179, being payment for 1,820 tons shipped, and $1,412, for 60 tons concentrates shipped —in all, $32,591. Vancouver mine report: Shipped 40 tons. Net receipts are $1,421, being payment for 20 tons shipped. Concentrates, no receipts. Net estimated value lead concentrates made during April, $10,000.

Le Roi No. 2.—Cable has been received from the company's manager at Rossland:—"In order to give earliest possible information, although no final decision yet arrived at, am confident have discovered the H vein 900-ft. level. We have commenced to drive to the vein; looks most promising; today assays, gold, 0.58 oz., copper, 0.50 per cent.; width indeterminate; will not be less than 1 ft. 6 in. H vein, 700-ft level—Average since last advice—gold, 2.75 oz., copper 0.50 per cent." (Office note—The last advice referred to was a cable received on May 6 from the manager, stating that he had reason to believe that the streak of ore on which driving had been commenced on the 700-ft level was the downward continuation of H and that for four days the average assay had been 1.30 oz. gold and 0.70 per cent. copper.)

Slough Creek.—The manager cables: "Pressure is still decreasing, and now represents a fall of about 200 in. in the height of the water." The secretary writes:—"The

new machinery is working well, and owing to the larger quantity of water now being pumped the pressure has already gone down 6 lb. per sq. in. This represents a reduction of about 14 ft. in the column of water, affording a strong presumption that the new plant recommended by Mr. Kendall should be ample for all requirements.

Tyee.—April: Smelter ran 13 days and smelted: Tyee ore, 880 tons; custom ore, 2,121 tons; total, 3,001 tons. Matte produced from same, 269 tons. Gross value of contents (copper, silver and gold), after deducting costs of refining and purchase of custom ore, $7,658.

U. S. A.

Alaska Treadwell—Alaska Mexican—Alaska United—April 12: Mines have been closed since April 1, on account of labour troubles, but think an early settlement may be expected.

Alaska Treadwell—April 17: 240-stamp mill running day and night. Part crew at all mines. (Alaska Mexican, Alaska Treadwell and Alaska United).

Exploration Company.—April 27: Alaska Treadwell—Alaska Mexican—Alaska United Companies. Upon the suggestion of my (our) superintendent the dividend (s) will be deferred. Labour now is quiet, and working, but situation not completely settled.

Alaska Mexican.—April: 120-stamp mill ran 14¼ days, crushed 8,947 tons; estimated realizable value of bullion, $21,399. Saved 145 tons sulphurets; estimated realizable value, $8,990. Working expenses, $26,377.

Alaska Treadwell.—April: 240-stamp mill ran 19 days, crushed 18,760 tons; estimated realizable value of bullion, $26,995. Saved 450 tons sulphurets; estimated realizable vaiue, $25,088. Working expenses, $56,018.

Alaska United.—April: Ready Bullion claim: 120-stamp mill ran 15 days, crushed 10,700 tons; estimated realizable value of bullion, $11,717. Saved 165 tons sulphurets; estimated realizable value, $6,435. Working expenses, $20,812.

NOTES.

The Pay Roll Gold Mining and Milling Co., Ltd., with authorized capital of $500,000, was incorporated on November 17, 1899. Its registered office is at Cranbrook, East Kootenay. In the "Annual Report" for 1898 the provincial mineralogist gave a short description of the Pay Roll group, on Little Nigger Creek, in the course of which he observed "as nothing more than a surface exposure has been made and the permanence of the vein has not been established. it is an open question whether the lead can be profitably worked." The company is now in liquidation.

The London, England, *Critic* says: "A cablegram from Juneau, Alaska, states that the Alaska Consolidated will probably begin milling about the beginning of June. The company has 100 stamps erected, and its ore reserves are estimated at 10.000,000 tons. Like all Alaskan properties, the ore is very low-grade, but it can be handled so economically that it can be treated at a profit. The results secured by this company should be closely watched by investors."

