

Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

Coloured covers/
Couverture de couleur

Coloured pages/
Pages de couleur

Covers damaged/
Couverture endommagée

Pages damaged/
Pages endommagées

Covers restored and/or laminated/
Couverture restaurée et/ou pelliculée

Pages restored and/or laminated/
Pages restaurées et/ou pelliculées

Cover title missing/
Le titre de couverture manque

Pages discoloured, stained or foxed/
Pages décolorées, tachetées ou piquées

Coloured maps/
Cartes géographiques en couleur

Pages detached/
Pages détachées

Coloured ink (i.e. other than blue or black)/
Encre de couleur (i.e. autre que bleue ou noire)

Showthrough/
Transparence

Coloured plates and/or illustrations/
Planches et/ou illustrations en couleur

Quality of print varies/
Qualité inégale de l'impression

Bound with other material/
Relié avec d'autres documents

Continuous pagination/
Pagination continue

Tight binding may cause shadows or distortion along interior margin/
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure

Includes index(es)/
Comprend un (des) index

Title on header taken from:/
Le titre de l'en-tête provient:

Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

Title page of issue/
Page de titre de la livraison

Caption of issue/
Titre de départ de la livraison

Masthead/
Générique (périodiques) de la livraison

Additional comments:/
Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/
Ce document est filmé au taux de réduction indiqué ci-dessous.

10X	12X	14X	16X	18X	20X	22X	24X	26X	28X	30X	32X
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>								



MINING RECORD

ESTABLISHED 1895

VOL. XIII.

OCTOBER, 1906.

No. 10

BRITISH COLUMBIA MINING RECORD

E. JACOBS.....Managing Editor

Devoted to the Mining Interests of the Pacific Northwest.

PUBLISHED MONTHLY BY

THE BRITISH COLUMBIA RECORD, LIMITED

VICTORIA, B. C.

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

ADVERTISING AGENCIES:

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

SUBSCRIPTIONS PAYABLE IN ADVANCE:

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

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

Correspondence to be addressed to the Managing Editor.

CONTENTS.

	PAGE.
Notes and Comments.....	379
Beware of the B. C. Amalgamated Company..	383
Strike Settlement at Crow's Nest Coal Mines..	384
Diamond Drilling in the Boundary District... 385	385
Kiddie Hot-Blast System for Copper Furnaces.	387
Alaska and Its Progress During Recent Years.	391
Copper at Whitehorse, Southern Yukon.....	392
Development of Coal Fields of Western Canada	395
Mining in Ainsworth Camp, West Kootenay..	396
South Fork of Kaslo Creek, Sloean District... 398	398
Telkwa Mineral Belt, Skeena Mining Division.	401
Progress at Coal Mines of Vancouver Island... 403	403
Lead-Mining in British Columbia.....	404
Black-Sand Tests by U. S. Geological Survey..	407
Gold-Dredging on Fraser River.....	408
Director of Geological Survey in B. C.....	409
Company Meetings and Reports—	
Dominion Copper Co., Ltd.....	410
Granby Consolidated M. S. & P. Co., Ltd... 412	412
Providence Mining Co., Ltd.....	413
Mining Men and Affairs.....	418

NOTES AND COMMENTS.

The Ashcroft *Journal* states that John Hopp began piping on his Lowhee hydraulic gold mining property, Cariboo, on October 17.

It is considered probable that the J. c. Roi Mining Company will at its annual meeting to be held in London in November announce the intention to pay another dividend, probably of two shillings per share.

Publication of a number of notes of mining properties in various parts of Nelson, Sloean and Lardeau districts, obtained by the editor of this journal in the course of a recent trip in West Kootenay, is unavoidably held over until next month.

Attention is invited to the notice (see opposite page 420 of this issue) of intention to hold examinations for efficiency in the practice of assaying, at Victoria on December 3 and such following days as shall be found necessary.

During two years to June 30, 1906, the Granby Consolidated M. S. and P. Company did 13,898 lin. ft. of development work and 14,653 ft. of diamond drilling in its mines in Phoenix camp. The value of the metals produced by the company at its smelting works during the same period is stated to have been \$7,500,203.71.

Now that the copper ore deposits of Southern Yukon are again attracting attention there are many enquiries for a geological map of that region. The Geological Survey of Canada may soon be in a position to supply this need, several of its staff having done field work in that district during the two or three years last past.

The first ore to reach the Britannia Smelting Company's smelter at Crofton, Vancouver Island, from the Mt. Andrew mine on Prince of Wales Island, Southeastern Alaska, which property is under the control of the Howe Sound Copper Company, arrived on October 10. It is expected that shipments will be regularly maintained hereafter, at the rate of about 100 tons daily, or from 2,500 to 3,000 tons per month.

Anent the sending out from Edmonton of a press despatch relative to an alleged important gold discovery in the Peace River district by a Dominion exploration party, the *Greenwood Ledge* observed: "As the winter approaches the stories of great mineral discoveries in remote places commence to drift back to civilization. The latest is a wonderful report of a gold discovery in the Peace River country, and probably has nothing to do with the price of real estate in Edmonton."

The appointment of A. B. W. Hodges as local manager of the Granby Consolidated M. S. and P. Company would appear to be a recognition by the board of directors of the able manner in which he has, in the capacity of general superintendent, directed affairs at the company's mines and smelter. The creation of this new office and the promotion of Mr. Hodges to fill it, have prompted that gentleman's many friends to offer him their sincere congratulations, in which the B. C. MINING RECORD heartily joins.

Coast newspapers recently quoted a well-known lawyer of Victoria, for several years connected professionally with Atlin, as having stated that he believes that for the present season "at least \$500,000 will come from the camp, or \$50,000 more than the output of 1905." An injustice appears to have been done Atlin, no doubt unwittingly—its output for 1905, as shown in the "Annual Report of the Minister of Mines for 1905" was 23,750 oz. of gold valued at \$475,000. This would give the camp a total for last year \$25,000 in excess of that indicated in the statement above quoted.

The *Vancouver News-Advertiser* has reprinted an article taken from a New York publication in which the following occurs: "The gold output of British Columbia for 1905 was \$20,000,000, an increase of \$2,000,000 over that of the preceding year." May we be permitted to remark that the gold production of this Province for 1905, as shown by the "Annual Report of the Minister of Mines" for that year, was valued at only \$5,902,402—an increase of less than \$200,000 over that of 1904. Why give additional publicity to the flights of imagination of a New York writer?

One of the effects of the recent strike of the men previously employed at the Crow's Nest Pass Coal Company's collieries appears in the much reduced quantity of ore received at the Trail smelter of the Consolidated Mining and Smelting Co. of Canada in October as compared with that of September. The respective totals for the two months were: For September, 28,196 tons; for October, 11,675 tons. The decrease in tonnage of ore received during the latter month was, therefore, more than 50 per cent. Particulars of October receipts are printed on another page.

A series of interesting notes of Kootenay mines has been appearing in the *Victoria Week* lately, contributed by Percy Godenrath, who has been making a round of the Kootenay towns and mining camps in the interest of that weekly publication. It is so seldom that the daily or weekly newspapers published in Provincial coast cities are enterprising enough to obtain for themselves information concerning the mines of the interior of southern British Columbia, other than an occasional telegraphed despatch, by any other means than "cribbing" from their up-country exchanges, that this departure from what has long been a general custom in the coast cities merits mention as being noteworthy and commendable.

The *Rossland Miner* quotes Fred T. Greene, mining engineer of Butte, Montana, who was at one time on the staff of the Centre Star and War Eagle mining companies at Rossland and was afterwards appointed assistant geologist for the Anaconda Copper Mining Company, as having expressed the opinion that the structural geological survey Professor R. W. Brock, Dr. G. A. Young, and W. H. Boyd, have been engaged on in Rossland camp during the seasons of 1905 and 1906 will undoubtedly be of great benefit in the future. This work was undertaken by the Geological Survey Department in response to the repeated urgings of the Rossland Board of Trade and others directly interested, and it has been carried on assiduously by the above-mentioned officials who were assigned this admittedly very arduous duty.

A statistical table published in the *London Mining Journal* of October 20, inst., show the highest and lowest prices of copper in each year over a period of 43 years, 1864-1906. The respective prices for the expired portion of 1906 are—highest, £215 (equivalent to, at \$4.86 per £, \$1,046.33); lowest, £161 (\$783.33). The highest price recorded previous to this year was in 1872 when £108 (\$525.59) was reached. The lowest price was in 1894, in which year values ranged from £42:8:9 (\$206.52) down to £37:17:6 (\$184.31). Only in three years during the 42 years prior to 1906 under notice did the price exceed £100, viz., in 1864, £101; in 1872, £108, and in 1888, £100:10:0. Not only has a record high price been reached in 1906, but it is more than probable the quantity of copper produced will be the largest known, exceeding the previous record of 708,810 long tons, which was the world's production in 1905.

The facetious editor of the *Greenwood Ledge* would make it appear that he has received the following, among other, "Tallowgraphic Nuse, By Our Leased Lier":—"Cobalt,—It is reported that the mines here are getting ready to ship a million dollars worth of silver every minute. It is necessary to do this in order to keep pace with the Toronto papers." This seems like going rather far afield when "leased" or other "liers" are occasionally in evidence in British Columbia, as witness some of the pseudo mining news

now and again published in provincial newspapers. The exaggerations are not so extreme as that suggested by the *Ledge*, but at times they are bad enough.

The Le Roi No. 2 is in fine condition to produce more dividends, observes the *Rossland Miner*. The mine never was in better shape than at present, and the ore shoots give promise of yielding a good-sized tonnage of high grade ore. The stockholders are to be congratulated on the way the mine is yielding, and the promise which it makes from its generally good condition to yield for a long period considerably more ore. The virgin ground owned by the company, and particularly the Annie claim, which, it is thought, carries at least one of the Le Roi ledges, is valuable. There is a lot of unexplored ground thought to be rich and which when exploited should yield good results. Paul S. Couldrey is to be congratulated on the manner in which he is managing the affairs of the Le Roi No. 2.

Development work was resumed in the Richard III mine at Mount Sicker on October 23, after the mine had been idle about two years and a half. Operations for the time will be confined to exploring the ore body passing into Richard III ground from the adjoining Tyee mine, in which it has been worked up to the joint boundary of the two properties. Capital to provide for this resumption of work was obtained by the sale of 15,000 of the 80,000 shares of stock that comprised the company's treasury. Practically the whole of these 15,000 shares were purchased by the directors and others of the larger shareholders of the Richard III Company, who thus again demonstrated their belief in the value of the mine, notwithstanding that up to the time of the suspension of development work in April, 1904, the extension of the Tyee big ore shoot into Richard III ground had not been met with in the several cross-cuts run with the object of intersecting it.

We print this month a disinterested opinion of the prospects for mining in the Telkwa section of the Skeena mining division, in northern British Columbia, lately obtained from one whom we have long known and found to be conservative and reliable. Summed up, the position in regard to that part of the Province seems to be that the showings of mineral are numerous and large, and average assay values of ores sufficiently good to give promise of the working of the ore deposits proving profitable whenever labour, freight and transportation costs shall be reasonably low, which under the most favourable conditions of progress cannot be for two or three years from now and probably longer. While it is manifest the chief mineral resources of that part of the Province can hardly be utilized for some time, it appears evident there is a good field for such development as can be done at moderate cost and without the assistance of heavy power machinery. In common with the agricultural, pastoral and general industrial re-

sources of the interior of the Skeena country, coal and metalliferous minerals must await the construction of a railway ere they can be turned to profitable account, but after transportation facilities shall have been provided the progress of that section should be rapid and great, with permanent prosperity the eventual result.

The B. C. MINING RECORD continues to steadily extend its field of usefulness. Recently one request to have it sent came from Constantinople, Turkey; one from Mexico; another from Nova Scotia; still another from Ottawa, while, as is usual every month, several came from various parts of the United States. A member of the field staff of the Geological Survey of Canada wrote: "I saw a number of copies of the B. C. MINING RECORD this season in the Yukon, where I was working, and was much interested. Please send it to me for the coming year." A well known member of the United States Geological Survey, lately on a visit to Victoria, also expressed his appreciation and added that he had recommended it in Washington, D. C. The *Slocan Mining Review* not long since remarked: "The B. C. MINING RECORD is honest, is not a stock booming journal, and its readers can depend upon it that anything appearing in its columns has been subjected to close scrutiny, and is as near accurate as the ability of the editor can make it." The *Similkameen Star* last month referred to this journal as "that excellent publication, which is a terror to fake manipulators, sleepy mining and development companies and all kinds of frauds and deceivers." Our friends and patrons may depend upon it that we shall continue to do our utmost to merit commendation and support for honesty of purpose and useful achievement, while making the B. C. MINING RECORD, now as in the past, the best mining journal in the great Northwest.

Taking British Columbia's production of lead in 1906 at about 30,000 tons (G. O. Buchanan, distributor of the lead bounty, says that "production is now going on at the rate of 30,000 tons per annum,") the value, calculated at the average New York price for the year, less 10 per cent, will be about \$3,000,000. The Province's production of lead for all years to 1906, inclusive, has reached a total of about 226,000 tons, valued at nearly \$18,000,000, more than one-third of which, by the way, has been produced during the last three calendar years. The total amount paid as bounty on lead during the three fiscal years ended June 30 last was \$615,000—the appropriation authorized was \$500,000 per year. It is believed the market price of lead will remain so high during the remainder of the current fiscal year that there will not be any bounty paid during the 1906-7 period. It is well to remind any who may conclude that because no bounty is payable under existing conditions lead-mining is not being carried on, that, as Mr. Buchanan points out, there is no shrinkage in the industry. Similarly there should be kept in mind the fact that

a larger tonnage of ore being mined and a smaller proportion of lead produced does not necessarily mean that the lead mines are "petering out." On the contrary, it shows that, owing to the higher price prevailing, ore of much lower grade can be treated at a profit and is being utilized accordingly, consequently what may without explanation appear to be a disadvantage is a decided advantage, since mine owners are under existing conditions able to mine and treat at a profit ore that when the price of lead was much lower was to all intents and purposes of no value to them.

"The Kiddie Hot-Blast System for Copper-Smelting Furnaces" is the title of an article printed on pp. 387-391 of this issue, descriptive of what is believed to be an advance in metallurgical practice, due to the ingenuity of Thomas Kiddie, well known on the Pacific coast as a skilled metallurgist and successful smelter designer and operator. It is pleasing to know that Mr. Kiddie's efforts in the direction of further reducing smelting costs are receiving the favourable attention of several metallurgists in charge of large and important reduction works in the United States. It is to be hoped that it will not be long ere his system shall be given fair trial at a smelter in practically continuous operation, and where the question of whether it really does effect the substantial saving its inventor believes, as the outcome of his own experience, it capable of doing under ordinary conditions shall be definitely determined. The excellent illustrations (for which we are indebted to the courtesy of *The Engineering and Mining Journal*, New York,) serve to make clear the working of Mr. Kiddie's system in which, as stated in the introduction to the article, "a principle has been successfully adopted which is entirely different from anything previously devised in copper-smelting practice." We heartily congratulate Mr. Kiddie on the measure of success he achieved at the Tyee Copper Company's smelter with this hot-blast system, and sincerely wish him further and speedy success at larger works, so that he may derive practical benefit from his invention.

The "Department of Publicity, Alaska-Yukon-Pacific Exposition" has commenced its campaign to make known what is being done in preparation for "The Fair of 1909," and incidentally to boom the City of Seattle for all the movement is worth. Regarding the proposed exposition, a recently-issued circular says: "The fair already gives promise of a scope yet unattained by western enterprises. The name, 'Alaska-Yukon-Pacific Exposition,' contributes an idea of the general nature of the show. It will be primarily an Alaskan fair, held to exploit to the world the resources of the little-known Northland, and in this connection will be gathered the most remarkable mining display ever shown at a world's fair. The gold that made the country originally famous will be told of through specimens and photographs and machinery, and the other ores more re-

cently discovered, will have proper representation. And more important, the agricultural and industrial possibilities will be effectively exploited. Besides Alaska, the great Yukon country will contribute samples of its untold wealth, and the islands of the sea will show their marvels. One of the principal objects of the exposition will be to bring together in trade the shores of the Pacific. * * * With nearly three years remaining before the exposition, the beginning of preparation has already been made. The Washington University grounds, comprising 355 acres, bordering on Lake Washington and Lake Union, have been chosen as a site, and landscape gardening will soon be begun. The site is situated 20 minutes' ride from the centre of Seattle, and is in every way adapted to its purpose."

The "Report of the Commission Appointed to Investigate the Zinc Resources of British Columbia and the Conditions Affecting Their Exploitation" has been published. It is lengthy and comprehensive and covers 377 pages, with 21 additional pages devoted to an index. It contains (1) "Report on the Zinc Resources of British Columbia and Their Commercial Exploitation," by Walter Renton Ingalls, editor of the *Engineering and Mining Journal*, New York, and one of the best-informed men in America on zinc matters; (2) "Report on the Zinc Mines of the East and West Kootenays," by Philip Argall, M. E., of Denver, Colorado; (3) "Report on Some Mines of Ainsworth and the Sloam," by Alfred C. Garde, M. E., of Nelson, B. C.; (4) "Report on Some of the Undeveloped Zinc Deposits of British Columbia," by Alfred E. Barlow, M. A., D. Sc., of the Geological Survey of Canada, Ottawa, Ontario; (5) "Report on Methods for the Concentration of Zinc Ores of British Columbia," by Philip Argall; (6) "Reports on Methods of Assaying," by Henry Harris of Nelson, B. C., and Henry E. Wood of Denver, Colorado; (7) Synopsis of Mining Laws of British Columbia; and other data and general information. It is freely illustrated, having in all nearly 100 plates, diagrams, maps, etc., many of them well finished and some of particular value in elucidating the subject they relate to. The work is one that, owing to its wide scope and very considerable importance, can not be done justice to in a hasty review, so a more full notice of it is deferred until later. Meanwhile it may be concluded that the gathering together of so much data relating to zinc in British Columbia cannot but be of special service in dealing with the question of the best means of utilizing to advantage the zinc resources of the Province, for with so much information available, which but for the liberal attitude of the Dominion Government towards British Columbia in this connection would not be at disposal in this concrete and readily accessible form, there should not be very great difficulty in determining what serious obstacles to profitable utilization of the large quantities of this mineral known to occur in the Province are in existence, and how best to overcome them.

BEWARE OF THE B. C. AMALGAMATED COAL COMPANY.

ANOTHER TORONTO WILDCAT has made its appearance, and if the bare-faced attempt to induce people to put money into this suspicious-looking scheme, which some one has had the effrontery to name "The British Columbia Amalgamated Coal Company," shall succeed, more howls will be heard from Toronto about British Columbia wild-cat mining. The pity of it is that the big displayed advertisement of this "company" is appearing in this Province, so that to the extent of the additional publicity thus given, this very doubtful project is being assisted in British Columbia.

Fortunately for the public, times have changed somewhat since the notorious "Windy" Young, fortified by professional reports of an "engineer of 30 years' standing," induced people to part with their good money for his Similkameen Valley Coal and Ashnola Smelter worthless schemes. Now a note of warning is sounded by both Dominion and Provincial government officials, which is as it should be, and the press has been asked to expose what looks like the mendacity of whoever is the culprit.

There does not seem to be any necessity for us to go through the ingeniously worded paragraphs appearing in print over the name of "Owen J. B. Yearsley, Banker and Broker, 61 Confederation Life Building, Toronto," and deal with them *seriatim*. Two or three should amply suffice to show that the "British Columbia Amalgamated Coal Company," the "treasury stock" of which Owen J. B. Yearsley is asking people to put their savings in, should be left severely alone by those who do not wish to lose their money.