At a meeting of the Crow's Nest Pass Coal Company held on May 22, it was resolved to issue $500,000 additional stock. The new stock will be issued to those present shareholders who desire to take it at the ratio of one of the new bonds for each seven shares of the original stock which each shareholder now has. The price of issue will be $250 per share. The proceeds of the new stock are to be used for development purposes.

At a meeting of the directors of the Giant-California Mining Company, held at Rossland on May 17, officers were elected as follows: President, Jay P. Graves; vice-president, A. L. White; secretary, Charles H. Wolf; treasurer, George W. Wooster. William Yolen Williams, who developed the Granby was chosen superintendent. The company decided to at once begin operation on the Giant and California claims. It was stated during the meeting that there was ample funds at the command of the company to carry on development work and place the mine on a profit-making basis.

The Pacific Coal Mines, Ltd., has been incorporated at Ottawa with a capital stock of $6,000,000, and headquarters in Toronto, Ontario, to carry on a general mining business and to take over the business of the Alaska Development Company and of the Pacific Coal and Oil Company. The names of the incorporators are given in the *Canada Gazette* as J. S. Lovell, accountant; E. W. McNeill, solicitor's clerk, and others of Toronto, but the enterprise is understood to be one of Mackenzie & Mann.

The Trusts and Guarantee Company, Ltd., liquidators of the William Hamilton Manufacturing Company, of Peterborough, Ontario, have accepted an offer made by R. R. Hall, M. P., to purchase the assets of the Hamilton Company. The price offered was $192,000. At a meeting of the creditors it was decided to ratify the acceptance of the offer by the liquidators.

An announcement in the *Yukon World* intimates that at Dawson another dredging company is applying for incorporation. It is entitled the Indian River Gold Mining and Development Company. The incorporators are Harold G. Blankman, George G. Lemons, Russell Hildebrand, E. Smith Strait and R. B. Ackerman, all of Dawson. The capital stock of the company is to be $1,000,000, in 1,000,000 shares of $1 each.

COAL MINING NOTES.

The Crow's Nest Pass Coal Company's mines are again producing a large quantity of coal—nearly as much as before the recent strike that caused a suspension of operations for several weeks. A local newspaper lately stated that about 1,000 men were at work at the company's Coal Creek mines and 650 at its Michel mines.

At the end of May fire broke out in one of the slopes of the Wellington Colliery Company's No. 4 mine in Comox district, Vancouver Island. As this is one of the most productive of the Comox mines, the interruption thus caused to production of coal is particularly unfortunate at this time when the demand for coal is greater than the supply. It is hoped that during June it will be found practicable to resume work and production here.

According to a press despatch from Brandon, Manitoba, local coal companies have decided to amalgamate and build a monster coal shed. It will be built this summer and be large enough to hold sufficient coal to last for years. A large quantity of coal will be put in stock during the ensuing autumn in preparation for meeting next winter's heavy demands.

The Hillcrest coal mine, near Frank, southwest Alberta, is still idle and the managing director states that work will not be resumed under the general agreement recently made between the Mine Operators' Association and the miners, the terms being regarded as unfair in some respects to the Hillcrest mine. The installation of the new plant for handling coal, will, however, it is understood, be completed.

A coal company, capitalized at $1,000,000 has been organized in Edmonton and a charter applied for. American capital is interested, three Minneapolis men being the shareholders. The company will operate a mine up the Saskatchewan River, some 50 miles from Edmonton and 78 miles due west from the Canadian Pacific railway at Leduc.

CONSTRUCTION NOTES.

The Pacific Coal Company, which also owns the Bankhead colliery, Alberta, is putting in a 250-h. p. Rand duplex engine, for operating a large ventilating fan, at the coal mine it is opening at Hosmer, Crow's Nest Pass.

At Phoenix, Boundary district, the Granby Con. M. S. and P. Co. is now operating the hoisting engine the installation of which at its new Victoria shaft was lately completed. It is a Rand 250-h. p. double conical drum engine, driven by a Westinghouse 3-phase variable speed induction motor; its capacity is 1,000 ft. of 1⅛-in. steel rope.