One statement in the published advertisement is as follows: "This Amalgamated Coal Company controls 17,500 ACRES OF COAL LAND in Nicola Valley, B. C., and, according to coal experts' reports, this great area is underlaid with inexhaustible quantities of high-class bituminous coal, the best for steam, blacksmithing and cooking purposes, estimated to contain approximately 1,400,000,000 tons of coal." (Probably it is "coking," not "cooking" coal that it was intended to call attention to, but we quote the advertisement before us as it is printed.) Now, we have reason to believe that the 17,500 acres on the Coldwater and around the Nicola basin alleged to be controlled, as above, are practically all in volcanic rock country, consequently the promoters of the company here criticized could get very little, if any, coal on this so-called "coal land," assuming that they have the right to it, as claimed. But there may be a deliberate trick in the wording of the paragraph under notice, the reference to the 1,400,000,000 tons of coal perhaps being really intended to apply to the whole district, not to the 17,500 acres in particular.

To those interested in this matter we would say that the official report of Dr. R. W. Ellis, the chief coal expert of the Geological Survey of Canada, on

the Nicola and Quilchena coal basins in B. C. (*vide* "Summary Report of the Geological Survey Department of Canada for 1904," pp. 42-74, part of which was reprinted in the "Annual Report of the Minister of Mines, British Columbia, for 1905," pp. 196-201), gives much information concerning coal occurrences in Nicola Valley, and the publications named can probably be obtained from the respective departments mentioned on application.

The other attempted deception, as we regard it, is in making it appear that stockholders in the "B. C. Amalgamated Coal Company" would have the benefit of Government protection in certain ways. The simplest answer to this is that since this so-called company has not been organized nor registered under the laws of British Columbia, there is absolutely no Government protection as implied, if not plainly stated, for those who put their money into this seemingly very questionable "company."

Owen J. B. Yearsley asks: "Do you want to make money honestly?" We suggest that there are people who do not, and to make sure that experience may not prove any of them to be connected with the promotion of this very 'wild-cat' scheme, it will be well to avoid putting money into it.

ORE RECEIPTS AT TRAIL SMELTER DURING OCTOBER.

ORE RECEIPTS at the Consolidated Mining and Smelting Company of Canada's smelting works at Trail, B. C., during the month of October were 11,673 tons, as under:

Mine.	Net Weight. Lb.
California, Slocan	62,117
Centre Star, Rossland.....	3,682,464
Corinth, Slocan	56,141
Duncan, Boundary	36,373
Hamilton Fraction	1,105
Iron Mask, Rossland.....	415,765
Josie, Rossland	1,225,170
Le Roi, Rossland.....	8,899,561
Lardeau	857
Little Robert	-193
Lone Bachelor, Slocan.....	41,123
Nettie M.	57,434
Ptarmigan, East Kootenay....	42,560
Providence, Boundary	472,765
St. Eugene, East Kootenay..	4,240,191
Snowshoe, Boundary	2,972,142
Spokane, Ainsworth	143,225
Strathmore, Boundary	45,727
War Eagle, Rossland.....	911,822
Ymir, Ymir	38,775
	<hr/>
	23,345,510

Practically the whole of this came from three districts, in the following proportions: Rossland, 7,568 tons; East Kootenay, 2,141 tons; Boundary, 1,763 tons.

SETTLEMENT OF STRIKE AT CROW'S NEST PASS COAL CO.'S COLLIERIES.

THE BIG STRIKE IS OVER. These are the words the Fernie *Free Press* printed in large black letters on a "Special" it issued announcing that a settlement had been reached between G. S. Lindsey, general manager of the Crow's Nest Pass Coal Company, Ltd., and Thos. Burke, member of the National Board of the United Mine Workers of America, the latter having been sent to British Columbia by John Mitchell, president of the U. M. W. of A., to arrange a settlement.

Last month the B. C. MINING RECORD published a summary of the Crow's Nest Pass Coal Company's side of the labour dispute that had unfortunately resulted in the suspension of work at the company's coal mines and coke ovens, and had to some extent hampered progress at mines and smelters in West Kootenay. It was then intimated that we would this month summarize other matters than the question of employment of non-union men, it having been stated that these had influenced the men in their decision to remain on strike. As, however, the question of whether or not there should be at the company's works an "open shop" or a "closed" one, was made the issue, no good purpose can, we think, be served by now going into minor differences, especially as the notice of intention to discontinue work made no mention of them, but simply intimated that after September 21, the "union" men would cease to work with "non-union" miners.

The following is what the *Free Press* published in its special issue dated November 12:

"The strike is settled. The end came suddenly and unexpectedly. Tonight Mr. Thomas Burke, National Board member, called upon General Manager Lindsey at his office and within a short time the agreement as given below was signed by these two gentlemen for the contending parties. This settlement completely vindicates the stand which the company's officials took from the start, and which the great bulk of miners in their desire to be fair and honourable, conceded. Mr. Burke acknowledges that Sherman was wrong in demanding the closed shop and that the strike was entirely unjustifiable. The discrimination clause is inserted. A new check-off, operative for the life of the agreement, is substituted, but all names added since September 11 are to be cancelled. The men go back to work at once. At Michel, where the fan in No. 8 has been in operation, work will commence tomorrow morning. At Coal Creek the mines will be put in workable condition with all possible despatch.

"The *Free Press* desires to take this early opportunity of congratulating all parties concerned on the resumption of activity to our great wheels of industry, which since September 22 have been ominously silent. We congratulate the miners. They will welcome the opportunity to take up their discarded picks and shovels. To their credit be it said that the rank

and file persistently stood by their principles of honour and justice and at the same time did all they consistently could to uphold the good name of their union. To the company we extend congratulations. The strike has incurred heavy loss to the shareholders, but the management could not afford to recede from the position which they felt was the right one. To the business men of the city, the smelting men, the metalliferous miners and all that great outside class who suffer most in times of strikes and who are powerless to intervene, we extend congratulations. The satisfaction will be none the less keen because it is unexpected.

MEMORANDUM OF AGREEMENT.

"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 was promised by the Conference Committee, which framed and signed the agreement of May 23, 1905:

"(a) That there should 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 purposes.

"(d) That it was relying on the faith of these promises that the discrimination clause in the 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 nor 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 that date, are released from the said organization and their signatures to such orders shall be and are cancelled, and they may rejoin and resign at their option.

"3. That the moneys collected for the union by the company for dues in October from the September payroll 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, B. C., November 12, 1906.

"Witness: R. W. Coulthard.

"(Signed) G. G. S. LINDSEY,
"THOMAS BURKE."

COPY OF CHECK-OFF FORM.

"Ferne, B. C. 190..

'To the Crow's Nest Pass Coal Co., Ltd.:

"By the agreement entered into between you and the United Mine Workers of America on May 23, 1905, I authorize and empower you to deduct and pay to their legal representative from my earnings from month to month during the life of said agreement, initiation fees, dues, and such other assessments that may be designated by the financial secretary of Local Union No. 2314, U. M. W. of A.

"Signed.....

"Check No....."

Included among the October mining company stock quotations of the *Engineering and Mining Journal*, New York, were the following, showing range of prices and number of shares sold of British Columbia Copper Company's stock, the par value of which is \$5:

Week Ended:	Number of Shares Sold.	—Prices—	
		Highest.	Lowest.
October 6.....	48,500	\$11 ³ / ₄	\$11 ⁵ / ₈
October 13.....	96,010	14 ⁷ / ₈	11 ³ / ₄
October 20.....	59,500	14 ⁷ / ₈	12 ⁵ / ₈
October 27.....	26,600	13 ³ / ₄	12 ⁷ / ₈
Total	230,610		

The same journal's Boston quotations and sales of Granby Consolidated Mining, Smelting and Power Company's stock, par value \$10, were as under:

October 6.....	5,105	\$14 ³ / ₄	\$13
October 13.....	6,728	15	14
October 20.....	4,060	14 ³ / ₄	13 ¹ / ₂
October 27.....	513	14	13 ³ / ₈
Total	16,406		

An Indian visitor to Canada, in the person of Nabhai D. Daru, B.A., B.Sc., of Surat, Bombay Presidency, India, has spent about 15 months in the Dominion investigating mining conditions, occurrences of ores, methods of extraction and treatment, and the procedure of prospectors in locating mineral deposits. Beside having graduated at one of the leading universities of India, Mr. Daru is a graduate of the University of London and of the Royal School of Mines, his four years spent in England having been chiefly occupied in higher and technical education. After having visited nearly all the more important mining camps in West Kootenay and Boundary districts, Mr. Daru spent two or three weeks looking into mining and smelting matters at the coast. He will shortly return to India and will, upon his return to his home there, report to the Government of India fully upon what he has seen and learned of mining, milling, smelting, etc., in Canada.

NOTES ON DIAMOND DRILLING IN THE BOUNDARY DISTRICT.

By Frederic Keffer.

(Paper for *Journal of Canadian Mining Institute.*)

AS AN ADJUNCT in prospecting and developing the low grade ore deposits of the Boundary district of British Columbia, the diamond drill has proved an unqualified success. As these great ore bodies have been opened up, it has come to be more and more apparent that the ore exists in irregular masses with usually no very well defined walls (except where it lies in contact with limestone). Further, the deposits are frequently separated by barren zones, so that when the boundary of an ore body is reached it is quite impossible to predict whether or not more ore will be found beyond. Commercially, the low grade of the ore prohibits cross-cuts or drifts being run in barren ground solely in order to prospect it, the only allowable dead work being that necessary to reach known deposits.

It is under these conditions of necessary economy and uncertainty of ore occurrences, that the diamond drill is so useful, not the least of its value being negative, for knowing where the ore is not to be found is only secondary to finding it.

When a new deposit of ore has been located by drilling, it is the practice in our mines to drill no further holes to determine its extent, for the reason that ore occurrences are seldom so limited that it will not pay to drift or cross-cut to them; moreover, the irregularities of the deposits are such that judgments of size based on even a number of drill holes are most unreliable. It is also general experience that ideas of quality based on assays of diamond drill cores and borings are likely to be erroneous, the ore when reached often being as a whole very different from what the drill assays would indicate. Nevertheless, the assays of borings are most carefully made and checked from time to time by assays made on samples of the cores. Borings are carried out by the stream of water and allowed to settle in a tub; every five feet they are taken from the tub and thoroughly mixed for the sample. Occasionally, when the drill penetrates a cave, the borings will not come out with the water, and in such a case the sample must be taken from the cores.

Most of the drilling done under the writer's direction has been by day labour, this having been found to be more satisfactory than contract work, as well as more economical. The result of each day's work is reported by the driller on the following forms:

DAILY DIAMOND DRILL REPORT.

Shift..... Date.....
 Hole No.....Level.
 Actual Drilling Time.....Hours.
 Depth of Hole at Beginning of Shift.....Feet.
 Depth of Hole at End of Shift.....Feet.
 Distance Drilled.....Feet.
 Amount of Core Saved.....Feet.
 Distance Reamed.....Feet.

GEOLOGY.	
From.....to.....	Material.....
From.....to.....	".....
General remarks.....
.....
.....
Signed.....

Runner.

These daily reports are tabulated, and the costs of work figured at the close of each month. Drilling by day labour was started in the mines under the writer's charge last spring, and the following tabulated results may be useful to those contemplating similar work.

The rock, while hard, is not excessively so, and the ground rarely caves, and in only one hole drilled so far has the water proved troublesome.

In assaying it has been found that the general tendency is for samples to run too high in gold and too low in copper, when borings are being tested. This is easily accounted for, because the flow of water from the tub in which the borings are settled carries off a greater proportion of copper than of gangue, while, on the contrary the gold (much of which is free milling) remains in the tub, thus enriching the sample. On the other hand, when samples are taken

from the cores irregularities occur on account of the frequent grinding up of considerable proportions of the core—grinding which sometimes amounts to 50 per cent.

Some comparative assays of boring and core samples follow:

		Gold	Silver	Copp'r	Silica	Iron	Lime	S'ph'r
Borings	1 . . . . .	.13	.52	2.35	...	...	...	...
	2 . . . . .	.12	.45	2.20	...	...	...	...
	3 . . . . .	.12	.47	2.35	...	...	...	...
	4 . . . . .	.11	.40	2.50	...	...	...	...
	5 . . . . .	.01	.00	.30	...	...	...	...
	6 . . . . .	.14	.00	1.10	29.0	15.1	24.3	3.6
Cores	1 . . . . .	.14	.50	2.50	...	...	...	...
	2 . . . . .	.07	.30	2.30	...	...	...	...
	3 . . . . .	.08	.25	2.10	...	...	...	...
	4 . . . . .	.05	.20	2.00	...	...	...	...
	5 . . . . .	.01	.00	.50	...	...	...	...
	6 . . . . .	.14	.00	1.10	26.9	15.3	26.2	3.4

These assays illustrate in Nos. 1, 2 and 5 the tendency of cores to run higher in copper than borings. Nos. 3 and 4 are given to show cases where the reverse has occurred. Nos. 2, 3, and 4 show a decided enrichment of gold in the borings.

1—PROGRESS TABLE.

	Apl. May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
*Shifts	37	26	26	27	23	27	26	25
Feet drilled	304	253½	259½	295	250	245	278½	356
Hours drill was run.....	231	167	149½	194	164½	142	170	167½
Hours setting diamonds, moving machine, etc..	57	44	79½	22	19½	101	38	32½
Feet per shift.....	8.21	9.75	9.98	10.93	10.87	9.07	10.71	16.24
Feet per running hour..	1.31	1.52	1.74	1.52	1.52	1.72	1.64	2.13

*Underground shifts are 8 hours; surface shifts, 9½ hours.

Note—Carats used were as follows: In April and May, 6 36-64; June, 6 55-64; July, 7 42-64; August, 5 62-64; September, 6 43-64; October, 4 9-64; November, 7 58-64; December, 2 2-64.

2—COST TABLE.

	Apl. May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Labour	403.60	272.00	260.88	271.00	210.35	219.60	226.50	231.75
Diamonds	328.81	342.99	382.81	298.45	299.18	227.73	434.85	114.83
Power, etc.	13.46	29.10	30.56	26.76	25.13	31.78	18.49	118.97
	745.87	644.09	674.25	596.21	534.66	479.11	679.84	465.55
Feet	304	253.5	259.5	295	250	245	278.5	356
Cost per foot.....	2.45	2.54	2.60	2.02	2.14	1.95	2.44	1.31

Total feet drilled during 1905 is 2,241.5; average per shift during 1905, 10.32 feet; average cost per foot, \$2.1501; average cost diamonds per foot, \$1.0830.

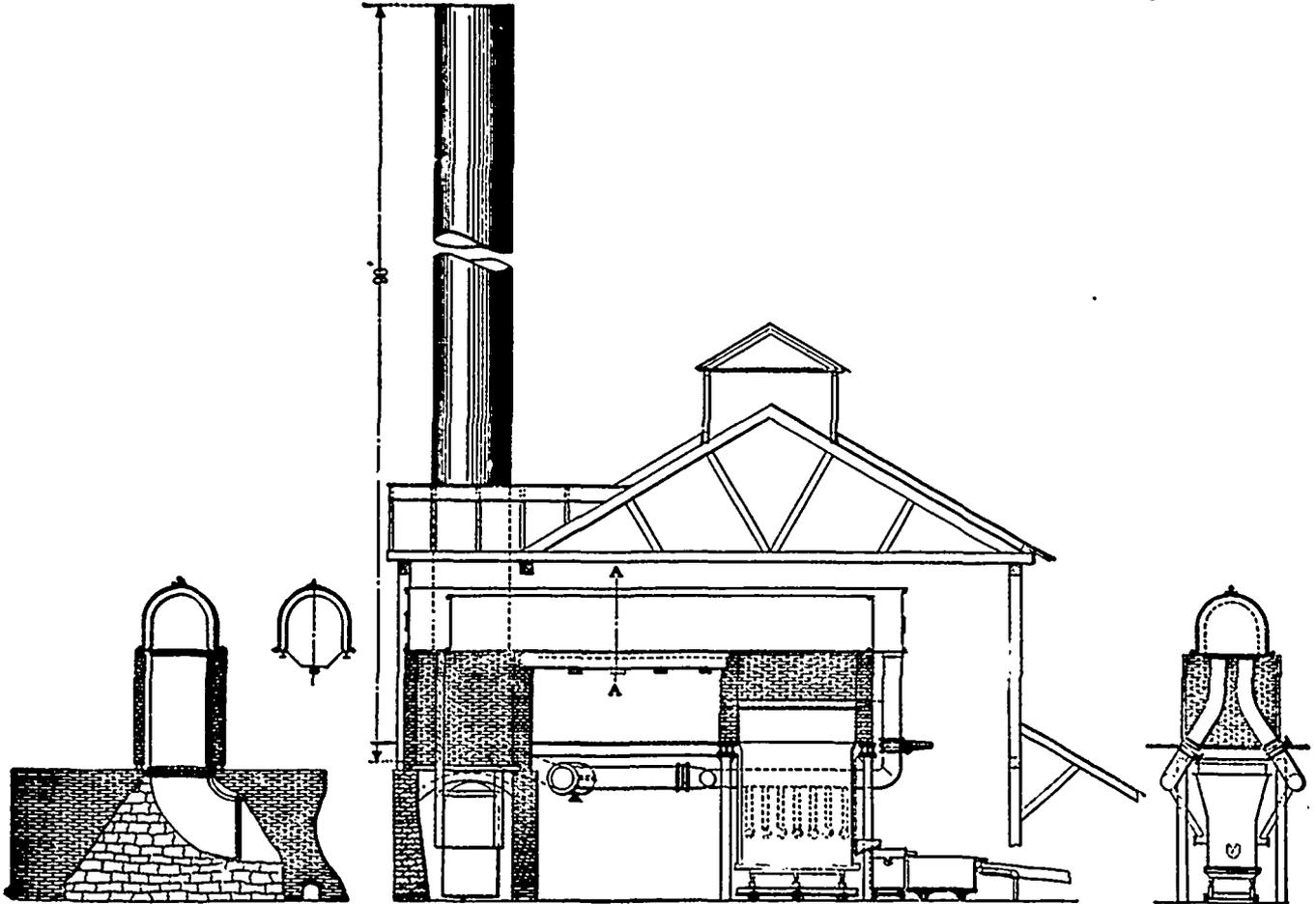
THE KIDDIE HOT-BLAST SYSTEM FOR COPPER-SMELTING FURNACES.

BY E. JACOBS.*

IN THE HOT-BLAST SYSTEM invented and patented last year by Thos. Kiddie, of Victoria, British Columbia, for several years smelter manager for the Tye Copper Company, Ltd., of Ladysmith, Vancouver Island, B. C., a principle has been successfully adopted, which is entirely different from anything previously devised in copper smelting practice.

ment was continued over a period of three months with the following results: (1) The average temperature obtained for that time was 345 deg. F., and (2) the tuyere under this hot blast was always brighter and more easily kept in working order than the tuyeres simultaneously receiving cold blast under a like pressure and furnace conditions.

It having been conclusively demonstrated that the heating of the blast in this manner was quite feasible and decidedly advantageous, a double horizontal flue immediately over the furnace, and a pipe or tube, described as the "absorption pipe," running the full



GENERAL LONGITUDINAL AND TRANSVERSE SECTIONS.

This new principle is long travel of the air through thin steel pipes at the comparatively low temperature of the gases passing from the blast furnace into the dust chamber.

It is a well known fact that the temperature of gases issuing from blast furnaces is about 400 to 600 deg. F. With a view to utilizing the waste heat from such a source, an experiment was made at the Tye Copper Company's smelting works (which were designed and erected by Mr. Kiddie), by running a circular steel pipe, 6 in. in diameter, the entire length of the dust chamber and back to the furnace, where it was connected with one of the tuyeres. This experi-

length of the dust chamber and return, were constructed. This pipe was so designed as to give the greatest heating surface and at the same time keep its cross section down to the lowest practicable limit; its shape is such that the distance through which the heat must radiate to its centre is reduced to a minimum, viz., approximately 4 in., as compared with 11 in. in a circular pipe of equal area.

The new system, for which Mr. Kiddie has since been granted Canadian (No. 96,665), United States No. 830,152, and Mexican (No. 5,596) patents, was in due course installed on a scale equal to the full capacity of the 250-ton blast furnace in operation at the Tye Copper Company's works. The installation was completed in June, 1905, and proved very effective.

*Editor *British Columbia Mining Record*.

The following observations on this hot-blast system are submitted:

Cost of Installation—It may be stated that the cost of installing this system is, approximately, 50 per cent less than that of the ordinary hot-blast U-pipe stove; also that Kiddie's system can be applied to

tion pipe therein, the wear and tear is reduced to the lowest limits. In other systems the air jackets are so constructed as to extend too close to the flames and, as a consequence, the steel plates soon become burned and the stay bolts tear through the plates by reason of the excessive expansion and contraction of the latter.

On referring to the accompanying diagram it will be noted that the lowest part of the double horizontal flue leading from the dust chamber to and over the furnace is kept sufficiently high above the charge in the furnace to prevent any burning of the steel plates taking place, thus insuring long life to these plates and avoiding what in other systems is a heavy cost for renewals. The outer jacket, being in sections, can in case of need be readily taken apart, while all the joints, having outside flanges, are equally accessible at all times.

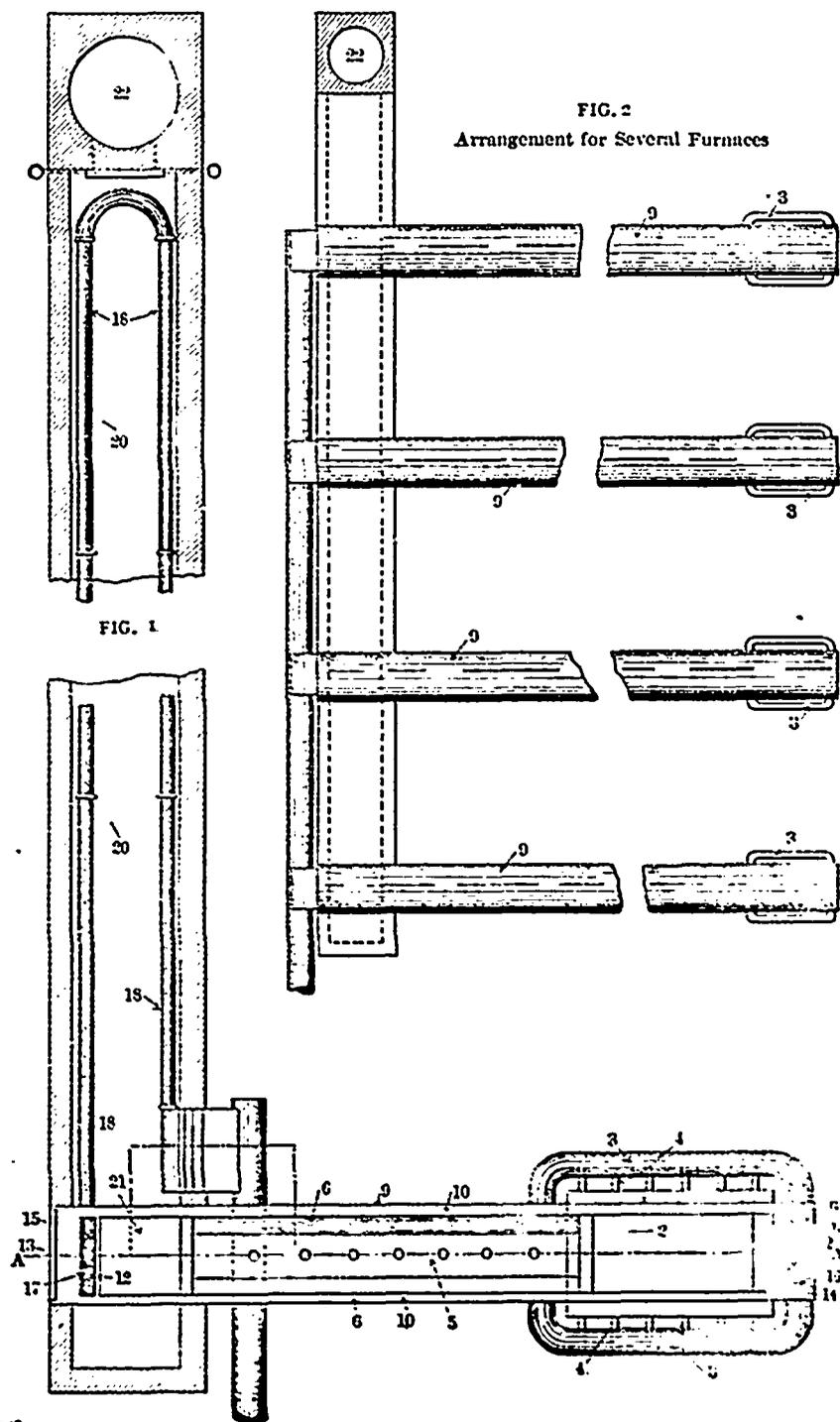
Smelting Economy—The saving of coke and the superior oxidizing power of this system is exhibited by the following average results of the first two months' hot-blast practice as compared with cold blast under similar furnace conditions:

Running With Hot Blast—The charge consisted of 37 per cent roasted ore, containing 6.32 per cent sulphur and 4.08 per cent copper; and 63 per cent raw ore, containing 16 per cent sulphur and 4.08 per cent copper; coke used, calculated on the ore smelted, 9.36 per cent; coke used, calculated on the mixture smelted, 7.70 per cent. The matte produced contained 42 per cent copper; sulphur to copper—3.04 sulphur to 1 copper.

Running With Cold Blast—The charge consisted of 63.62 per cent roasted ore, containing 6.32 per cent sulphur and 4.08 per cent copper; and 36.38 per cent raw ore, containing 16 per cent sulphur and 4.08 per cent copper; coke used, calculated on the ore smelted, 13.93 per cent; coke used, calculated on the mixture smelted, 12.97 per cent; matte produced contained 42 per cent copper; sulphur to copper—

2.41 sulphur to 1 copper.

These records show that as compared with cold-blast practice the hot blast made a saving of 32.91 per cent coke on ore smelted, and 40.43 per cent on charge, while the tonnage smelted was practically the same. As regards oxidation, the respective percentages of



any modern blast copper furnace, without disturbing the brick work of the furnace, above the feed floor.

Wear and Tear—Owing to the comparatively low temperature, viz., 400 to 600 deg. F., of the gases passing through the dust chamber and the long travel and small cross-section area of the heating or absorp-

roasted and raw sulphide ore used in the furnace charges were reversed, the hot blast producing equally good results with a two-thirds proportion of raw ore as the cold blast with a one-third, the product being in both cases a 42 per cent copper matte. This represents a saving in ore-roasting cost of 50 per cent.

smelting, this last being one of the chief objects of Mr. Kiddie's hot-blast system.

EXTRACTS FROM SPECIFICATION.

The specification accompanying Mr. Kiddie's patents includes the following:

"My efforts have been directed to expose the air blast very fully to the heat of the waste gases in the flues, and that in a gradual manner, exposing it first to the heat of the dust chamber of the flue farther from the furnace and thereafter to the greater heat of the direct gases close to the furnace. By this means I not only impart a high temperature to the blast, by which alone I am enabled to derive full economy of fuel and advantageous results in smelting, but by the long exposure and gradual increase of temperature the air tube and jacketed linings last longer, as they are not exposed to extremes of temperature on opposite sides of the sheets of metal of which they are constructed.

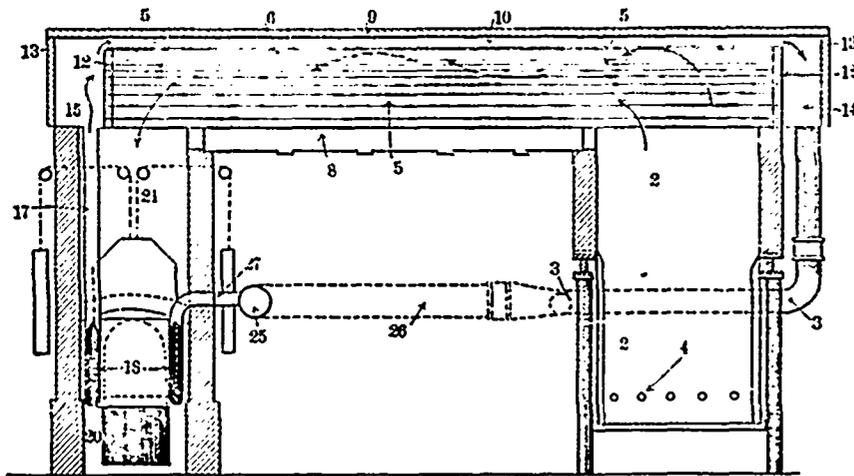


FIG. 3

Analysis of Ore Smelted—The following general annual average analysis of ore from the Tyee mine, which ore formed by far the greater part of that smelted during the period over which the operations giving above mentioned results were spread, may be of interest in this connection: Copper by electrolytic assay, 4.08 per cent; silver, 2.67 oz. per ton; gold, 0.131 oz. per ton; iron, 10.49 per cent; zinc, 7.36 per cent; silica, 13.48 per cent; alumina, 7.01 per cent; barium sulphate, 37.63 per cent; lime, 2.04 per cent; magnesia, trace; sulphur (as sulphides), 6.32 per cent. The general analysis of slag is as follows: Copper, 0.41 per cent; gold, trace; silver, 0.14 oz. per ton; iron oxide, 17.25 per cent; zinc oxide, 6.47 per cent; barium oxide, 28.57 per cent; calcium oxide, 6 per cent; silica, 31.42 per cent; alumina, 10.73 per cent; magnesia, trace.

General—In general, it may be said that a furnace when working with hot blast is more easily kept in good condition than when using cold blast; that a greater oxidation of sulphur, zinc and iron in the ore takes place in smelting with the former; that decreasing the velocity of the waste gases through the dust chamber—as was done by Mr. Kiddie by placing a regulating door or a damper in the flue stack, after careful observation of effects of such decrease—results in a great recovery of the waste heat of the furnace, and a decided increase in the quantity of flue dust recovered; and that with a hot blast considerable economy is effected in the quantity of coke used in

"My system is thus in contra-distinction to the short travel at high temperature in thick cast-iron pipes, as in the ordinary hot-blast stove.

"A further economy in the utilization of the waste

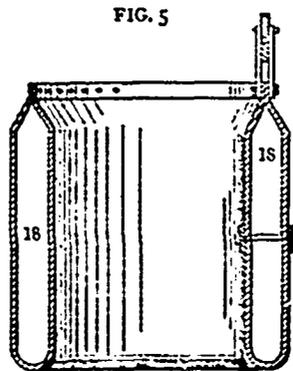


FIG. 5

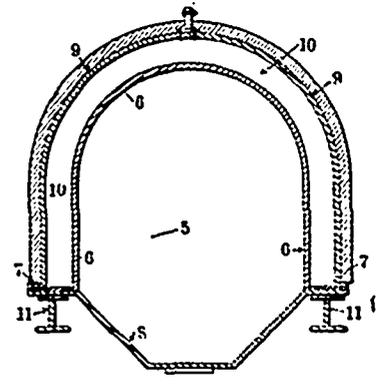


FIG. 4

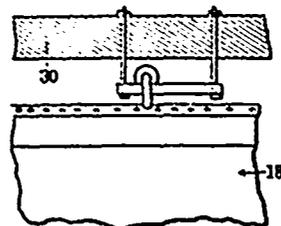


FIG. 6

heat of the furnace is effected by decreasing the velocity of the gases through the flues and dust chamber to the minimum by introducing a damper in the furnace stack; by which means also the amount of cold air drawn in at the feed doors is correspondingly re-

duced and a more complete settling of the particles of flue dust is insured.

"Fig. 1 is a general plan showing the application of my system to an existing blast furnace having a separate flue-dust chamber. Fig. 2 is a similar view showing a modified arrangement, appropriate to an installation of several furnaces. Fig. 3 is a vertical section on the line *AA* in Fig. 1. Fig. 4 is a cross section of the jacketed flue leading from the blast furnace to the dust chamber. Fig. 5 is a cross section to an enlarged scale of the heat-absorption pipes in the flue-dust chamber. Fig. 6 is a side elevation showing a means for supporting and providing for the expansion of the absorption pipes in the flue dust chamber.

"On referring to Figs. 1 and 3, 2 represents the blast furnace and 3 the bustle pipes from which the tuyere pipes 4 deliver the blast to the furnace. From the top of the furnace 2 a jacket flue 5 conveys the furnace gases to the dust chamber 20. In cross-section the flue 5 is preferably shaped as drawn in Fig. 4, the top and sides being inclosed by a plate 6 carried around and outwardly flanged as at 7 to be rivetted to corresponding outward flanges on the cover plate 9, which cover plate incloses an air space 10 between it and the lining plate 6, through which the air of the blast is passed on its way to the furnace tuyeres in a manner to be described later. The bottom of the flue is formed of a trough-shaped plate 8 laterally flanged to rest on the girders 11 and form seats on which the flanges joint of the flue lining and its cover plate rest. The cover plate 9 extends beyond the ends 12 of the flue 5 and by means of end plates 13 jackets these ends with air spaces 14 and 15, which are in connection with the air space 10 which jackets the flue. The space 14 at the furnace end of the flue 5 is connected by down pipes 16 to the bustle pipes 3 on each side, and the space 15 at the opposite end is connected by a shallow, flat pipe 17 in the downtake 21, which delivers the furnace gases from the flue 5 to the flue-dust chamber 20. The flat pipe 17 is connected in the flue-dust chamber to the absorption pipe 18 to be described later.

"The air for the blast is delivered through the pipe 25 and, as shown in dot and dash lines in Fig. 3, a connection 26 furnished with a stop valve will permit the air to be delivered direct to the bustle pipes when for any reason such delivery may be found necessary, valves being also provided on the down pipes 16. The blast-delivery pipe 25 is connected by a flattened pipe 27 to the absorption pipe 18 before referred to in the flue-dust chamber 20. This absorption pipe extends along one side of the chamber toward the chimney and returning along the other side is connected by the pipe 17 to the air jacket of the flue 5.

"The absorption pipe 18 is made of thin sheet metal and is in cross section laterally narrow and vertically deep, the upper side being formed as an inverted V to prevent any considerable settlement of the flue dust upon it, and the under side rounded for convenience of manufacture. It may be supported within the dust chamber in any appropriate manner that will provide

facility for its expansion under heat, but is preferably suspended from the roof 30 of the flue-dust chamber on rollers somewhat in the manner illustrated in the right-hand side of Fig. 5 and in Fig. 6.

"The flat sides of the pipe may be reinforced to enable them to withstand, without distention, the internal pressure of the blast. On the right-hand side of Fig. 5 such reinforcement is attained by longitudinal bars on each side and stay bolts between, but the particular manner in which this is done is not material to this application. The course of the blast air is as follows: From the delivery pipe 25 it passes through the connection 27 to the absorption pipe 18 in the flue-dust chamber where it is exposed very completely to the heated gases therein. The air then passes up the flat pipe 17 in the downtake 21 to the jacket space 15 and along the flue jacket 10 to the space 14 and thence down the pipes 16 to the bustle pipes.

"It will thus be seen that the air is gradually heated in its progress to the furnace, being first exposed to the less highly heated gases in the dust chamber and later, just before discharge through the tuyeres, to the direct heat of the furnace. All pipes and cover plates where exposed to the external air are protected by a covering of heat non-conducting material to prevent loss of heat by radiation. In these circumstances no great extremes exist on opposite sides of the plates of which the pipes and flue lining are composed and the life of the material of which these parts are made is thereby lengthened. This is an important feature as is evidenced by the short life of hot-air stoves at present in use, in which a series of cast-iron air pipes is exposed to the extreme heat of the furnace gases close to the furnace itself. These shallow, flat absorption pipes in the flue-dust chamber offer an ample heating surface in proportion to the cross-section area of the pipes, and their design is such that every opportunity is offered for endwise expansion by the heat of the flue so that no straining of their structure takes place.

"Where a series of blast furnaces is installed it may be found convenient to connect them to one flue-dust chamber as illustrated in plan in Fig. 2 when, by extending the flue 5, the absorption pipe 18 in the flue-dust chamber may be dispensed with altogether and the blast pipe 25 connected direct to the jacket space of the flue 5. The form of the flue 5 and its inclosing air jacket is designed to accommodate itself to expansion and contraction due to variation of temperature and to the lateral extension due to the blast pressure within the jacket space."

[Note—Since writing the foregoing article the Annual Report of the Tyce Copper Company, Ltd., for its fiscal year ended April 30, 1906, has been received. This shows the actual average results at the company's smelting works for that year, the smelter manager reporting that one ton of coke smelted 11.52 tons of furnace mixture in that year as against 8.63 tons of mixture, which latter was the average for the year immediately preceding, during which the furnace was run with cold blast only. Allowing for one month

(May) during which cold blast was used, these figures indicate an average saving during eleven months of the year of 27.2 per cent of coke, which was due to the use of the hot blast system. An analysis of an average sample of the coke used gave the following: Volatile hydrocarbons, 6.15 per cent; fixed carbon, 76.61 per cent; ash, 17.24 per cent. In addition to the above it is noted that the quantity of raw ore smelted was considerably increased, having been 27.74 per cent larger than in the previous year. A further economy was thus effected, to the extent of what, under similar conditions to those obtaining in other years, would have been the cost of roasting this additional quantity of raw ore.—E. J.]

ALASKA AND ITS PROGRESS DURING RECENT YEARS.

HON. W. B. HOGGATT, Governor of Alaska, in the course of a patriotic address he delivered recently at Ketchikan, Southeast Alaska, as reported in the *Mining Journal*, said in part:

After much arduous labour and some ridicule from the unthoughtful, the Hon. William H. Seward more than 39 years ago succeeded in making an agreement with His Majesty, the Emperor of all the Russias, for the purchase of Alaska. This treaty was proclaimed by Andrew Johnson, then President of the United States, on June 20, 1867, and 39 years ago to-day formal possession of Alaska was given over to General Lovell H. Rosseau, acting as Commissioner on behalf of the United States.

For a long period after its acquisition almost the sole industry in Alaska was that of barter and sale with the natives. The first influx of Americans was caused by gold excitement at Sitka in the early seventies, but real development of its resources did not begin until the discoveries of gold in Silver Bow basin near Juneau. Following close upon this discovery came the exploitation and development of the great Treadwell mine. A surplus of restless, hardy prospectors hearing stories of gold in the Yukon Valley began to invade that immense territory, and every year brought new reports of its richness, until now thousands of stalwart miners are braving the rigors of an Arctic climate and recovering a portion of the vast riches of the northwest.

We are all familiar with the history of Alaska during the past 10 years—how this prosperous town of Ketchikan has sprung into existence, how the gold and copper deposits of the surrounding country have been developed until you now have an assured future safe from the cavil of the doubter and the sceptic. With the smoke coming from two smelters, and the noise of the stamps and the drills in the various camps adding evidence of your prosperity, and with your canneries each year providing food for hundreds of thousands of people, your position is indeed an enviable one.

Thousands of brave and hardy men are scouring our country in search of the hidden wealth which its hills and valleys contain. Ten thousand are busily engaged in recovering from the gravels of the Yukon from \$4,000,000 to \$7,000,000 each year. An equal number are recovering a like amount from the sands of the Seward Peninsula. A thousand stamps in Southeastern Alaska are pounding out from the rocks of the hills \$4,500,000 of gold each year. Five thousand men are developing great copper deposits in Prince William Sound and in the Copper River range of mountains, and in building railroads to bring the vast resources of this part of Alaska to the aid of mankind. We can well be proud of such a history, compassed within less than a decade.