The Dominion Copper Company, Ltd., has bought for

its Sunset mine, near Greenwood, Boundary district, a Rand 10-drill compound air compressor. This engine will shortly be installed. A 50-h. p. electric hoist has also been purchased for this mine.

Large quantities of materials are being taken into the Yukon by the Guggenheim mining companies, for use in connection with their water supply system for hydraulicking and dredge-mining operations in the Dawson district. About 1,000,000 ft. of timber for dredge construction purposes has been purchased in British Columbia and one-fourth of this quantity is now in transit between Skagway and the head of navigation on the Yukon River. About 100 large pipes, approximately 70 ft. in length by 4 ft. diameter, have been shipped from the Fraser River terminus of one of the transcontinental railways for Skagway, en route to the Yukon. These pipes were manufactured in Pennsylvania and are probably the largest ever taken into the Yukon.

The Dominion Copper Company, Ltd., now supplies compressed air from a central power house on its Idaho mine, Phoenix, Boundary district, to four of its mines, viz., the Idaho, Brooklyn and Stemwinder, all adjoining properties; and the Rawhide, distant about a mile from the power house. The air is compressed by a Rand 25-drill duplex tandem compound engine, electrically driven, and having a capacity of about 2,800 cu. ft. per min. of free air at sea level. A full equipment of Rand Little Giant machine drills has also been put in at each mine.

BOOKS, ETC., RECEIVED.

United States Geological Survey.—

"Mineral Resources of the United States, 1905." By David T. Day, chief of Division of Mining and Mineral Resources. Pages, 1369.

"Black Sands of the Pacific Slope in 1905." By David T. Day and H. Richards. From "Mineral Resources of the United States, 1905." Pages, 84.

"Production of Gas, Coke, Tar, and Ammonia in 1905." By Edward W. Parker. From "Mineral Resources of the United States, 1905." Pages, 31.

Department of the Interior, Mines Branch, Ottawa.—"Report on the Experiments made at Sault Ste. Marie, Ontario, under Government Auspices, in the Smelting of Canadian Iron Ores by the Electro-thermic Process." By Eugene Haanel, Ph. D. Pages, 149; illustrated by diagrams and half-tones.

Department of Lands and Forests, Ontario.—"Report of the Bureau of Mines, 1906." Vol. XV, Part II. "Clay and the Clay Industry of Ontario." By M. B. Baker. Pages, 120; illustrated.

California State Mining Bureau.—"The Auriferous Black Sands of California." By J. A. Edman, E. M. Bulletin No. 45, issued by the State Mining Bureau, San Francisco, under the direction of Lewis E. Aubury, state mineralogist. Pages, 22; illustrated. Price, ten cents.

BOOKS REVIEWED.

The Metallurgy of the Common Metals, by Leonard S. Austin, professor of metallurgy and ore-dressing at Michigan College of Mines. 407 pages, 6"x9¼" in., freely illustrated; published by the *Mining and Scientific Press*, San Francisco. Cloth, $4 (plus postage 16 cents.)

In his preface to this book the author says: "This outline of the metallurgy of the common metals, namely, gold, silver, iron, copper, lead, and zinc, is devoted to the description of the processes of winning the metals from their ores and to the refining of those metals, except iron, the metallurgy of which is treated only to the point where pig iron is obtained. Following the description of ores, as well as of the fuels used in treating them, and the materials of which the furnaces are composed, we come to their sampling, for the determination of their exact value before treatment. Attention is next given to the subject of thermo-chemistry as applicable to igneous methods of extraction. The winning or reduction of the various metals is then taken up in order and is followed by a description of the methods of refining them. Finally, the commercial phases of the question have consideration, since the processes must be conducted in a profitable way."

As an example of the scope of the author's work in what he intimates is but an "outline" of the general subject, the following narration of the sub-heads of the commercial section of the book will serve to indicate that notwithstanding necessary space limitations, the subject is comprehensively though briefly treated. These sub-heads are, respectively: (1) Location of Reduction Works; (2) Handling of Materials; (3) Organization of a Metallurgical Company; (4) Investment Required on Original Plant; (5) Profits; (6) Organization; (7) General Remarks on Management and Labour; (8) The Purchasing of Ores in the Rocky Mountain States; and (9) The Marketing of Ores and Metals.

A number of half-tone blocks and line-cut diagrams serve to effectively illustrate this interesting volume, thereby increasing its usefulness. The letter press is excellent and the binding serviceable.

Mine Timbering, by Wilbur E. Sanders, Bernard MacDonald, Norman W. Parlee, and others. 176 pages; 6⅛ by 9⅛ in.; illustrated by numerous diagrams. Published by Hill Publishing Company, London and New York. Cloth, $2 postpaid.

This book is a collection of articles previously printed in the "Engineering and Mining Journal," "The Mineral Industry," and the "Transactions" of various societies. In the absence of any treatise on the important subject of "Mine Timbering," which in published hand-books and text-books on mining is as a rule dealt with only in a superficial way, it has appeared worth while to publish in book form the articles, contained herein, these being offered as a series of essays rather than as a complete treatise on the subject dealt with. Many important details are gone into fully, and the practical information thus placed in readily accessible form is rendered more valuable by numerous object lessons in the shape of diagrams and other illustrations. The fact that methods of timbering adopted in mines in various countries—several of the United States, British Columbia, Queensland, Tasmania, etc.—are dealt with, thus showing different styles to meet diverse conditions, makes the book of greater use to those whose business it is to familiarize themselves with the best methods, consequently it should be widely read by mining men.

Examination Questions for Certificates of Competency in Mining 532 pages, 6x9 in.; illustrated. Published by the Scranton, Pa., International Textbook Company. Cloth, $3.50.

This book contains examination questions for certificates of competency as mine inspector, mine foreman, mine manager, fire-boss, hoisting engineer, etc., as given by the State Examining Records, together with answers prepared and edited by the editors of *Mines and Minerals*. In addition to dealing comprehensively with its subject matters in their relation to the United States, British Columbia has attention, and as well, brief reference is made to Nova Scotia.

The twenty-eight chapters, comprising the volume contain 2,570 questions, with answers thereto. This compilation is believed to faithfully and fully represent the range of subjects covered at the present time by examinations for certificated mining positions in the United States and Canada. It is intended to assist those preparing themselves for official examinations for such positions. It is, therefore, not intended as a text-book but merely as an aid in connection with text books on mining.

No deposits of tin, of an economic nature, have yet been discovered in Canada.

MINING MEN AND AFFAIRS.

E. H. Finch is superintendent of the mines at Rossland of the Le Roi No. 2, Ltd.

S. S. Fowler of Nelson, who recently went to New York and other Eastern points, is back again.

Edward Stables of London, England, has been examining the Lenora mine at Mt. Sicker, Vancouver Island.

S. W. Emmerson of Philadelphia, Penn., U. S. A., has been examining mining properties in the Kamloops district.

Charles Rundsberg of Salt Lake City, Utah, U. S. A., has been appointed superintendent of the Dominion Copper Co.'s mines in the Boundary district.

R. H. Stewart, manager of the mines of the Consolidated Mining and Smelting Company of Canada, returned to Rossland on May 11 from a visit to Wallace, Idaho.

Newton W. Emmens, formerly of Pittsburg, Pa., now manager of the Silver Dollar and Broadview mines in the Lardeau district, was a recent visitor to Victoria.

J. C. Haas of Spokane, Washington, U. S. A., was in the Boundary district lately in connection with the further development of the Golconda and on other mining business.

Horace V. Winchell of St. Paul, Minnesota, U. S. A., chief geologist for the Great Northern Railway Company, has been visiting mines and smelters in the Boundary district.

N. F. McNaught when in Nelson about the middle of May stated that in the Silverton section of Slocan district prospects for the ensuing season were excellent, especially for mining.