Looking over the statistics for the last three years we note a tremendous increase both in values of goods brought into the country and of the wealth recovered and sent without its limits. In 1903-4 the value of domestic merchandise shipped to Alaska was a little over \$9,000,000 each year; in 1905 it jumped to a little over \$11,000,000, and in 1906 to over \$14,000,000.

The value of domestic merchandise shipped from Alaska to the United States during this same period has remained practically the same, inasmuch as this is represented almost entirely by the value of the fish captured within its waters, but the increase of the value of gold shipped from Alaska to the United States has been by leaps and bounds, starting in 1903 with \$4,750,000, three-quarters of which was the product of one group of mines in Southeastern Alaska, to nearly \$13,000,000 in 1906.

We are beginning the development of our copper and gold deposits, and, we can look for a great increase in the production from these two sources within the next few years.

This increase in commerce has brought about a very material increase in water transportation to and from Alaskan ports. Ten years ago we had but two steamers a month to Southeastern Alaska, and probably two steamers a year to the western portion. Today we have a steamer every other day to Southeastern Alaska ports, with 40 vessels plying from the Puget Sound ports to the western part of our country. The development of the rich placer deposits in the Yukon Valley and of Seward Peninsula, and the prospective development of rich copper deposits in the coast range of mountains near the Copper and White Rivers and their tributaries has caused an activity in railroad construction throughout Alaska, and there are now in course of construction and extension several lines of railroad, which, when completed, will open up a country, the vastness of the resources of which one cannot imagine. Within the life of those present we will undoubtedly have the Alaska Peninsula gridironed with railroads, and the tremendous wealth of Alaska adding each year to the general store of wealth and happiness of the people of the United States.

COPPER IN THE WHITEHORSE DISTRICT, SOUTHERN YUKON.

DISCOVERIES OF COPPER in the Whitehorse district of Southern Yukon have lately been reported in the press. One widely circulated report says: "If the discoveries lately made in the Whitehorse district develop in depth in anything like the same degree as they promise at the surface, Southern Yukon will become one of the most valuable copper fields of the world." No doubt this is, to those not previously informed of the occurrence of promising showings of copper ore in the district mentioned, interesting news, but there are others who for four or

partially developed are the Rabbit's Foot, Anaconda, War Eagle, Copper King, Carlisle, Pueblo, Grafter, Arctic Chief, and the Corovette group, and assessment work has been done on 200 claims.

"Two distinctive classes of ore are present and their occurrence is quite different. There are large masses of specular or magnetic iron, as at the Pueblo, where it is hematite, or at the Little Chief, where magnetite prevails, both carrying a moderate tenor of copper; or outcrops of much smaller dimensions in which the ore is essentially bornite, with occasional patches of chalcopyrite and green copper carbonates, in the condition of sand, or disintegrated granular limestone stained with copper. Azurite is rare; chalcocite and



Copper King Mine, near Whitehorse, Yukon Territory.

five years have known of these copper deposits. For instance, in March, 1902, the B. C. MINING RECORD published an article by J. P. Whitney on "Mineral Occurrences at Whitehorse," that was illustrated by views of the Rabbit's Foot and Copper King mines, two of which are here reproduced. Concerning the copper claims Mr. Whitney wrote:

"West and south of Whitehorse, from four to ten miles, lies the great copper belt which has been prospected along its length for 18 miles, but there is still an immense area of country referred to in the Canadian geological reports. The claims that have been

black oxide occur sparingly, but native copper seems to be absent as well as the red oxide. The typical ore is bornite. These outcrops are scattered all over the plateau, and denuded in the general erosion. They are found resting on the granite with no lime in the vicinity, or associated with the patches of lime which still remain; and their discovery in the dense tangle is largely a matter of accident, even to the careful searcher.

A carload of ore was shipped this year from the Copper King to the smelter at Tacoma; this ore averaged 45 per cent copper and netted about \$90 per ton.

At present the owners of this claim have ready for shipment 400 sacks of high-grade ore. A shaft has been sunk 30 ft. in depth on the lead and strikes of high-grade ore are frequent. Capital, however, is required to thoroughly develop the properties."

In a paper by Wm. M. Brewer, M.E., of Victoria, B. C., on "Bornite Ores of British Columbia and Yukon Territory," contributed to the annual meeting of the Canadian Mining Institute in March, 1905, the writer observed that "during 1899 McIntyre and Grainger, two Yukon pioneers, found bornite ore near Whitehorse, the present terminus of the White Pass & Yukon railway, and further prospecting has determined that such ore occurs at intervals along a zone

chalcopyrite, occurring under practically the same geological conditions as do the bodies of bornite, and at about the same elevation, but in a zone which appears to lie parallel to that known as the main copper belt in which the bodies of bornite occur. For several good reasons the development work in Whitehorse camp has been quite limited, and when I last visited that district in 1904 I found that only on one property—the Copper King—had the ore body been prospected to a depth exceeding 100 ft. The limestone footwall on which the ore lay had been followed down on its dip, and at a depth of about 126 ft. the ore body exposed was solid chalcocite, which assayed close to 50 per cent in copper. In the workings above, consider-



Rabbit's Foot Mine, near Whitehorse, Yukon Territory.

about 16 miles in length." Again, Mr. Brewer noted that "in some instances, notably on the Arctic Chief mineral claim near Whitehorse, the matrix of the ore near the surface is magnetite and chlorite, but about 60 ft. below these minerals disappear and garnetite is found as the gangue material." A further reference to this camp was made as follows: "In the Whitehorse copper camp the fact that while nearly every discovery made along the zone, in length about 16 miles and of variable width, has been a body of bornite ore overlaid by a shallow zone of copper carbonates, there are a few instances where the surface ore is unaltered

able chalcocite had been found mixed with the bornite, but at no point had the ore body been entirely composed of chalcocite until the depth mentioned was reached."

D. D. Cairnes, a field officer of the Geological Survey of Canada, has during the past summer been making surveys in this district, and his reports, full details of which will shortly appear in the Department's Summary Report, leave no doubt, so it is stated, that west of Whitehorse there are all the makings of a wonderful copper country. Mr. Cairnes, after remarking that, with the short time at his disposal, his knowledge of

the geology and origin of the ores is naturally superficial, furnishes some interesting particulars concerning development, from which the following has been taken: "The latest and one of the most valuable discoveries in the camp has been made by Byron N. White, of Spokane, on the Pueblo. He owns it and several adjoining properties and came in here about three months ago, only intending to remain a few days, but has found things so interesting that in spite of his interests in some of the leading camps in the Western States he is still here personally supervising developments. With a small crew of men doing chiefly surface work, Mr. White has uncovered on the Pueblo a body of ore 250 by about 270 ft. and has sunk about 100 ft. and has not, as yet, found either wall. The ore is almost solid hematite heavily impregnated with copper minerals. This whole body is practically shipping ore and will average in the neighbourhood of 4 per cent copper with some gold values. There are masses and streaks, however, of high grade ore forming a large proportion of the ore body. Cuprite and copper glance occur in considerable quantities, with some native copper, and bornite-chalcopyrite, and the carbonates are thickly disseminated throughout the ore; so that, with only rough hand sorting, high grade shipments can be made. It is certainly an enormous surface showing. This combined with the large copper deposits of the Copper King, Copper Queen, Arctic Chief, Carlisle, and many others of this camp, give good grounds for the general enthusiasm in the vicinity. Even the question of a local smelter in the near future seems a probability. Mr. White is shipping 100 tons of ore at present and ore buyers are negotiating for large shipments. I saw smelter returns from the Tye Smelter of 10-ton lots from the Copper King which went 46 per cent, 31 per cent and 29 per cent copper respectively, and there appears to be no scarcity, even of these high grade ores."

Recent newspaper advices from Yukon Territory are to the effect that Oscar B. Perry, general manager of several of the Guggenheim mining enterprises, and John F. Newsom, professor of mining and metallurgy at Stanford University, California, U.S.A., have been examining and sampling some of the Whitehorse copper claims, supposedly with a view to recommending their purchase by the Guggenheims. The *Whitehorse Star* on October 12 stated that: "After the property had lain idle for several years, work was resumed on the Arctic Chief copper mine this week by the owners, Captain John Irving of Victoria and William Clark of Whitehorse. Captain Irving came here two months ago for the purpose of starting work on the Arctic Chief, but at that time, owing to the great demand for men in the Windy Arm, Watson and Wheaton districts, it was impossible to secure any hard-rock miners in the country. This time, however, that difficulty has been overcome and a number of experienced men left here on 10th inst. for the scene of operations. The first work done will be the repairing of cabins, putting them in shape for winter, getting in a supply of wood, and otherwise fitting up for a season of active mining."

On 26th inst. the same newspaper published the following: "On October 23rd Captain John Irving completed a deal with Angus McKinnon, by which the latter's claim, the Best Chance, and Irving and Clark's claim, the Arctic Chief, pass into the hands of a syndicate of which W. J. Elmendorf of Spokane, Washington, U.S.A., is general representative, but whose interests in the deal just completed were represented by Captain Irving. Just how much money is involved in the taking over of the two claims by the new owners has not been made public, but it is known that Angus McKinnon gets \$50,000 for the Best Chance, and a substantial payment has been already made to him on account. One of the stipulations of the sale is that the new company must begin active operations on both properties as soon as machinery can be installed, and in compliance with that stipulation, compressor plants will be shipped to Whitehorse as soon as possible and freighted out over the snow to the mines, a distance of about six miles. Captain Irving has received a telegram requesting him to come to Spokane at once to confer with other members of the syndicate regarding the working of the property, and he expects to leave for the Falls City at an early date."

The outlook for the Whitehorse copper deposits being extensively developed now appears more favourable than for years past. In August, last, the *B. C. MINING RECORD* published the information that a large quantity of ore had been blocked out in the Pueblo, while at the Carlisle there were about 100 tons of high-grade ore on the dump. A wagon road to the Pueblo was being constructed by the Government so as to permit of a lot of sacked ore being hauled to the White Pass & Yukon railway for shipment thence to a smelter. It was stated to be Mr. White's intention to keep about 30 men employed on the Carlisle and Pueblo all the winter. With the other copper properties above-mentioned being worked as well, considerable progress will probably have been made by next spring with the opening up of this copper camp. No information has yet been published as to the returns Byron White received from the 100 tons of ore he shipped to the Tye Copper Company's smelter from Whitehorse during the autumn. It appeared to be of a grade, though, that would leave a good margin of profit above mining, freight and treatment costs.

A Spokane, Washington, copy-manufacturing press correspondent recently discovered that "the Frank Smelting Company has bought the Blue Bell mine on Kootenay Lake, opposite Ainsworth, B. C., north of Spokane, and has put a large force of men to work developing the property." This item of "news" has been reprinted recently in several British Columbia publications. It may be pointed out that there is no company in existence named "the Frank Smelting Company." In 1905 the Canadian Metal Company, having its head office in British Columbia at Nelson, purchased the Blue Bell mine and Pilot Bay smelter and in September of that year commenced operations at the mine, which it has worked ever since with only a few weeks' intermission.

INCREASING DEVELOPMENT OF THE IMMENSE COAL RESOURCES OF WESTERN CANADA.

SLOWLY BUT SURELY the immensity of the coal resources of British Columbia and the adjacent country long known as the North West Territories is becoming, widely realized. The fact that 15 years ago the late Dr. Selwyn, then Director of the Geological Survey of Canada, "roughly estimated the coal underlying each square mile in one part of the Crow's Nest Pass coal field at 49,952,000 tons," and that afterwards the late Dr. Dawson, who succeeded Dr. Selwyn as Director of the Survey, stated that "this coal field, although not yet fully defined, must have an area of at least a couple of hundred square miles," failed to convey to the general public an adequate idea of the tremendous importance of this great natural wealth, lying dormant. Recent years have, though, seen a marked advance in the recognition of the enormous potentialities of this valuable possession, which is not by any means restricted to the Crow's Nest Pass, and as a result public attention has, from time to time, been directed afresh to it. Once again the Geological Survey is giving publicity to information concerning the coal resources of the western mainland. The following notes are preliminary to a report that will be published in due course:

If the development of the coal industry is to be taken as indicative of the prosperity and development of a region, then Western Canada is making almost unprecedented strides. Mr. J. C. Dens, of the Geological Survey of Canada, has returned to Ottawa from a visit to the principal western coal fields of the mainland, and he reports that everywhere coal mining is going ahead at a tremendous rate. It is but a very few years since the only coal mines worthy of the name operating in Alberta were the Lethbridge and the Canmore mines. These have expanded into large enterprises, and many other similar ventures have since achieved success. There are now in the provinces of Alberta and Saskatchewan more than 20 well established and well equipped collieries, besides numerous smaller mines which are worked spasmodically to supply local wants.

Figures speak louder than words. The records kept by the Mines Section of the Geological Survey show that in 1887 the coal production of the then North West Territories was for that year 74,152 tons, valued at \$157,577. In 1905 the figures for Alberta and Saskatchewan had attained over 1,000,000 tons, representing a value of over \$2,000,000. In other words, in 18 years the production had increased about 14-fold.

But even at a very greatly increased rate of production, the question of exhaustion of the fossil fuel is yet in a future exceedingly remote, for it has been calculated that the coal-bearing region of the great plain provinces, between the International Boundary and the 56th parallel of latitude, has an area of over 65,000 sq. miles.

In this vast expanse of country all the different

grades of coal are represented—from a lignite, containing 14 per cent moisture, 36 per cent volatile matter and 44 per cent fixed carbon, to an anthracite with as much as 90 per cent fixed carbon. This variety of coal allows of each industry being suited to a nicety according to its requirements, and coals of superior quality may be found for steam-raising, blacksmithing, coke manufacture and domestic use.

One of the features of the coal industry of Alberta in 1906 has been the inauguration of new methods of mining in the Edmonton region. Heretofore the coal for the use of the district was mined by means of tunnels driven on the coal seams which outcrop on the steep and high banks of the Saskatchewan; this coal was then shipped in scows. But with the growth of the region these means were thought inadequate, and within the last three months three shafts have been sunk, the deepest to 200 ft., which will greatly facilitate the extraction, and the coal production is now ready to keep pace with the growth of the region expected by the most sanguine resident. The product of the mines of this district is a lignitic coal well adapted to domestic uses.

At Bankhead, near Banff, the Pacific Coal Company is mining anthracite. The preparation of this coal for the market is attended with the production of a very large proportion of coal dust. After a long series of experiments as to the best means of utilizing this dust, the coal company is at present erecting a very complete and up-to-date briquetting plant, and it is expected that within a few months an excellent fuel, new to Canada, will be placed on the market in the form of anthracite coal dust briquettes.

On the mainland of British Columbia the coal industry has not been less active. It is true that in 1906 the only producing company beside the Vancouver Island collieries was the Crow's Nest Pass Coal Company, but preparations are being made in the Crow's Nest field, in its northern extension and along the line of the Canadian Pacific Railway, for the establishment of new and important mines.

At present the largest individual colliery of British Columbia, and of Western Canada for that matter, is the Coal Creek colliery of the Crow's Nest Pass Coal Company, which can handle 4,000 tons of coal in a day of 10 hours.

Over and above all the producing fields, there are yet in these western provinces vast tracts, underlaid by incalculable quantities of coal, which are waiting the advent of the railway to be developed and to become important producers. Mr. Denis believes that, judging by appearances, they will not have to wait very long.

From the *Similkameen Star* it is learned that the proposed sale of the Nickel Plate mine near Hedley to New York capitalists, has fallen through. It is stated the Daly people will now go ahead with various much needed improvements to the property.

MINING IN AINSWORTH CAMP, WEST KOOTENAY.

AINSWORTH CAMP, although not fully reported on by Philip Argall when in charge of the field work of the "Commission Appointed to Investigate the Zinc Resources of British Columbia," had a fair share of his attention with the result that several pages of the "Report of the Commission" were taken up by information relating to the Highlander mine, while more or less space was given to six or seven others. As it happened that H. M. Stevenson, manager of the Highlander, was away when, a few weeks ago, Ainsworth was visited by the editor of the B. C. MINING RECORD, and that consequently but few particulars of the property were obtained, the following description of it, by Mr. Argall, is reprinted from the report above mentioned:

"HIGHLANDER MILL AND MINING COMPANY.

"The property of the Highlander Mill and Mining Company at Ainsworth Camp consists of seven claims aggregating 380 acres, developed by 2,766 ft. of tunnel work, 1,227 ft. of drifts in the veins and 430 ft. of winzes and raises.

"The Highlander vein varies from 25 ft. down to about 2 ft. in width, and may be said to average 3 ft. of concentrating ore in the shoots opened on the main Highlander tunnel-horizon south drift. About 700 tons of lead concentrates and 100 tons of hand sorted lead ore have been shipped from this property and is said to average 67 per cent lead, 4 per cent zinc and 22 oz. silver.

"The Highlander vein was discovered in 1890. It outcrops on the summit of the steep escarpment on the western side of Kootenay Lake, about 1,100 ft. above high water. A short tunnel intersects the vein 100 ft. below its outcrop, and development is continued by a shaft for a depth of 170 ft. from the outcrop of the vein. Later, a main tunnel was started, now known as the Highlander tunnel, to open up this vein at a depth of 750 ft. vertically below its apex, or 1,000 ft. on the dip of the vein. The portal of this tunnel is situated about 350 ft. above the lake and one mile south of the town of Ainsworth.

"After penetrating the wash, the tunnel entered the mica schists of the district, and at a distance of 225 ft. from the portal intersected what is known as the Tariff vein. At 350 ft. the schists gradually became harder, passing by insensible gradations into gneiss, through which the tunnel penetrates for a distance of 1,200 ft. In the centre of this mass of gneiss the crystallization becomes coarse, the rock in places presenting a granitic appearance, but on nearing the main lode again becomes schistose and the vein is intersected at 1,560 ft. from the portal, with a westerly dip of 45 degs. giving the following general section. The footwall portion shows a banded structure of quartz and dark slaty rock, containing some seams of calcite, occupying a width of 2 ft., next comes 2 ft. of gray porphyritic vein filling, possibly a portion of a small dyke, the hanging wall of which is polished and shows slicken-

side markings. Resting on this wall is a seam of quartz and slate breccia cemented by a porphyritic ground mass. The remaining portion of the vein consists of dark schists containing irregular lenses of vein quartz, the whole occupying a width of 25 ft. between walls, but does not contain pay ore in any part, truly a rather disappointing showing after so much expense. On drifting to the south, however, pay ore was found in the foot wall portion of the vein.

"This main vein was cut in the exact position that the prolongation of the dip from the surface workings on the Highlander vein would indicate; therefore it was assumed to be the Highlander vein; but considering the 900 ft. of unexplored ground between this tunnel and the surface workings on the Highlander, it must be freely admitted that it is simply a matter of conjecture. A basic dyke 4 ft. in thickness cuts almost vertically through the vein on the tunnel horizon.

"The hanging wall streak of this composite lode is continuous quartz that has been drifted on northerly for about 80 ft., showing a fairly regular seam (averaging 30 in. thick) of white and blocky quartz, but devoid of mineral.

"Crossing these quartz lenses in the tunnel, at about right angles to the dip, is a sheeted zone showing four open fissures, varying from 0.5 to 4 in. in width, as seen on the line of the main tunnel; giving a basis for the impression that this portion of the vein has an easterly dip. Passing westerly along the main tunnel, the mica schists become harder, more silicified, and various breaks or open fissures occur between the hanging wall of the Highlander vein and the face of the main tunnel, a distance of 1,014 ft.