Dr. Eugene Haanel of Ottawa, late superintendent of mines for the Department of the Interior, has been appointed director of the Mines Branch of the newly created Department of Mines.

Colgate Hoyt, president of the British Columbia Copper Company, has been looking over the several mines and the copper smelting works of the company in the Boundary District.

B. P. Little, superintendent for the Diamond Vale Coal and Iron Mines, Ltd., operating in the Nicola district, on May 10 left for Pittsburg, Pennsylvania, to attend the golden wedding celebration of his parents.

W. H. Wiley, who reached Whitehorse from California early in May, is examining a number of mineral claims in Whitehorse copper camp bonded during the winter for a Pennsylvania syndicate.

Bernard MacDonald, for years in charge of mines at Rossland, and later managing mines at Guanajuato, Mexico, has opened an office in New York as mining engineer. Mexican mines will be a specialty with him.

John B. Hobson, manager of the two Guggenheim companies operating in the Cariboo district, has gone up to Quesnel Forks to direct the season's hydraulicking work on the big placer gold property formerly owned by the Consolidated Cariboo Hydraulic Mining Company.

A. J. G. Swinney, known in the Lardeau district of British Columbia, where he was for some time in charge of the Ferguson Mines, Ltd.'s Silver Cup and Nettie L. mines, and chlorination mill, has left England to take up work in the Deccan goldfields, India.

H. J. Baron, who three years ago made a trip through the mining districts of southern Kootenay and southern Yale in the interests of a Denver, Colorado, mining journal, is now editor of the journal of the Western Association of Technical Chemists and Metallurgists.

H. E. T. Haultain, formerly of Nelson, and for the past 18 months or so manager of the production part of the Canada Corundum Co.'s business, has been appointed that company's general manager, with headquarters at Craigmont, Ontario.

W. J. Elmendorf of Spokane, Wash., manager for a syndicate which last winter purchased the Arctic Chief and Best Chance copper claims in southern Yukon is at Whitehorse directing development work on these properties.

W. C. Thomas, resident general manager for the Dominion Copper Co., operating copper mines and smelting works in the Boundary district, recently examined some copper properties in the Similkameen district of that province.

T. J. Vaughan-Rhys, formerly in charge of the Van Anda Copper and Gold Mines Co.'s Cornell and Copper Queen mines on Texada Island, and now operating mines in Mexico, lately visited British Columbia. He is mining on Valdez Island.

Geo. W. Maynard of New York arrived at Whitehorse, southern Yukon on May 14, and has since been engaged in examining a number of copper properties under bond to Col. W. S. Thomas of Harrisburg, Pa., representing the Pennsylvania Syndicate.e

Dr. Alfred Stansfield, professor of metallurgy at McGill University, Montreal, Quebec, after accompanying the McGill Summer Mining School on its western itinerary, visited the Tyee Copper Co.'s smelting works at Ladysmith, Vancouver Island.

Geo. H. Collins of Greenwood, formerly superintendent of the mines at Phoenix now operated by the Dominion Copper Co., has removed to the coast after having been connected with mining in the Boundary district for about eleven years. For the present he is making Vancouver his headquarters.

D. R. Irvine, manager for the Berry Creek Mining Co., Ltd., has gone up to Cassiar with 25 men to resume hydraulicking operations on his company's placer gold leases on Thibert Creek. Warburton Pike, having lately arrived from England, whence he went on one of his periodical visits, expects to shortly join Mr. Irvine on Thibert Creek.

Dr. G. C. Hoffman, LL.D., F. I. C., F. R. S. C., of Ottawa, Ontario, has resigned the offices of assistant director, chemist, and mineralogist to the Department of Geological Survey, Canada, to which he was appointed on July 1, 1883. He entered the employ of the government on September 1, 1872, so has been in that service nearly thirty-five years of which twenty-four were devoted to the duties he now voluntarily relinquishes.