"On account of poor ventilation and the amount of water that was issuing from the joints and fissures, I found it impossible to examine carefully the rock structure between the Highlander vein and the face of the tunnel. One large fissure was, however, encountered, said to contain mostly loose calcite, which burst out several times in the tunnel, but was timbered up closely at the time of my examination.

"At the present face of the tunnel, 1,014 ft. from the hanging wall of the Highlander vein, another vein was encountered, with a strike north 50 degs. west, and a dip 25 degs. westerly. This has been opened up on both sides of the tunnel for a total distance of 50 ft., and consists of an irregular quartz lens varying from 2 in. up to 15 in. in thickness, showing some very pale iron pyrites with a little siderite and calcite, a clay gouge of about 6 in. and a hanging wall of mica schist. This point is 2,610 ft. from the portal of the tunnel and about 1,400 ft. vertical below the surface of the mountain. The vein conforms, as far as can be seen, with the strike and dip of the schists, and while the showing is very poor, there is a possibility that drifting on the strike of the vein might open up some pockets of pay ore. Work, however, had been suspended in this place for some time prior to my examination.

"The last 300 ft. in the main tunnel is a poor piece of work, crooked, and at extremely bad grade, but on

account of the numerous slips and open fissures that have been encountered, all of which are discharging considerable water, it was doubtless an expensive and rather difficult place to operate.

"Returning now to the point where the Highlander vein was intersected (1,560 ft. from the portal of the tunnel) a drift extends southerly along the foot wall; while the vein was entirely barren where intersected, some blende was discovered at about 50 ft. south of the tunnel and continued for 100 ft. in length; then 50 ft. of barren vein came in, followed by about 150 ft. of vein matter, averaging about 5 ft. in width and containing about 2 ft. of pay streak, showing zinc blende and galena. A sample taken across the pay streak 320 ft. south of the tunnel gave the following result: Silver 4 oz., lead 21 per cent, zinc 7.2 per cent; width sampled 2 ft. At 400 ft. south a winze had been sunk 52 ft., the vein having here a dip of 45 degs. to the west and varying from 6 to 12 ft. wide. At the collar of the winze there is a very good bunch of galena which carried down nearly 2 ft. wide of a pay streak, following the hanging wall, for a distance of 30 ft. along the winze, and from 18 to 24 in. of mixed zinc blende and gangue resting on the foot wall.

"The vein here shows a banded structure with a large development of calcite as vein filling, together with siderite and schist; the hanging wall is very smooth and regular, next to it a 6-in. clay gouge occurs, the whole formation presenting the general appearance of a bedded deposit. A drift has been advanced about 40 ft. northerly from the bottom of the winze and in places this shows quite a mass of porphyry and zinc blende fragments, encrusted with siderite and zinc blende in alternating layers. The galena in the vein rather favours a calcite gangue, makes near the hanging wall gouge, and invariably contains a sprinkling of chalcopyrite.

"The general order of mineral deposition around the porphyry breccia is first a film of siderite; then zinc blende; third, siderite, and fourth zinc blende as a very thin outer coating of the fragments and beyond that the siderite ground-mass cements everything solidly.

"At 30 ft. south of the winze on the main level, a raise has been put up about 200 ft., which, for the first 60 ft. shows a very fair vein with a pay streak, varying from 18 to 24 in. of blende and galena, the siderite and calcite gangue being very similar to that seen in the winze below, but the galena is less plentiful. A sample taken across this vein in two cuts, for a width of 18 in., about 30 ft. above the level, assayed: Silver 1.9 oz., lead nil, zinc 13.9 per cent. The main level extends on the vein 300 ft. southerly from the winze, for the last 200 ft. of which the lode becomes hard and unproductive, the face of the drift showing a porphyry structure, and it looks as if at this place a gray porphyry dyke occupied part of the vein.

"Two cross-cuts have been driven into the hanging wall of the vein between the main cross-cut tunnel and the face of the southern drift, without showing up any

mineralization, but the foot wall portion, as opened on this level for a distance of 350 ft., shows an extremely well-mineralized deposit with a pay streak that would average about 2 ft. wide of a composition similar to that indicated in the samples above referred to, both of which were taken from two cuts across the vein. The best showing is in the bottom of the level, but owing to the wet nature of the country and the prevalence of fissures in this rather open vein structure, mining below the level will, no doubt, be hazardous and expensive. A tunnel could be brought in 320 ft. deeper, but it would necessitate driving about 2,800 ft. and would not be warranted without considerable further development on the vein and the opening up of large quantities of pay ores.

"The water is pumped from the winze and the ore hoisted by compressed air delivered from the Taylor air compressing plant situated on Coffee Creek about two miles south of the mine. There is no opening to surface except the main tunnel; the only ventilation in the mine is that supplied by the compressed air, which is insufficient, as carbonic acid is very prevalent, and in many of the workings a candle will scarcely burn.

"Although there are 900 ft. of backs above the tunnel level available for stoping no prospect raises have been put up, except the one described. One or more raises should be pushed through to surface, as in such a strong vein there is every probability of good shoots of pay ore being found above the tunnel level.

"It is interesting to note a comparatively flat deposit, conforming to the planes of schistosity of the enclosing rock, which continues so regular and strong at a depth of nearly 1,000 ft. from surface, and under such a mass of superincumbent rock.

"The appearance of the Highlander vein in places would suggest that a small stratum of limestone had been in part replaced by ore, and the solution and recrystallization of the limestone had resulted in considerable settling of the hanging wall and general rock movement adjacent to the vein. There is also evidence that in various places a porphyry dyke occurs within the vein.

"The Highlander property has the appearance of having had far too much money squandered on the main tunnel, in search of elusive veins at great depth, to the neglect of the large vein, which is really a first class prospect and deserving of thorough development.

"The Highlander tunnel is connected by wire tram with a concentration mill on the shore of the Kootenay Lake. The tram serves to transport both the milling and hand-sorted ore, and the latter, together with the concentrates is shipped in barges from the mill. This mill was not examined as it has not been operated for some time. The management was, at the time of my visit, figuring on shipping the crude ore in bulk to the smelter, after a preparatory hand sorting, and in this way securing the benefit in a smelter rate from the carbonate of iron and lime that the ore contains, and saving the loss incident to concentration. Though the freight and smelting charge must be necessarily higher than the combined rate on concentrates, yet, the man-

agement considers the bulk shipments more profitable. Considering the low tenor of the ore and its intimate association with the gangue, the experiment does not appeal very favourably to me."

THE SOUTH FORK OF KASLO CREEK, SLOCAN DISTRICT.

KASLO, one of the most beautifully situated towns in West Kootenay, is benefitting considerably from mining activity on the South Fork of Kaslo Creek. In the South Fork camp there are a dozen or more mineral claims of known merit, and at least half a dozen may well be called mines in contradistinction to undeveloped or partially developed prospects. The properties that of recent years have been most active are the Cork, Province, and Bismark, while the Montezuma, Silver Bell, and Gibson were more prominent in earlier years. Others that should have mention are the Bell group, Sturgis, and Index. On the last-named a strike of rich ore was reported a few months ago and it is regarded as a promising property of which more will yet be heard.

When Kaslo was visited about the end of September the editor of the B. C. MINING RECORD was informed that there were in all some 75 men employed in the South Fork camp, more prospecting and development was being done than ever before, and that the camp was in a generally prosperous condition to a degree not experienced in any previous season since mining had been done in it. Not only was the Cork concentrating mill being regularly operated and the mine more extensively worked, but the old Montezuma mill was being equipped afresh with plant and machinery and tramway connection was being made between the Montezuma and Province mines, respectively.

The following particulars of some of the South Fork properties are from the "Report of the Zinc Commission," the data having been obtained and the account written by Philip Argall:

"The South Fork district is reached by the Kaslo & Slocan railway to South Fork station, about five miles from Kaslo; thence an excellent wagon road connects with the Cork mine, a distance of five miles, in which the road rises only about 1,000 ft., following the South Fork of the Kaslo through a densely wooded country.

"At four miles from the railway a mill was erected some years ago by the Montezuma company, and a wire tram probably connects direct from the mill to the mine. The mill is now partially dismantled, not having been operated for about seven years. It was, however, fairly well arranged, operated by water power from the South Fork, and contained 8 jigs and two double-deck revolving buddles. The tailings show considerable zinc, and some ore left in the bins also contains zinc, though it was evident that a lead concentrate was aimed at.

"Mr. H. Geigerich, of Kaslo, who is now the principal owner of the property, gave me the following note: 'The Montezuma claim was operated through

a cross-cut tunnel from surface, 450 ft. long. There are four levels on the property, and all connected to surface. About 1,000 tons of lead concentrates were shipped, containing so much zinc that the operation of the mine on a lead basis was abandoned. The property finally went into liquidation with a debt of \$75,000, and has not been operated since 1898. There are 6,000 to 7,000 tons of ore in the mine and on the dump.'

"The zinc ore showing on the Cork mining claim and on the Province was not, in my opinion, sufficiently important to warrant the examination of the Montezuma property, more especially as the owners had not made any preparation to clean up and prepare the mine so that the workings could be properly examined after their seven years of abandonment.

CORK MINE.

"This property is, in point of development, the most important now being operated on the South Fork. The vein has been tapped by three tunnels, and considerable lateral development conducted. A large mill has been erected, and 30 men are employed on the property.

"Geology.—The mineral channel containing the Cork vein would appear to occur in the basal series of the Slocan slates. The geology, as seen in the No. 1, or lowest, cross-cut, consists of indurated dark semi-crystalline slates and schists in which are strata of crystalline limestone, the principal one occurring about midway between the portal of the tunnel and the vein, and the next in size, 110 ft. east of the vein. The last, varying from 3 to 4 ft. in thickness, is found near the face of the main tunnel, 200 ft. easterly of the vein. The line of demarkation between the crystalline limestone and the slates is everywhere clear cut and distinct. Usually the slate adjoining the limestone is quite soft, and in places mere clay. There are other beds of fine grit included in the series, all of which have a general easterly dip of about 55 deg., though the innermost bed of limestone, where intersected by No. 1 tunnel, dips easterly at about 75 deg. The limestones, easterly of the vein, are very thinly bedded and contain dark bands of apparently clayey material. On examining this rock under the glass it presents a coarse aggregation of calcite crystals.

"The vein, or veins, occur in a channel of faulted or disturbed slates from 30 to 50 ft. in width. The ore makes along irregular slips, or incipient faults, inside the main walls of the faulted zone, which bears approximately north 40 deg. east, the vein proper dipping at 62 deg. easterly, or into the mountain.

"Mill.—The No. 1, or lowest, tunnel is connected with the new mill by a level tramway, the cars being pushed out and dumped into the mill bin, the ore passing first through a 10 by 20 in. Blake crusher, following which it passes through a No. 4 Gates crusher, and without screening between the crushers, which is rather bad practice. The crushed ore is then spouted to a stock bin, whence a Challenge feeder delivers it to a set of 10 by 30 in. Allis-Chalmers rolls, running at 80 r.p.m. The crushed ore is then elevated to revolving screens which size it to 12, 8, 5 and 2 mm. the oversize returning to the first roll, and the middlings

from the jigs to two other rolls of the same make and running at the same speed. The fines from the 2 mm. screens goes to two V boxes, the product of which is also jigged, making six jigged products. The overflow from the V boxes passes to a settling tank, the product from which is treated in three sizes on three Overstrom tables, and the overflow from the large settling tank passes to a second tank of similar construction, simply an elongated V box, where the entire product is treated as three different sizes on as many Frue vanners, but this feed is entirely too thin for any effective work, and it looks as if the amount of concentrate obtained by the vanners would not pay for their lubrication.

"Both the lead and the zinc in the mill feed is very finely distributed through the ore, and is also of very fine grain, so much so, that the four compartment jigs give but one finished product and three middlings for regrinding.

"I was informed by the management that the ore now being treated, (which, by the way, is first roughly sorted in the mine) is producing from 6 to 7 tons of concentrates per 100 tons of feed, the concentrates running from 50 to 55 per cent lead and 30 to 33 oz. silver per ton. The average capacity of the milling plant is 3 tons per hour.

"The machinery is operated by Pelton wheels, one situated on the crusher floor operating the crushers, screening machinery and the jigs, while a smaller wheel operates the tables and Frue vanners.

"The water has a head of 700 ft. and is conducted to the mill in an 8-in. pipe line, but the present flow (November, 1905,) is insufficient to operate the milling plant alone, to say nothing of the compressor and sawmill; consequently, this new mill, which had not operated 30 days, was then short of power, and arrangements were under way to install a turbine wheel on the South Fork Creek, where there appears to be an ample flow of water, practically at the foot of the mill. This new power will, I suppose, be used to operate the mill, while the 8-in. line will operate the sawmill and air compressor. An enlargement of the mill is also contemplated by an addition of one rough jig and two jigs to treat medium product. This addition is somewhat in the nature of an adjustment, some of the present jigs having too much feed and others too little. The mill is fairly well built and the arrangements are on the whole good. There is no doubt if sufficient galena exists in the mill feed, paying results will be obtained. No effort is made to save any of the zinc blende. It is of such a fine nature that the ore would have to be crushed very much finer, and more slime machinery introduced before any attempt could be made to save the blende. The examination of the present mine works, however, shows that the Cork property does not at present come within the definition of a zinc mine.

"Mine.—This mine is developed by three tunnels. No. 1, or the lowest, is connected with the concentration mill, as previously described. The vein is

reached in this tunnel at a distance of 900 ft. from its portal, the tunnel extending, as previously noted, 200 ft. beyond the vein. At the point of intersection the vein is very poor, consisting almost entirely of crushed slate, with a little siderite and quartz on the joints and faces of the crushed rock.

"On extending the drift northerly in this faulted zone, siderite became more plentiful, and at about 150 ft. an 8-in. streak of mixed galena and siderite with a little zinc blende occurs and has been stoped in the roof for a distance of 70 ft. An examination of the stope shows that the lens-like mass of ore is cutting out 15 ft. above the level, though another lens will doubtless come in higher up. The ore, however, is low grade. Sometimes it is found near the hanging wall of the faulted zone, as at the present face of the north drift, which is entirely in the hanging; at other times near the foot wall, or in diagonal seams crossing between these walls which are about 30 ft. apart—but it is doubtful if the mineralization in these northern stopes, drifts and cross-cuts is sufficiently rich to pay for mining and milling under the conditions that now obtain. An examination of the No. 2 tunnel, 203 ft. vertically above, shows a more regular vein, but it consists almost entirely of iron pyrites and siderite, with small bunches of zinc blende occurring at intervals, so intimately mixed with dense siderite as to be almost impossible to concentrate, as well as expensive to separate the mixed materials after concentration.

"Going south on the vein from No. 1 cross-cut tunnel, no particular mineralization can be detected until the raise is reached at a distance of 150 ft. This raise connects with No. 2 tunnel at a place where there is a good development of ore, but on No. 1 tunnel the vein at the raise is not of much value. Immediately to the south, however, a stope was being operated that had reached a height of 60 ft. above the level, the vein being wide between regular walls, much striated, and showing deep scars and slickensides. Formerly the full width was stoped, but now an effort is being made to stope a wide of five feet only on the foot wall. On the northern face of this stope, at the height indicated, there is a streak on the foot wall of 8 in. of quartz and galena, and on the hanging a little galena associated with blende, the central portion being massive siderite with a sprinkling of blende. At the south face of the stope at about 70 ft. from the level, a cutting-out stope has advanced about 10 ft. south of the regular line of stoping. The pay streak is there 4 ft. wide of very solid blende, which assayed 6.7 oz. silver, 13.7 per cent lead, and 28.5 per cent zinc. This was the only place in the mine where the occurrence of blende was sufficiently good to warrant sampling. This stope is only about 70 ft. long, and is more in the nature of a chimney than the regular occurrence of ore in vein-like form. It has, as previously noted, good walls, but lacks continuity in length. If the deposit were stoped to the main hanging wall it would be about 30 ft. in width by 70 ft. in length. Considering the showing on No. 2 level above, I rather expect that some good bunches of lead and zinc ore will be

developed as the stoping is carried upwards. On the main drift, south of this stope, the vein again splits up, and nothing but a clay gouge exists in the face.

"Tunnel No. 2 intersects the vein 70 ft. northerly from the raise connecting with No. 1. The main drift extends northerly and southerly along the foot wall portion of the vein, and on the south extension shows but little mineralization until a point is reached 20 ft. north of the raise when ore comes in which can be traced along the level for 100 ft., at which point it shears off into the foot and is exposed in a short cross-cut, but has not been followed. The vein there consists of massive siderite, with bunches of very good blende distributed irregularly through it, also considerable pyrites. The vein in this south drift may be considered a sort of cross vein, that is to say, running diagonally across a mineralized and faulted zone. The ore at the raise makes back into the crystalline limestone, which there forms the hanging country rock. At this place massive siderite and blende, with a little galena, occurs for a width of 20 ft. and a length of 50 ft., the cross vein terminating in solid limestone, evidently a replacement of the lime by the mineralizing solutions. South of the short cross-cut the pay ore gradually plays out in the main vein, and the face is entirely barren. This south drift is 300 ft. in length and the short cross-cut indicated occurs at 130 ft. Going northerly from the main tunnel cross-cut, the vein is picked up at 50 ft., showing a little mineral, and continues in rather irregular bunches to the face, a distance of 200 ft. Siderite is, however, the predominant mineral. Hard white iron pyrites would come next in order of abundance, while blende occurs at irregular intervals; also a little galena in places. This portion of the vein, however, like that in the level immediately below it, is low grade. So far as present development shows, the only good ore in the mine is the short chimney-like shoot immediately south of the raise and extending from No. 1 level to possibly No. 3. or the uppermost level. There are, however, possibilities that if the drifts are pushed further north and south in the mineralized zone, at least another shoot or chimney may be met with. Considering, however, even in the best stope, the very scattered occurrences of mineral in this wide, crushed and faulted zone, it becomes clear that it must be worked on broad lines, at big capacity and with all modern improvements, in order to score complete success.

"Tunnel No. 3 starts on the outcrop of the vein, which shows a considerable development of quartz and spathic iron with very little lead mineral. The drift advances southerly to a point over the main raise from No. 1, near which communication was made with No. 2 tunnel. The workings here were caved and inaccessible. The management indicated that they were also unimportant.

"It will be noticed that the vein carries good ore where the limestone forms one of the walls, as on No. 2 level. If the main vein could be traced into one of the limestone beds good discoveries of pay ore might follow.

PROVINCE MINE.

"The Province property is situated immediately to the north of the Cork, the vein occurring in the same mineralized zone. The geology and ore occurrences are practically identical for both mines, but the Province has a better shoot of zinc ore than anything yet developed in the Cork.

"The Province mine is opened by two tunnels, the upper, or No. 1, being merely a prospect drift extending northerly and southerly on the vein for some distance beyond its exposure in the creek.

"Tunnel No. 2, about 65 ft. lower, enters the mineral zone at a distance of 120 ft. from its portal, after penetrating the slates and schists of the district, but no limestone could be detected. The vein was reached at a distance of 170 ft. from the portal of the tunnel in an unproductive place; a drift northerly of about 100 ft. (which is now caved) did not, it is stated, discover anything of value. The southern drift followed a fairly regular wall until a point was reached 20 ft. north of the winze, where a nice bunch of galena was met with close to the hanging wall, and underneath it some zinc blende associated with siderite. The winze is sunk 65 ft. on this showing, and at the bottom a cross-cut reached the foot wall giving a distance of 25 ft. between walls. The galena and zinc blende continues very regular in the winze, and the cross-cut exposes for 20 ft. a vein of massive siderite, through which blende is distributed in irregular streaks and bunches. The vein for a width of 20 ft. would average one-third blende, and in the ordinary milling, four tons of feed should give one tone of blende concentrate, exclusive of siderite. There is also some galena showing on the foot wall as well as on the hanging, but the latter is the best showing. The hanging wall drift extended northerly about 20 ft. carrying galena for most of the distance; the face, however, is rather poor.