Albert P. Low, deputy head and director of the Geological Survey Department of Canada, has been appointed deputy minister of the newly-created Dominion Department of Mines. Hon. Wm. Templeman is the first minister of mines, in charge of the new department, which consists of two branches, respectively the "Mines Branch" and the "Geological Branch."

H. H. Claudet has returned to Rossland after several months' absence in Colorado and Mexico. Whilst away he installed two of the Elmore Vacuum Oil Concentration Process plants in Mexico—one each at Nacozari and San Luis Potosi—and one at Denver, Colo. Two similar plants are to be installed in Kootenay district of British Columbia, and one in Lake Superior district, Ontario.

W. A. Carlyle has resigned the position of general manager of the Rio Tinto copper mines, Spain, to which he was appointed towards the end of 1899. During 1896 and 1897 Mr. Carlyle was provincial mineralogist of British Columbia and resigned that office early in 1898 to become general manager for the British company then owning the Le Roi mine at Rossland. He is now practising as a consulting engineer with headquarters in London, England.

Dr. J. Bonsall Porter, professor of mining at McGill University, Montreal, Quebec, after having been in charge of the McGill Summer Mining School during the mem-

bers' recent visit to Cobalt, Ontario; several coal mines in southwest Alberta, and mines, concentrating mills, smelters, etc., in the Kootenay and Boundary districts of British Columbia, spent two or three days at Victoria towards the end of May, before returning East.

Byron N. White of Spokane, Wash., who last year bought the Pueblo and Carlisle copper properties near Whitehorse, Yukon Territory, has resumed mining operations, giving them personal supervision. During the winter 700 or 800 tons of ore were shipped to the Tyee Copper Co.'s smelter on Vancouver Island, and gave profitable results.

D. D. Cairnes of the Geological Survey of Canada reached Vancouver about the middle of May on his way from Ottawa to Whitehorse, Yukon Territory. Last year Mr. Cairnes spent the season for field-work in investigating the economic resources of certain areas of that territory south of Whitehorse. During the ensuing season he will work north of Whitehorse, particularly in the vicinity of the coal measures in that locality.

Eugene Coste of Toronto, Ontario, who during recent months has been directing the Canadian Pacific Railway Co.'s oil-boring operations in the Canadian Northwest, has returned to Toronto from Colombia, South America. While in that country he obtained an option on a large area of land situated near Barranquilla and Puerto Colombia, in the northern part of Colombia. Development work is shortly to be undertaken on the property, on which natural gas is burning at the surface.

J. Anste Bancroft, assistant to Dr. Frank D. Adams, professor of geology at McGill University, Montreal, Quebec, has been given charge of the Dominion geological survey party assigned to continue the work of examining the coast line of British Columbia commenced last year by O. E. LeRoy. Mr. Bancroft, with his assistant, R. Graham, is now on the coast making arrangements for working north from Powell river, at which point Mr. LeRoy's operations ceased at the close of last year's field-work season.

W. H. Jeffery, for several years in charge of one or other of high-grade properties near Greenwood, Boundary district, has been appointed superintendent for the La Rose Mining Co., of Cobalt, northern Ontario. The La Rose mine is situated at the northern end of Cobalt Lake; the property was first taken up in the fall of 1903 and has been worked steadily since the summer of 1904. There are ten distinct silver-bearing veins on the property. Underground development is carried on from two shafts, the deeper of which is between 300 and 400 ft.

Louis Pratt of Sandon, Slocan, was in Victoria during the month in connection with matters at issue between the owners of adjoining mines one of which he has charge.

A. B. W. Hodges of Grand Forks, manager of the Granby Mining, Smelting and Power Co., and J. E. McAllister of Greenwood, general manager of the British Columbia Copper Co., proceeded to New York early in May to confer with their respective directorates in regard to a demand made by the companies' employees for an increase in wages.

J. W. Campbell of Toronto, Ontario, manager of contract sales for the Canadian General Electric Co., after having been 15 years in that company's service, has resigned to accept the position of managing director for the Alberta Portland Cement Co. of Calgary, Alberta, Canada. Before leaving Toronto Mr. Campbell was given a farewell banquet and presented with a cheque for a substantial amount by the Canadian General Electric and Canada Foundry companies, and a gold watch by his fellow officers in the employ of those companies. He assumed his new duties on May 15.

Robert R. Hedley, late manager of the Hall Mining and Smelting Co.'s lead-silver smelter at Nelson, B. C., has been appointed to collect data in British Columbia, Alberta, Saskatchewan, and Manitoba, relating to mines, reduction works, etc., for the full report on the mining industry of Canada which it is announced the Dominion

department of mines intends publishing. Mr. Hedley proceeded from Ottawa to Victoria, where, it is understood, he is conferring with the provincial mineralogist, W. F. Robertson, concerning the most effective means to adopt in order to obtain as reliable and complete information as shall be found practicable of the mining and smelting industries of western Canada.

BRITISH COLUMBIA GAZETTE NOTICES.

Herbert Cecil Flewin of Port Simpson, to be gold commissioner and mining recorder for the Skeena River mining division from May 25, 1907, during the absence on leave of John Flewin.

Constable James E. Kirby of Hazelton, to be acting mining recorder for the Omineca mining division, with recording office at Hazelton, from June 1, 1907, during the absence of Harry Berryman.

R. Gale of Aldermere, Bulkley Valley, to be deputy mining recorder for the Omineca mining division, with sub-recording office at Aldermere, from June 1, 1907.

Constable Malcolm Ross to be deputy mining recorder for the Atlin Lake mining division, with sub-recording office at Discovery.

Constable William Henry Vickers of Discovery, Atlin district, to be a deputy mining recorder for the Skeena mining division, with sub-recording office at Prince Rupert, from June 1, 1907.

John Cartmel of Atlin, to be acting gold commissioner and acting mining recorder during the absence of James A. Fraser, gold commissioner, and Herbert Young, mining recorder.

John Leask of Cranbrook, East Kootenay, tailor, to be official liquidator of the Pay Roll Gold Mining and Milling Co., Ltd., (in liquidation).

Examinations for the positions of inspectors of steam boilers and machinery, under the "Steam Boilers Inspection Act, 1901," will be held at the Parliament Buildings, Victoria, commencing on Monday, June 24. Particulars, forms, etc., can be obtained from John. Peck, chief inspector of machinery, New Westminster.

EXAMINATIONS FOR INSPECTORS OF STEAM BOILERS AND MACHINERY.

EXAMINATIONS for the position of Inspectors of Steam Boilers and Machinery, under the Steam Boilers Inspection Act, 1901, will be held at the Parliament Buildings, Victoria, commencing on Monday, June 24th, 1907. Application and instruction forms can be had on application to the undersigned, to whom the former must be returned, correctly filled in, not later than June 17th. Salaries, $110 and $115 per month.

JOHN PECK,
Chief Inspector of Machinery,
New Westminster, B. C.

In 1887 the gold produced in Canada was 57,465 fine oz., valued at $1,187,804; in 1897, 291,582 oz., value $6,027,016. The maximum production was made in 1900, with 1,350,176 oz., valued at $27,908,153. For six years, 1901-6, there has been a steady decrease; the production in 1906 was estimated at $12,023,932, which was the lowest output of any year since 1897. An incerase in 1907 is looked for.

SYNOPSIS OF CANADIAN HOMESTEAD REGULATIONS.

Any available Dominion Lands within the Railway Belt in British Columbia, may be homesteaded by any person who is the sole head of a family, or any male over 18 years of age, to the extent of one-quarter section of 160 acres, more or less.

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

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

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

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

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

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

Coal lands may be purchased at $10 per acre for soft coal and $20 for anthracite. Not more than 320 acres can be acquired by one individual or company. Royalty at the rate of ten cents per ton of 2000 lbs. shall be collected on the gross output.

W. W. CORY,
Deputy of the Minister of the Interior

N.B.—Unauthorized publication of this advertisement will not be paid for.