"Returning to the main (No. 2) level, the ore lens on which this winze and other workings occur, shows to be only 40 ft. in length, but at 20 ft. south of the winze a cross branch drops in, and at the intersection with the main vein, a raise was put up 30 ft., and a drift advanced 6 ft. in the vein. The face of this drift contains for 7 ft. in width a very good exposure of zinc, a sample assaying: Silver, 15 oz.; lead, 20.7 per cent; zinc, 23.6 per cent; and zinc and lead can be seen in the ends of the raise down to the No. 2 level. About 35 ft. west on the cross seam a good bunch of galena occurred and has been stoped in the bottom of the drift for a depth of 12 ft. The main drift then takes a northwesterly course, following a zinc and lead cross seam for a further distance of 40 ft. I believe this cross vein is merely a local phenomenon. I would not expect it to extend for any particular depth or height; it is simply a small fracture carrying ore across the main mineral channel. A sample taken in the face of this drift assayed: Silver, 3.6 oz.; lead, 1.7 per cent; zinc, 27.8 per cent. Sufficient work has not been carried out to show the exact nature of the principal ore occurrence. It looks, how-

ever, as if this chimney could be depended on to give from present development a stoping width of 10 ft., a length of 50 ft., and a vertical extension of, say, 100 ft., which would give approximately 4,000 tons of milling ore, from which considerable galena could be picked out, probably 200 tons. The remainder, however, would require concentration, and owing to the dense nature of the siderite, would give a low grade concentrate containing approximately equal parts of blende and siderite. Arrangements may possibly be made by which this ore could be stoped out and treated in some local mill. Far more extensive developments would have to be carried out before any concentration will be justified for the treatment of Province ores on the ground. The property, however, is a very promising one, and may, on development, open out into a big mine of medium grade ore. The diamond drill could be used effectively to prove up the deposits and attention should be given to the location of the vein system in the limestone beds, where there is every reason to expect larger and richer ore deposits."

THE TELKWA MINERAL BELT, IN SKEENA MINING DIVISION.

ORE BODIES of fairly large size and, as far as sampled, of good average grade, appear to be the most prominent feature of the Telkwa mineral belt. This is the conclusion of Geo. R. Naden of Greenwood, Boundary district of British Columbia, after having spent the greater part of three months travelling over the country drained by the Telkwa River and examining the numerous surface showings of mineral occurring there.

While not making any pretensions to being a mining expert, Mr. Naden's nine years' residence in the Boundary and his general knowledge of the numerous and varied mineral showings of that extensive district give those who know him confidence in accepting his judgment as to whether or not the surface showings in the Telkwa are sufficiently good to warrant the expenditure of capital to develop them. When, therefore, he expresses the opinion that the Telkwa is well worthy of the attention of those prepared to spend money in the development of promising mineral claims, there need be little or no hesitation in regarding that new and promising mining field with favour.

Mr. Naden left Greenwood on June 4 and Vancouver about a week later. On his return he arrived at Vancouver on September 18, so that, as already stated, he was nearly three months in the Bulkley district, having given very little time to any other part of the Skeena country. Travel to the Skeena and thence up to Hazelton (about 180 miles up the Skeena River) was by the usual coast and river steamers. From Hazelton up the Bulkley to the confluence of the Telkwa with the larger stream, and thence to the mineral belt was by trail.

So far as yet known, the Telkwa mineral zone commences at about 20 miles up from the junction of the

river with the Bulkley. This zone or belt appears to be about four by ten miles in extent, but as it has not yet been closely explored its area may later be found to be larger. The country rock is described as being chiefly porphyry and basalt, the ores as a general rule occurring at the contact of the two. There are dykes of a kind of trap rock and mineral is usually associated with these dykes. Some of the mineral lodes or ore bodies are apparently of good size, ranging from 6 to 20 ft. in width. In several instances the lodes have been traced the full length of the claim, with indications of still greater length. Values are principally in copper, with very little gold. In some cases silver values are fairly good. From numerous assays of general samples taken from the larger ore bodies from two to ten per cent copper was obtained. But little development has been done on the larger number of the mineral claims. The Telkwa Mining, Milling and Development Company, Ltd., an extra-provincial company having its head office at Seattle, Washington, U.S.A., and holding about 60 mineral claims on the Telkwa, has done most work, but the attention of all interested has been given largely to making trails, something like 60 miles of which have been made by the claim owners of this section.

Beside the above-mentioned company there is the Tel-Kwa Mines, Ltd., among the incorporators of which are several well known mining men of Nelson, B. C., who have been represented in the district by Col. E. S. Topping, formerly of Trail. This company owns eight claims. Then there are Messrs. Carr Brothers (three), Saunders, and Stark, with some 25 claims between them. A few others own claims, but those above-named comprise practically all in that part of the district.

There are as well several smaller camps—Hunter Basin, Goat Creek, and Sunset Basin, these being tributary to Four-Mile Creek which flows into the Telkwa about four miles from its junction with the Bulkley. Mr. Naden spent very little time in Hunter Basin, in which occur small veins of ore, 15 to 18 in. wide, usually of very high grade. The numerous claims in the other two camps were not seen, consequently Mr. Naden could not say anything of them. Nor had he any information concerning the suitability or otherwise of the Telkwa ores for smelting purposes, their fluxing properties, etc. There appears to be plenty of iron in the district, but lime seems to be scarce. There is an abundance of water, and an ample supply of timber for local use.

As to accessibility—a railway from the Grand Trunk Pacific main line up Bulkley Valley would reach the centre of the Telkwa mineral belt in about 30 miles. The country up the Telkwa appears to afford an easy grade for a railway, without serious engineering difficulties.

Other parts of the Skeena mining division mentioned by Mr. Naden were Copper River, from which had come most attractive looking specimens of high grade ore, occurring in small veins and carrying values chiefly in silver and copper; and Morrice River, from

the country drained by which prospectors had brought in samples of ore of good grade, also assaying high in silver and copper. As he spent only half a day on the Babine Range, having had no time to look over this extensive district, in which discoveries of good ore had been reported, Mr. Naden could not say much about that part. Some beautiful specimens of ore come from its claims, though. An assay of a general sample of ore taken from every two feet of a 27 ft. tunnel gave 11.78 per cent copper, 2.61 oz. silver, and 0.05 oz. gold per ton. Mr. Naden's personal observations in the Babine country, though, were necessarily too few under the circumstances to warrant him in speaking with such confidence of its mineral showings as of those of the Telkwa, which latter he examined closely.

In the Bulkley Valley there are about 100 sq. miles taken up as coal lands, there being fine outcrops of coal up the valley to the Telkwa camp. W. W. Leach, of the Geological Survey of Canada, was in the valley obtaining data for a topographical map, which the Survey Department may issue next April or as soon thereafter as shall be practicable. Mr. Leach may also make a report on the geology of the district as well.

Mr. Naden's general impressions of the district are decidedly favourable. The apparent occurrence of so much copper-bearing ore in the Telkwa section, coal in Bulkley Valley, agricultural and horticultural capabilities that promise well for the future, and the assurance that in the course of a few years railway transportation will be provided, combine to make it appear that the district has before it a prosperous future. In conclusion it may be mentioned that in the opinion of those believed to be reliably informed the route of the Grand Trunk Pacific railway eastward from the mouth of the Skeena River has been decided upon. It will run to the northeast 180 miles to Hazelton, and then turn almost directly south for 60 miles or so along the Bulkley River. Thence its course trends to the south and east till the foot of the Stewart and Babine Lakes is reached 350 miles from the coast. From there it may reach the prairies by any one of four routes, but which of these four will be taken was then doubtful. Mr. Naden thinks the final word as to this has not been spoken. But it is almost assured that the course from Stewart Lake to the coast will be that here outlined.

The North of England Institute of Mining and Mechanical Engineers has had printed in pamphlet form a brief account of the general meeting of its members held at Newcastle-upon-Tyne on August 1 to receive the visiting members of the American Institute of Mining Engineers. After the Lord Mayor had extended to the visitors a most hearty and kindly welcome to England and the metropolis of the North and expressed appreciation of the visit of so important an institute to the heart of the iron and steel industry of England, the president of the North of England Institute of Mining and Mechanical Engineers cordially welcomed the visitors "to the ancient City of Newcastle, and to the oldest coal-field in Great Bri-

tain," adding that "early in the fourteenth century coal was worked at Elswick by the prior and brethren of Tynemouth, and the burgesses of Newcastle worked coal near the place where those present were then assembled. The appliances were primitive, and horses were used for haulage, until George Stephenson and William Hedley invented their locomotive engines. The safety lamp was invented by Dr. William Reid Clanny and by George Stephenson, so that the district was the birthplace of inventors who had improved the methods of mining." Captain Robert W. Hunt (Chicago), president of the American Institute of Mining Engineers, in returning thanks for the welcome given and hospitality shown, acknowledged the influence of Newcastle, which was known even in America. The pamphlet above mentioned also contains notes of some of the features of interest of the following collieries, works, etc., seen by the visitors when in the North of England: North-Eastern Railway Co.'s Dunston coal-shipping staithes, at Dunston-upon-Tyne; North Pier, Tyne Harbour; Swan, Hunter & Wigham Richardson, Ltd's, shipbuilding works (with 16 slips) at Wallsend and Walker; Hylton, Wearmouth, Horden and Dawdon collieries, with their respective extensive workings and equipments; and Sir W. G. Armstrong, Whitworth & Co., Ltd's Elswick works (engine works and ordnance department). The concluding article in the pamphlet is an interesting short paper on "The Northumberland Pipes," indicating the connection of Northumbrian folk-music with Northern England and its bagpipe as early as A. D. 1225.

The *Mining Journal* of Ketchikan, Southeast Alaska, states that Mr. A. W. Geiger, superintendent of the Alaska Smelting and Refining Company, of which Mr. Paul Johnson is manager, reached Ketchikan on October 23 *en route* to Tacoma, Puget Sound, to look after a shipment of 850 tons of copper matte lately shipped from Hadley. Mr. Geiger is quoted as saying that this is the largest single shipment of matte yet made from Alaska. It runs about 40 per cent copper, 1.5 oz. gold and 3.5 oz. silver. Its total value is about \$140,000.

The cause of rust was recently discussed in the *London Engineer*. Experiments of Gerald Moody reported to the Chemical Society held that the presence of carbonic acid gas was necessary to oxidation of iron. From careful tests he showed that polished iron exposed to air and water for six weeks showed no signs of rusting, but when normal air was substituted for that freed from carbonic acid gas, oxidation began in six hours. Other correspondents say that, according to Prof. Calvert, dry carbonic acid gas did not oxidize iron, but the most rapid corrosion occurred in damp oxygen and carbonic acid mixed. Another says that water is positively necessary. The interesting point is that moist air containing carbonic acid gas is necessary for the rusting of iron, and that this does not occur when either is absent.

PROGRESS AT COAL MINES OF VANCOUVER ISLAND.

COAL-MINING on Vancouver Island appears to have recovered from the setback it received as a direct result of the San Francisco disaster about six months ago. It will be remembered that owing to the serious falling off in the demand for coal from that city, which had long been the chief foreign market for Vancouver Island coal, the Western Fuel Company of Nanaimo closed its No. 4 Northfield (also known as Brechin) mine, keeping only its No. 1 Shaft—Protec-

houses in all destroyed by the San Francisco earthquake. The great majority of those houses were of the smaller type, where coal was almost exclusively used for fuel purposes. For many weeks fires were not allowed to be burned inside the houses, and cooking was done on the streets, with the use of debris as fuel. This, of course, resulted in a tremendous falling off in the sale of coal. On top of this a new competitor arose—a stiff rival of coal—gas. The mains of the gas company were not seriously destroyed; they were quickly repaired, and the gas company made a strong bid for favour with householders,



Pithead at Western Fuel Company's No. 1 Shaft, Esplanade, Nanaimo, B. C.

tion Island mine at work. That the position has lately improved considerably is evident from the statements of John L. Howard, president of the company, whom the *Nanaimo Free Press* recently reported as having said:

"We hope to work both mines throughout the winter months, and by opening up new workings and adding to the number of the men in the Northfield mines as this new work will require, eventually turn out 1,000 tons a day there. If no unforeseen thing happens I hope to see the Nanaimo mines, in the course of a few months, turning out more than 2,000 tons of coal daily.

Talking of the falling off in the coal market last spring, Mr. Howard said there were about 16,000

the result of which was that the use of coal in many places was discontinued. Of course, with the reorganization of the city coal is being now more extensively used, and a canvass of Oakland and other parts of the State, and pushing the sale in various ways, has created a market that it is hoped will be able to take all of the coal the two Nanaimo mines can produce.

The Wellington Colliery Company, too, is understood to be finding its coal trade brisk. The *Nanaimo Herald* reports Andrew Bryden, superintendent of that company's coal mines at Extension, as having stated that although the demand for coal would justify the putting on of another shift at Extension, men are not available at present for so doing. There are still

some vacancies on the regular shift. If men can be obtained later it is probable another shift will be worked. There are at Extension about a dozen new arrivals—good miners who lately came from the old country. Mr. Bryden said further that the prospecting for coal lately done between Ladysmith and Extension, along the "short line" of railway, has shown up good coal measures, and if the demand for coal continues, as now seems probable, coal from those measures will be mined before very long. At the present time the demand for Extension coal far exceeds the supply, and Mr. Bryden thinks the market outlook is particularly good for Vancouver Island coal mines.

Not much information has been published of late concerning the Wellington Colliery Company's operations in the Comox district, where there are four coal mines being worked. Last year was a prosperous one for these mines, and when the year 1906 opened the prospects were that there would ere long be fully 1,000 employees regularly at work at the Comox colliery. The demand for coke has been greater throughout 1906 than for several previous years, both the Vancouver Island copper smelters having been operated every month and smelting works in Southeastern Alaska having also required a supply of coke.

Altogether, the probabilities are that the total production of coal and coke at the collieries of Vancouver Island in 1906 will considerably exceed the quantity that five or six months ago it appeared probable it would fall to. It is gratifying to note also that exploration and development are being continued, and that additional equipment is provided whenever required.

Mr. Horace J. Stevens' valuable publication, "The Copper Handbook," (Vol. VI., 1906.) was issued on October 15. Within 11 days some 2,500 of the 3,000 copies comprising the first edition had been placed, so a second edition of 3,000 copies was ordered. It is not unlikely that it will be found necessary to publish a third edition, so widespread is the interest in the copper industry, in connection with which Mr. Stevens' book is regarded as supplying comprehensive and generally reliable information.

The *Denver Daily Mining Record* observes: What counts in mining, as well as any other business, is not the occasional spurt, but the steady operation and average business done. The public should not be lured into any stock scheme where extravagant claims are made as to great averages. There are today many mines lying idle that have produced record ore, running as high as \$250,000 a ton in gold, but nobody ever got very many pounds of that kind of stuff out of them. The milling proposition is the usual "stand-by," and if a concentrating plant of sufficient capacity can be erected to treat a vast amount of ore, it will do infinitely better business than the knife-blade enterprise that ships a few sacks occasionally of scattering ore.

LEAD-MINING IN BRITISH COLUMBIA.

An Authoritative Review of Progress Made Since Payment of the Bounty on Lead was Commenced.

LEAD-MINING in British Columbia has been in a more flourishing condition during the greater part of 1906 than, probably, at any other time in the history of the industry in the Province. This is due in large measure to the comparatively high price of lead, although it is to the very helpful influence of the bounty on lead granted by the Dominion that must be attributed the activity of the lead mines, few of which would have been in a position to take advantage of the prevailing high price had it not been that they had the substantial assistance of the bounty during the two years and a half over which that almost indispensable aid was spread until market value passed the limit up to which the bounty is payable. Another important factor in bringing about present favourable conditions is the very material help given by the management of the Canadian Smelting Works at Trail (now owned by the Consolidated Mining and Smelting Company of Canada) in finding a market for British Columbian metallic lead and so overcoming what had been a very serious obstacle to progress in lead-mining in the Province. Still another inducement to the development of the lead mines was the prospect of the zinc, occurring in association with lead in large quantities of ore, becoming marketable at a profit, a prospect, by the way, that for the time is somewhat clouded. These several incentives to a renewal of the production of lead have combined to bring prosperity to the industry with the resultant working of many properties that had long been idle.

At such a time it is of interest to note the fluctuations of production during the period of twenty years (including 1906) over which official records extend. The quantity of lead produced and its value (calculated as 90 per cent of the average New York price for each year) are shown in the following table, which is taken from the "Annual Report of the Minister of Mines for British Columbia":

Year.	Lb.	Value.
1887.....	204,800	\$ 9,216
1888.....	674,500	29,813
1889.....	165,100	6,498
1890.....	Nil.	Nil.
1891.....	Nil.	Nil.
1892.....	808,420	33,064
1893.....	2,135,023	78,996
1894.....	5,662,523	169,875
1895.....	16,475,464	532,255
1896.....	24,199,977	721,384
1897.....	38,841,135	1,399,517
1898.....	31,693,559	1,077,581
1899.....	21,862,436	878,870
1900.....	63,358,621	2,691,887
1901.....	51,582,906	2,002,733
1902.....	22,536,381	824,832
1903.....	18,089,283	689,744
1904.....	36,646,244	1,421,874
1905.....	56,580,703	2,399,022
Total.....	391,517,075	\$14,958,161

The figures for the still incomplete current year are, of course, not yet obtainable, but it is noteworthy that the average New York price of lead for the ten expired months of 1906 is 5.625 cents per lb. as compared with 4.707 cents for last year. It is therefore not unlikely that the total value of this year's lead production will be somewhere near that of 1905, even should it happen that recent interruptions to the operation of the lead smelters at Trail and Nelson shall be found to have unfavourably affected the production of metallic lead.

As of especial value in connection with the consideration of this subject, the views of Mr. G. O. Buchanan of Kaslo, West Kootenay, necessarily one of the best informed men in the Province concerning its lead-mining industry, are quoted below. Recently Mr. Buchanan, who in the capacity of distributor of payments earned under the Lead Bounty Act has special facilities for ascertaining the actual facts of the situation, has been interviewed. The information that follows has been taken from two published interviews.

Speaking at Victoria to a representative of the *Colonist*, Mr. Buchanan said:

"As regards the extent of the industry, there are 300 who have claimed bounty within the three years of the history of the bounty act. The bulk of these are not largely producing mines at present, but there are amongst them some big and thriving enterprises, such, for instance, as the St. Eugene at Moyie in East Kootenay, a great dividend paying concern; the Sullivan, at Kimberley, East Kootenay, a large and prosperous undertaking, owning its own smelter; and other large producers, the North Star, Slocan Star, Ruth, Payne, Reco—too long a list to mention individually—all in either the East Kootenay or Slocan district.

"A number of mines in the Boundary country also produce lead, but are not lead mines but silver-gold propositions carrying lead. There are various lead properties in Northern British Columbia, but so far only one shipment of lead has been actually made to the smelter from that region. The mine was named the Carbonado in the Skeena division.

"All smelters treating lead ore make their returns to me," continued Mr. Buchanan, "and upon such returns the payment of bounty is based. The appropriation for this purpose is \$500,000 per annum. Of this, in the first year \$193,000 was utilized; in the second year \$337,000, and in the third year \$85,000.

"At first glance, these figures would seem to indicate, though in a manner entirely misleading, a considerable shrinkage in the industry: but this is far from being the case, and the true explanation is found in the fact that the bounty payment system is based upon a sliding scale and begins to decrease when lead is quoted at £12 10s. per long ton on the English market, and when the price reaches £16 per ton the bonus becomes extinct. It is owing, therefore, to the relatively high price of lead on the London market in recent years that the payments of bounty have so greatly decreased; indeed, as a matter of fact, no bounty has been earned since April last.

"The industry, however, is in a flourishing condition, and with the price of lead in London at £18 10s., producers are doing better than for a long time. The production of the large mines has been increased in consequence.

"The general situation is this—that whereas the production of lead before the bounty began was 8,000 tons per annum, part of which was sent out of the country for smelting, production is now going on at the rate of 30,000 tons per annum and every pound of it is being smelted at home. During the first year, a special privilege was conceded whereby lead sent out of the country for smelting participated in the bounty paid in Canada, to the extent of two-thirds of the value of same, or say \$10 per ton of lead.

"The method adopted in the payment of bounty is as follows: Sixty per cent is payable on presentation of the claim showing that the ore has been delivered for smelting at a smelter in Canada; the remaining 40 per cent is payable at the end of the fiscal year upon proof that the ore so delivered has actually been smelted.

"The payment of bounty on exported ore was only in force for one year. The Government reserved to itself the right to pay such bounty on exported ore in order to guard against excessive rates being charged by smelters at home. The act was primarily intended for the benefit of miners. Smelters for one year assented to the payment of bounty on a limited portion of ore because a larger quantity was in sight than they could with advantage handle on short notice."

Regarding the present position of the smelters, Mr. Buchanan said: "The lead smelters at Trail, Nelson and Maryville are now in a position to handle all the tonnage that may be brought to them; and not only to smelt it, but, what is more difficult still, to find a suitable market for it. Smelter rates have been reduced from about \$15 for freight and treatment which miners formerly paid, to an approximate \$12 rate, according to the grade of the ore treated.

"The difficulty with regard to finding a market for the product is due to the fact that the Canadian market is not large enough to take the whole bulk of the production, and the consequence was that the overplus had to be shipped to Europe, where, on the London market, it came into competition with the cheapest lead in the world, and in addition to this the freight from British Columbia to Europe was a very heavy item.

"Now this surplus is being shipped to the Orient. Some quantity has been going there for the last five years, but it is only within the last two years that our producers could sell their whole output in that market.

"To sum up the whole position, the outlook of the lead industry in British Columbia is good and there is a certainty of continually increasing production; in volume perhaps it cannot compete with copper, but it will eventually become a great industry in this Province.

The total of lead produced in South Kootenay and Southeast Yale last year was 28,000 tons, against 18,000 tons in 1904. The total value of mineral pro-

duction in these districts for last year was \$17,000,000, against \$13,000,000 in the previous year. This year it was hoped that the output would have reached the sum of \$20,000,000, but owing chiefly to the strike of the workmen in the Crow's Nest Pass district, it is more than doubtful whether this desirable result will be realized, as that labour dispute will practically entail the loss of the last few months of the year."

The second interview follows:

"In the three years since the bounty on lead was instituted the production of that metal in British Columbia has increased threefold. On July 1, 1903, when the bounty was first given, the St. Eugene and Sullivan mines in East Kootenay, now the two heaviest producers, were idle. The latter was practically abandoned, leaving an unfinished smelter on the ground. In the Slocan, also, the effect has been equally good. Many small properties that were previously idle are being worked, some of them by lessees who are doing very well. The statistics show this. In 1904 the Slocan produced 10,611,227 lb. of lead from 70,296 tons of ore, while in 1905 5,399,330 lb. were produced from 88,279 tons. This shows that lower grade properties are being worked, which is further accentuated by the fact that the average silver contents of last year's ore were much lower than those of the previous year.*

"But the most important thing is that British Columbia smelters are successfully competing against the world, and all the ore produced is smelted within the Province. The bounty is 75 cents per 100 lb. until the price of lead reaches £12 10s. a long ton. After that it is reduced in proportion to the rise in price until at slightly under £16, no bounty is paid. The latter price was reached, for the first time, about the end of last year. A slight drop made the bounty payable until April 1, last, but since that time the price has always been above £16 per ton, and no bounty has been asked for. To-day lead is worth £20 per ton on the London market. This is a very high price, but there will probably be a fall—perhaps to £15 per ton, but I do not think we will ever see £12 lead again. That was the price when the bounty was first given.

"This low price is reasonable of explanation. Lead was largely mined in this Province as a by-product to silver. The latter was looked for, and so much lead was produced—as one may term it 'on the side' that the market became overstocked. The bounty, however, caused lead to become the principal object of the smelting, as with it payable ores with very low silver values could be successfully mined.

"The lead smelters of the Province are among the best in the world. They are worked very economically, and pay as good prices as almost any. There is only one thing in which they suffer by comparison with some in Europe. Zinc is penalized where it

reaches more than 10 per cent of the total contents; while some of the European smelters do not impose this penalty, but pay for the zinc and other by-products, such as antimony. Another notable feature of the lead industry in this Province is that, since the opening of the Trail refinery, about half of the lead produced has been refined in British Columbia. Roughly speaking, this half goes to supply the market in Eastern Canada, while the remainder, after being smelted, is exported to the Selby works, near San Francisco, California, in bond, where it is refined and afterwards shipped to the Orient.

"The Canadian Metal Company, which has completed its zinc smelter at Frank, Southwest Alberta, gave notice recently that it would apply for its share of the bounty on the lead contents of its ores. Zinc smelting is an altogether different process to that employed in the treatment of lead. Instead of large amounts of ore being smelted in a stack the zinc ores are ground to powder, mixed with coal dust, and put into what are termed 'mufflers'—moulds of fire clay, that only hold about a hundredweight each. These mufflers are open at both ends and are set in a rack like the cells in a honeycomb. One end is subjected to a heat of 3,000 deg. from a gas flame, while the other opens into a cooling retort. Zinc is the most volatile of metals. When the heat mentioned is reached it is thrown off from the ore in the form of fumes, which, on reaching the cooling chamber, become solidified and are deposited as metallic zinc. The Frank smelter is a first-class establishment, and it has already produced some metallic zinc from ore mined in the Lucky Jim, in Slocan. I do not think there will be any trouble about the Canadian Metal Company's claim for the lead bounty. A zinc smelter will not receive ores containing less than 40 per cent of that metal, so the lead contents would not be very great. What lead the plant at Frank may obtain will be found in the slag taken from the mufflers after the zinc has been extracted. This would have to be taken to a lead smelter and treated in the same way as any other lead ore. Whether the Frank smelter is entitled to the bounty or not is a matter for departmental decision.

"The enormous production of East Kootenay district, viz., over 86 per cent of the production of last year, is distinctly traceable to the lead bounty. In 1902, the year before it was given, Fort Steele mining division only produced 1,509 tons of lead, while last year it produced 24,124 tons. That, and the working of low grade mines in Slocan, are both traceable to this bonus."

In its "Market Gossip" the London *Critic* said on October 13: Amongst the mining cables published this week, that relating to Cariboo Consolidated is worthy of special mention. It shows that the gold won during the first week in October was 133 oz. from 132 yd. I hear that the precious metal met with is heavy lead gold, nearly all of it ranging from \$2 to \$6 pieces. Heartly congratulations to Sir Bevan Edwards, Mr. John Girdwood, and others who have been instrumental in bringing this enterprise to a successful stage.

*Note.—The official returns, as published in the "Annual Report of the Minister of Mines," show that in 1904 the Slocan produced 70,296 tons of ore containing 1,540,170 oz. silver—an average of 21.7 oz. per ton; in 1905 the silver contents of the 88,279 tons produced were 1,045,948 oz.—an average of a fraction under 12 oz. per ton.—Editor B. C. MINING RECORD.

THE BLACK-SAND INVESTIGATION BY THE
UNITED STATES GEOLOGICAL
SURVEY.

BLACK-SAND is known to occur in different parts of British Columbia, its presence in gold-placer districts being demonstrated in most places where placer mining is carried on. This being so the results of the investigations and extraction experiments of the United States Geological Survey at Portland, Oregon, are of much value to placer miners in this Province. In this connection the following letter to the *New York Engineering and Mining Journal*, published in its issue of October 27, will doubtless be read with interest:

In response to your request for information concerning the Black Sand and Gold Recovery Company, of Chicago, I write to advise you that the statements of this company indicating that it has the monopoly on the processes used by the Geological Survey in investigating the black sands of the Pacific slope are at least rather misleading. The Geological Survey, when directed by Congress to investigate the useful minerals contained in the black sands of the Pacific slope, sent out a circular of invitation to all the placer mines to send us samples of their heavy sands remaining in the sluice boxes, for investigation. We have examined about 4,000 of such samples, and in many cases found surprisingly large amounts of gold being thrown away in these heavy sands by the placer miners, on account of difficulty in extraction.

With the co-operation of Prof. R. H. Richards, of the Massachusetts Institute of Technology, we investigated also the best means for extracting the useful minerals from the black sands. For this purpose we invited manufacturers of concentrating machinery to send their machines to our plant in Portland, Oregon, and there we assembled concentrating machines of various standard types, but we did not test any owned by the Black Sand and Gold Recovery Company; therefore we are not in a position to speak of the value of its apparatus from any actual tests made, nor is it at liberty to state that we are at all conversant with its machinery. I have watched its magnetic separator in operation, and it seems to do very good work as far as one can tell without any actual tests. I happen to know that this company has nearly finished building a dredge of standard type in Portland, Oregon, and has given, thus, evidence of intention to go definitely into black-sand mining, just as any other corporation is at liberty to do with its own machinery, or with such machinery as we have tested at Portland.

Far be it for me to condemn any enterprise tending to make use of these waste materials; but, on the other hand, I must protest against the assumption by this company of any special advantage over any other company except in so far as its machines (which we have not tested) may prove of special value; and it is only common sense to call attention to the fact that this company is offering for sale stock in a five million dol-

lar company at a low rate per share without first having any plant in successful operation.

I should like to take this opportunity to call attention to the extremely fair way in which the results of our work have been reported, not only by the technical press, but by the daily press, and the fair way in which the results have been handled by the placer miners themselves. It seems hardly possible that 4,000 results could have been reported to the placer miners, many of them showing considerable value in these waste products, without some booming of properties being the result. But, so far as I know, nothing of the kind has taken place, the miners simply evincing an earnest desire for accurate information concerning this new method of utilizing their waste products. The result has been a new field of usefulness, in cleaning up in placer mining by means of concentrating machines of the shaking-table class.

The only case where an *apparent* effort to boom a property has resulted from this work was rather an amusing incident, about which an effort to make capital to the discredit of the Survey was attempted by a mining paper. It was in the case of a concentrate sent in by our special request from a placer miner in Albany county, Wyoming (on account of the fact that Professor Knight found platinum in placers in this region some years ago). The result of the examination of this concentrate showed that it did not contain platinum in appreciable amount, but it did contain over \$800 in gold to the ton of the concentrate, which meant to the owner a reasonably high amount of gold in the original sand. The owner is an engineer on the Union Pacific Railway, and of excellent reputation. He inadvertently showed the result to a newspaper reporter, who, actuated by local pride, multiplied the value of the concentrate by ten and sent out a "booming" press despatch, which, however, did not even serve to turn the head of the owner of the property, who had not, and never has had, any idea of projecting any boom by such means.

On the other hand, it is well to call attention to the fact that very successful commercial enterprises have already begun to reap the benefit of this investigation and to point, for example, to the success of the old mine at Gold Bluff, Humboldt county, California, where, with an entire cost of new installation of \$650 worth of machinery, including freight and expenses of installation, concentrates containing more than \$4,000 worth of gold, and, what is more significant, more than this amount of platinum, have been obtained as a result of three months' work.

DAVID T. DAY,

Chief of Division of Mining and Mineral Resources.
Washington, D. C., October 9, 1906.

It will probably be January before all the improvements at the Dominion Copper Co.'s smelter at Boundary Falls will be completed, said the *Greenwood Ledge* last month. These works will thereafter be able to handle 1,200 to 1,500 tons of ore daily.

FRANKLIN CAMP, IN BOUNDARY DISTRICT,
AGAIN VISITED BY GEOLOGICAL
SURVEY OFFICIAL.

FRANKLIN CAMP, in the Boundary district of British Columbia, has again been visited by a member of the staff of the Geological Survey Department of Canada. In 1900 Mr. R. W. Brock, of the Survey, whose name is well known in connection with the geology and mining industries of the Kootenay district, made an examination of Franklin camp, which is situated up the north fork of Kettle River, about 45 miles by wagon road from the town of Grand Forks. In his report of that visit, after describing the gold-bearing rocks of the district Mr. Brock gave particulars of the more promising claims, especially the Banner and the McKinley, and spoke encouragingly of the prospects and possibilities. At that time the camp was considerably hampered by two difficulties—first, that of transportation, being then three days' travel from Grand Forks, and, second, that bug-bear then so often the reason of delay in development in mining camps, namely, the ridiculously high prices put on their claims by prospectors, who seem to think that because a lode happens to carry valuable mineral it necessarily contains it in paying quantity.

Mr. Brock has lately returned from a second visit to this camp, and his views on it will shortly be included in the Summary Report of the Geological Survey which the Director has, it is understood, decided to bring out as soon as possible after the return of the field officers, instead of publishing it in June or July of the following year, when it would have lost half its value. Meanwhile it is learned that Mr. Brock is well satisfied with the progress made in the camp during the last six years. The McKinley, which has probably had \$30,000 expended on it, and the Banner are still two of the principal mines and are under development by a company, while the Gloucester, which at the time of Mr. Brock's visit was only down 15 ft., is being worked under bond by the Dominion Copper Company.

In general Franklin camp ores contain, beside their copper content, only a small value in gold, although the Gloucester ore is reported to carry nearly \$6 per ton, a proportion sufficiently large to be treated as a by-product if there are no chemical difficulties.

Several small companies are doing work on the Maple Leaf and other groups, and a number of prospectors are also busy on their claims.

The two above-mentioned initial difficulties have disappeared or at least are disappearing. The camp can now be reached in a day from Grand Forks and a railway is being constructed from that place, which will naturally considerably reduce mining expenses.

Moreover, the prospectors have brought their ideas of prices and values down to a business basis, and have realized that the mine purchaser of to-day wants something more for his money than a hole in the ground.

Mr. Brock sums up his views of the camp in the

following words: "While none of the claims are yet past the prospect stage (though the McKinley is developing satisfactorily), and none have been proved to any considerable depth, the camp possesses some of the ear-marks of a mineral-bearing district. Additional discoveries are extremely probable, and there seems to be a reasonable prospect of something in the camp developing into a mine."

GOLD DREDGING ON THE FRASER RIVER,
BRITISH COLUMBIA.

WRITING to the *Mining Journal* of London, England, Mr. H. G. Stringer, who for some time was in charge of the Fraser River Gold Dredging Company's dredging operations on the Fraser, lately contributed to that journal the following information:

Sir,—Bucket dredging on the Fraser River, although instituted as far back as 1898, has until the last 12 months met with scant success, but now that the principal difficulties have been overcome, the industry is beginning to go ahead, and in a few years' time will probably boom.

The chief causes of failure have been, first, the want of knowledge of the river, and second, the failing to take advantage of the knowledge when gained by the skilled practical men working the dredges. In the first place, sufficient notice was not taken of the ups and downs which had to be contended with in New Zealand, where dredging has been in vogue some 40 years, and where the industry has been brought to a great success. Many of the rivers in that country are very similar to the Fraser, and had the same class of machinery been more minutely studied in the first instance, a great deal of money would have been saved and success attained long ere this: the two main features for these swift-running rivers being strength and simplicity of machinery.

The first bucket dredge was put on the Fraser at Lytton by one John Cobbeldick. This was a powerful dredge, with 5-ft. buckets, and possessed many good points, but was, unfortunately, not adapted for bar dredging, wherein lay the Fraser's chief source of wealth. It possessed neither a projecting ladder nor tailings stacker, and to the want of these must be attributed one of the causes of failure of this dredge; but this could easily have been remedied, and the dredge could have rendered a good account of itself. As previously mentioned, the dredge possessed many good points; among the principal was the winch, which was powerful, easily handled, and suited in every respect to the river.

The second dredge, put on by the Fraser River Gold Dredging Company at Lytton in 1903, was a complete failure, although a special crew of experienced dredgers from New Zealand was brought over to work her. She lacked both strength and simplicity—the two essentials. She had five engines, as against two, and the pontoons lacked freeboard, and the decks being continually under water made it always a source of

great danger to the crew working her. This dredge commenced operations in 1904, but began to break down at the start. The winch was one of the first pieces of machinery to give out, it being incapable of pulling the dredge ahead or raising the ladder. This was replaced, and operations were commenced on a neighbouring bar, but owing to the continual breakdowns and the returns not being sufficient to keep her going, it was deemed advisable to shift her 10 miles down river, with the object of prospecting another claim. This was a risky undertaking, owing to the lack of freeboard, and many accidents occurred on this perilous voyage; the ladder and stacks were both lost, and the dredge all but swamped on several occasions. She, however, eventually reached her destination after magnificent handling. Repairs were then carried out, and the dredge prospected and located good payable ground before being put out of commission.

Another dredge, put on by the Iowa & Lillooet Dredging Company in 1903 at Lillooet, was altogether a better dredge, although considerable trouble occurred at the start. After several improvements had been carried out, this dredge met with, and is now working with, every success.

Dredge No. 4 is a New Zealand dredge; has, in fact, worked there, when it was bought by a small party of New Zealanders, and has been recently re-erected at Yale. This is a powerful dredge, and is without doubt the best that has been put on the river, although as yet possessing no stacker. If this company fails, it will not be the fault of the dredge, although they will doubtless have some pointers to learn with regard to the river.

There is yet another dredge about to be placed on Big Bar, about 30 miles above Lillooet. A company has been floated; plans have been obtained from New Zealand, and are being revised to suit the river by men who were originally brought over by the Fraser River Gold Dredging Company. I am satisfied that this is the correct method of bringing the business to a successful issue, and I confidently expect great things of this company.

Now as to the river itself. It generally has a varying current up to 15 knots. It is a river that is continually rising and falling, and is seldom stationary for any lengthy period. It usually attains its highest point in June, and its lowest in March. The rise and fall in the year varies from 25 to 50 ft. When at its highest there is considerable drift wood, and in winter at times heavy-running ice and "mush" ice—the latter being very difficult to contend with as it apparently rises from the bottom of the river; but this is only felt when dredging in the current. It is possible to dredge nearly all the year round. The ground is in most places very heavy, and is very difficult to break through. It consists mostly of large boulders and gravel, and is easy to treat. The gold is fine and flaky, and is easily saved.

The chief source of wealth has been found generally in the base, where good gold is obtained at full dredging depth—about 30 ft.

The bed of the river varies considerably in depth, for which reason it is generally impossible to work, and in the future I think operations will be confined exclusively to the bars, which from the present results yield from 10 to 20 cents to the cu. yd. Running expenses should not exceed 5 cents per cu. yd., but this, of course, depends on the capacity of the dredge.

H. G. STRINGER,

Late Manager, Fraser River Gold Dredging Company.
London, W., October 15, 1906.

VISIT OF DIRECTOR OF GEOLOGICAL SURVEY TO BRITISH COLUMBIA.

MR. A. P. LOW, Director of the Geological Survey of Canada, appears to have been favourably impressed with the capabilities of British Columbia as a mineral Province, notwithstanding that his visit to this Province last summer was too short to admit of his giving more than a few of the larger mining properties the time and attention necessary to a full knowledge and appreciation of the extent of development done in them and their value from a producing standpoint. Nevertheless he saw sufficient to convince him that the mining and smelting industries of British Columbia are on a substantial basis, are steadily growing in importance and are giving much promise of permanent and profitable operation. Further, the director's "flying visit," as it has been called, revealed to him the wide extent of mineral bearing country awaiting development, and its great need of all the assistance the Geological Survey can give it to aid in making known its geology and mineralogy, so as to encourage the employment of capital in the extensive utilization of its vast mineral resources. After Mr. Low's return to Ottawa there was printed some information giving a summary of his trip. From this the following notes have been abstracted:

Mr. Low first visited the coal mines of Crow's Nest Pass, East Kootenay. He found that at Fernie and Michel a large output of coal and coke is being made from the mines and ovens, which are not only operated to their full present capacity, but new workings are being opened to increase the output, for which a ready market is found, both in Canada and adjoining portions of the United States.

At Rossland and in its vicinity a distinct revival of mining has taken place, owing to new discoveries of richer ore in the deeper parts of the principal mines, discoveries which Mr. R. W. Brock, acting for the Survey, had predicted with considerable confidence. The work of Mr. Brock and of his confreres is much appreciated in the district, more especially owing to the renewed confidence it has imparted both to mine managers and prospectors.

At Trail, extensive alterations and additions were being made to the smelter, and similar improvements were taking place in Nelson, Grand Forks, Greenwood and Boundary Falls, showing that the output of the mines supplying these furnaces is of such a nature as demands more extensive plants for its treatment.

All the mines of the Boundary copper camps were active and their general tone appeared to suggest healthy improvement without any sign of an undesirable boom.

A hurried visit was made to the silver-lead districts of Slocan, where there is also an awakening, and several mines are working profitably. The finding of the vein in the Rambler-Cariboo mine at a depth of more than 1,200 ft. chanced to be coincident with Mr. Low's visit. This is of the greatest importance to the district, pointing, as it does, to the probability of the silver and lead ores being found at a depth previously unknown.

Near Hedley, in the Similkameen, the large Nickel Plate mine was visited and a trip was made over the adjoining properties. These gave surface indications of large ore bodies, and when the railway shall be completed and freights reduced to a reasonable figure it is expected these ores will prove payable.

Mr. C. Camsell, who was working along the Similkameen valley above Princeton, was seen at Hedley, and was quite enthusiastic about the large masses of ore in that region which, although low grade, will, he confidently believes, upon the completion of the railway, be found capable of being profitably worked.

The coast was reached on August 22, when Mr. O. E. LeRoy, who was working on the coast section about and to the northward of Vancouver, made favourable reports concerning the mineral deposits both of the mainland and Texada Island.

Summed up, Mr. Low's visit to southern British Columbia showed the existence of a renewed and increased activity in mining at all mining centres, and he came away with the feeling that the operations are now being conducted throughout those districts in a solid and legitimate manner with the object in view of making money, not from speculative dealings in shares, but from the actual output of the mines.

It is hoped a visit from the director will be of annual occurrence; that it will result in much mutual benefit to the mining interest and to the Geological Survey there can be little doubt. Mr. Low's endeavour to meet personally the principal owners and operators of the several camps and, where possible, to freely exchange ideas as to the present and future work of the Department is a step in the right direction. By this means and this only can a clear understanding be obtained as to the desire of the Department to help in every possible way the mining interest of Canada: at the same time the director receives valuable suggestions as to the manner in which such help may be given, and these suggestions it may be taken for granted will be acted upon as far as circumstances permit, thus increasing the usefulness of the Geological Survey and as well materially benefitting the mining industry of the Province.

The possibilities and probabilities of a proposition are sometimes at variance. In mining, we are so accustomed to the possibilities that we quite overlook the probability features.

COMPANY MEETINGS AND REPORTS.

DOMINION COPPER CO., LTD.

The annual general meeting of the Dominion Copper Co., Ltd., was held at Phoenix, Boundary district, B. C., on October 6. The following report of the meeting was taken from the *Phoenix Pioneer*:

The meeting was for the election of a board of seven directors and for such other business as might come before the meeting.

The directors' report and the financial statement and balance sheet for the year ending July 31, 1906, as follows, were read and adopted:

"Your directors respectfully present their report of the state and condition of the company for the year commencing July 31, 1905, when the present management took charge, and ending July 31, 1906.

"The report of the president, dated November 22, 1905, and mailed to each shareholder, stated the progress made up to that time in perfecting the reorganization of the Montreal & Boston Consolidated Mining and Smelting Company, Ltd., in transferring all its properties to your company, and in developing the mines and preparing to start the smelter.

"All claims against the company, or subsidiary companies, mentioned in the report, have been settled or successfully defended, so that at the present time the company and the subsidiary companies are free from claims of every nature.

"On January 31, 1906, your company purchased all the properties of the Montreal & Boston Copper Company, Ltd., including the smelter at Boundary Falls, B. C., and the Sunset, Crown Silver and C. O. D. mineral claims.

"The work of exploring and developing the properties of your company has been actively pushed under the supervision of Mr. M. M. Johnson, consulting engineer.

"The Rawhide and the Idaho claims are now in a position to furnish the additional tonnage necessary when the new furnace shall go into commission, and our output will be from 1,200 to 1,400 tons of ore per day, or considerably more than double our present capacity. The plant and equipment at the mines and smelter have been put into first-class condition.

"A number of economies in operation are being introduced at the mines and the smelter, including the equipment of both the mines and the smelter with electrical power in place of steam. The company has been using since last December about 600 h.p. per day, at a cost of about \$135 to \$140 per annum per h.p. When the electrical equipment is completely installed, the cost per h.p. per annum will be reduced to \$30. This will result in a saving of \$100,000 a year to the company over its present cost of power, as the company will be using at least 1,000 h.p. upon the installation of the new furnace.

"The new furnace, which has been built by the Traylor Engineering Co. has been shipped and will be installed as soon as it arrives. This is the largest furnace ever erected in British Columbia. It will have a daily capacity of about 800 tons of ore, and by reason of being equipped with the most modern devices it is expected that a saving of 20 per cent in fuel will be effected, and also a large saving in the labour required to operate it. These two items will aggregate over \$100 per day. The company has secured a new contract for converting its matte, which will reduce the cost of this work over 25 per cent.

"An analysis of the company's operations for the eight months of operation, December 1, 1905, to July 31, 1906, which has been largely a period of construction and development, shows 133,034 tons of ore smelted, producing 3,220.89 tons of matte, having a total value of \$640,128.97. The operating cost, including mining, smelting, converting, marketing and administration expenses, has been \$500,984.93, leaving a net profit for the eight months of \$139,144.04.

"The results of the economies already introduced are beginning to be reflected in the company's earnings. The operations for the month of July produced earnings of \$31,431.79, and on this basis the net profits of the present smelter for twelve months would exceed \$300,000. The new furnace will

more than double the present capacity, and the economies still to be completed will reduce the present cost of producing copper. Your directors believe the company will be able to produce its copper at a cost of not more than eight cents per pound.

"The company has taken options on a number of claims located in the district and is now engaged in prospecting and exploring these properties with a view of purchasing such as may prove to be valuable to the company.

"The financial statement and trial balance hereto appended set forth the condition of the company on July 31, 1906:"

Assets.

Mines, smelter and other properties, including a beneficial interest in certain of this company's stock acquired under the plan of reorganization:		
Cost as of July 31, 1905, including expenses of reorganization.....		\$3,744,312.79
Additions since:		
Smelter, equipment, etc.....	\$49,278.66	
Mine development and equipment	78,407.71	
Real estate, British Columbia..	2,975.00	
Miscellaneous	312.00	
		<u>130,973.37</u>
		\$3,875,286.16
Stocks and shares.....		1,792.50
Office furniture, New York and B. C.		740.00
Stores and fuel on hand.....		38,085.37
Sundry debtors:		
British Columbia Copper Co. acct. matte	\$117,476.50	
Miscellaneous, N. Y. and B. C....	3,013.06	
		<u>120,489.56</u>
Cash in banks and on hand:		
New York	\$17,789.93	
British Columbia	18,114.60	
		<u>35,904.53</u>
		<u>\$4,072,298.12</u>

Liabilities.

Capital stock authorized:		
500,000 shares of \$10 each.....	\$5,000,000.00	
Whereof issued:		
320,003 7-10 shares of \$10 each		\$3,200,037.00
First mortgage 6 per cent gold bonds due June 1, 1915:		
Total authorized	1,000,000.00	
Whereof issued		700,000.00
Sundry creditors:		
Open accounts, New York and B. C.	\$61,371.66	
Reserves for insurances and taxes	3,573.84	
Bond interest, coupons uncollected	1,440.00	
Bond interest accrued.....	7,000.00	
		<u>73,385.50</u>
Surplus account:		
Profit on eight months' operations to date, as Profit and Loss acct.		98,875.62
		<u>\$4,072,298.12</u>

Operating Account, November 27, 1905, to July 31, 1906.

Dr.

Mine operating accounts:		
Operating expenses	\$203,785.29	
Freight on ore.....	32,236.29	
		<u>\$236,021.58</u>

Ore purchased		3,315.05
Smelter operating expense:		
Sample mill	\$12,005.39	
Blast furnace	164,657.53	
Slag railway	10,457.08	
Power and light.....	20,571.26	
Pumping	2,227.77	
General expenses	1,370.11	
		<u>211,289.14</u>

General expenses, British Columbia:		
General	\$10,718.25	
Office	5,005.36	
Laboratory	4,077.51	
Travelling	1,455.85	
		<u>21,256.97</u>

Matte freight 418.66

General expenses, New York:		
Salaries of officers, etc.....	\$11,537.24	
Legal, mining expert and other professional services	11,358.75	
Travelling	2,408.78	
Rent, New York office.....	520.00	
General and office expenses.....	4,323.12	
		<u>30,147.89</u>

Balance, being profit on eight months' operations, carried down. 139,144.04

\$641,593.33

Cr.		
Sales of matte.....		\$640,128.97
Rents		1,464.36
		<u>\$641,593.33</u>

Profit and Loss Account.

Dr.		
Interest on 6 per cent first mortgage bonds		\$42,545.26
Exchange		128.78
Balance, being profit, carried to balance sheet		98,875.62
		<u>\$141,549.66</u>

Cr.		
Profit on operations account, brought down		\$139,144.04
Interest on bank deposits.....		2,405.62
		<u>\$141,549.66</u>

Directors and Officers.

The following is the list of directors elected for the ensuing year: Warner Miller, New York; Leopold Herrmann, New York; Samuel Newhouse, Salt Lake City; Arthur M. Wickwire, Boston; H. H. Melville, Boston; John M. Shaw, New York, and Alvin Untermeyer, New York. Mr. Miller, Mr. Herrmann and Mr. Newhouse were respectively president, secretary and general manager of the company during the past year, and will doubtless be re-elected to those positions at a meeting of the board of directors in New York. The only new member of the board is Alvin Untermeyer, who takes the place of Edward M. Neary.

Consulting Engineer's Report.

Maurice M. Johnson, the company's consulting engineer, recently reported to the president as follows:

I have just returned from a two weeks' visit to the Dominion Copper Company's operations in British Columbia, and wish to state that I made a thorough examination of all parts of the operations. Since your visit to the properties in February last, we have confined ourselves more particularly to the

development of the Rawhide and Idaho claims, and the results have been most satisfactory.

In the Brooklyn mine, we have found the ore between the 250- and the 350-ft. level, and about 50 ft. above the 350-ft. level, the character of which is the same as the upper ore, but in one or two places where we cut it the percentage of copper has been better, running about two per cent.

During our operations at the smelter, beginning Nov. 27, 1905, we smelted 133,084 tons up to July 31, which showed a net profit of \$139,144.04.

At the Idaho mine our tunnel has been extended to a distance of 476 ft. The first 200 ft. of this is in ore at a depth of 67 ft. under the surface. All our cross-cuts and raises in the Idaho are showing ore, as is also the 100-ft. level, from which we are drifting north and south, and had ore in the face of both drifts at the time of my departure.

Our ore bins are nearly completed at this point, and we are now using one-half of the bins for shipment to the smelter. The hoisting frame of the Idaho shaft is about completed, and the engines transferred from the Sunset mine are in position and ready for operation. The central compressor plant, foundation and building are about completed and ready for the reception of the machinery, which we have been promised would be on the way about this time.

At the Rawhide mine the work has been most satisfactory. All of the tunnel and open cuts have been blocked out and I think the developing of the mine will show up a very large tonnage of ore. During the month of July the ore from the Rawhide mine gave us an average value of 1.44 per cent copper, which is about what I figured this average would be when I first went to the property. We are also finding in No. 3 tunnel of the Rawhide some very heavy sulphide ore of a character that I have not heretofore seen.

The lowest level we have on the Rawhide will give about 125 or 130 ft. vertical depth on the ore, and as we are practically drifting from one side of the property to the other, it should give up at least 1,000 ft. of ore along the strike by cutting out several portions of waste, which seem to exist.

The new work at the smelter for the introduction of the furnace is going on as fast as we can possibly make it go at this time. Portions of our trestle and ore bins are up. The excavations for the furnace, stack and flue are completed and all our plans for sampling mill, conveyor and elevators finished, and all of the material ordered. I presume it will be some time about the first of January before we get going.

Concerning the Sunset mine—we are mining about 100 tons per day and the ore body is holding out satisfactorily in values, etc.

We have now under advisement two properties, which we will buy if our development work, which is now under hand, proves that the same would be valuable to us.

In the meantime, I wish to say that at no time during my connection with the Dominion Copper Company's mines have they looked so promising as at the present, and I have no doubt now that the mines will be capable of taking care of the increased tonnage as soon as the addition to the smelter is put into commission. The company should be able to extract its copper at a cost not to exceed eight cents per lb. of copper produced.

GRANBY CONSOLIDATED MINING, SMELTING AND POWER CO., LTD.

The annual general meeting of shareholders in this company was held in New York, N. Y., U. S. A., on October 2. The following report was submitted:

"It is with deep regret that we have to record the death, in February last, of Mr. John Stanton, one of our directors, whose advice and guidance are greatly missed by the board.

"The business of the company has been largely increased. The total tonnage smelted amounts to 832,346 tons, resulting in a production of 19,939,004 lb. of copper (fine), or an increase of over 40 per cent against the previous year.

"Two of the new, large blast furnaces, which became operative last fall, are working so successfully that it has been decided to reconstruct the six old smaller furnaces, which work is now in progress. Unfortunately, great delays were

experienced on account of the difficulty in procuring the necessary materials and accessory machinery. The probability, however, is that this work will be completed early next year and the smelting capacity will then again be largely increased.

"In November last a fire at the mine destroyed a large ore crusher, which for a few months greatly hampered shipments of ore to the smelter, as Tunnel No. 1 was practically idle for a time, during which all shipments had to be made from Tunnel No. 3. The local management deserves great credit for the efficient manner in which it met this emergency, without largely curtailing the current production. Since the completion of the new crusher, shipments have been made without any interruption.

"In view of the high prices for copper ruling since last fall, it has been deemed wise to mine large quantities of ore carrying a smaller percentage of copper than the average run of the mines. Active development work has been going on continually, and diamond drills have opened up large ore-bodies in the Victoria and Aetna mines, where a new shaft is now being sunk and the necessary improvements installed for crushing and shipping this output. The first shipment will, likely, be made by the end of this year.

"Development of the Gold Drop claims, which were purchased last summer, proved satisfactory, and for some months past shipments averaged over 200 tons of ore daily. A tunnel is being pushed toward the Monarch property, opening up satisfactory ore-bodies. The length and width is not yet fully determined, but indications point to large bodies of ore, a considerable portion of which will soon be available for hoisting. These developments have largely increased the tonnage of ore in sight over that extracted in the year.

"Further economies have been effected in practically all departments, again resulting in great savings.

"Under the circumstances, the board felt justified in paying two dividends of 3 per cent each on January 15 and May 15, respectively, amounting together to \$810,000. In addition, the available cash assets of the company were largely increased.

"Another dividend of 3 per cent has meanwhile been paid, viz., on September 15."

The balance sheet showed assets and liabilities, as at June 30, 1906, as under:

Assets.		
Cost of land, real estate, machinery, buildings, dwellings and equipment	\$14,895,044.22	
Stocks, bonds and bills receivable.....	45,429.32	
Cash and copper on hand.....	1,023,833.96	
Fuel and store supplies.....	187,334.38	
		<u>\$16,151,641.88</u>
Liabilities.		
Capital stock	\$15,000,000.00	
In the treasury.....	1,000,000.00	
		<u>\$13,500,000.00</u>
Issued stock	\$13,500,000.00	
Accounts payable (current for month)	102,466.87	
Dividends collected on liquidator shares	1,436.40	
Surplus	2,547,738.61	
		<u>\$16,151,641.88</u>

The following is a summary of the year's business:
Production.

The total production of metals and the average prices obtained were as follows. Corresponding figures for the fiscal year immediately preceding are given for purpose of comparison:

Produced.	1904-5.	1905-6.	Increase.
Copper, lb.	14,237,622	19,939,004	5,701,382
Silver, oz.	212,180	316,947	104,767
Gold, oz.	42,884	50,020	7,136

Sold at.			
Copper, lb.	\$0.1436	\$0.1778	\$0.0342
Silver, oz.	0.5830	0.6468	0.0638
Gold, oz.	20.00	20.00	.....
The total amount realized equalled: In 1904-5, \$2,749,145.02; in 1905-6, \$4,751,058.69.			

Costs.			
Working expenses at mines and smelter, freight, refining, selling and general expenses.....	\$2,697,164.81		
Foreign ores purchased.....	230,276.83		
			\$2,927,441.64

Cost per ton of ore, including all expenses, \$3.2988; net cost per lb. of copper after deducting value of gold and silver, \$0.0835.

Surplus.			
Surplus carried over from previous year	\$1,554,875.27		
Net profit for year ending June 30, 1906	1,823,617.05		
			\$3,378,492.32
Less exploration expenses	\$20,753.71		
Less dividends paid.....	810,000.00		
			830,753.71
			\$2,547,738.61

Expenditure on Capital Account.			
Expended in new construction, equipment at the mines, smelter and converter plants, etc.....	\$105,975.14		
For additional mining properties....	350,485.25		
			\$456,460.39

Other Particulars.
All development work, renewals and repairs have been charged to working expenses.

Mine development, 8,698 lin. ft.; diamond drill development, 11,505 lin. ft.

Granby ore smelted, 796,183 dry tons; foreign ore smelted, 36,158 dry tons; total, 832,346 tons.

Directors and Officers.
The board of directors, as now constituted, consists of George F. Baker, Jr., George Crawford Clark, Geo. Crawford Clark, Jr., Jay P. Graves, H. L. Higginson, B. Hochschild, Arthur C. James, Jacob Langeloth, George Martin Luther, Wm. H. Nichols, W. H. Robinson, Sanford H. Steele, Edwin Thorne, A. L. White and Payne Whitney.

The officers are: President, J. Langeloth; vice presidents, Jay P. Graves, G. M. Luther and G. C. Clark, Jr.; general manager, Jay P. Graves; local manager, A. B. W. Hodges; secretary, Northrup Fowler; treasurer, G. W. Wooster.

PROVIDENCE MINING CO., LTD.
The Providence Mining Co., Ltd., held its adjourned annual meeting at Greenwood, Boundary district, on October 18. The president, Mark F. Madden, was in the chair. The Nelson Daily News states that:

"The president's report showed a satisfactory record for the year, especially in view of the fact that shipments of ore have been made only during the past four months. During the balance of the year the efforts of the management have been directed toward thoroughly developing the mine and placing it in a condition where it would be possible to extract large quantities of high grade ore at little cost. The report states that 1,832 ft. of development work have been accomplished during the year, of which 1,669 ft. were drifting and raising and 213 ft. sinking. Of the latter work 205 ft. was in the shaft going down from the 400 to the 600-ft. levels. In prosecuting the work in the shaft the company was fortunate in being able to follow the ore all the way to the 600-ft. level.

"Shipments of ore were begun in the month of June, and until September 30 1,374 tons were treated, giving gross returns of \$117,230.74. This for shipments covering a period of only four months is gratifying indeed, and the company is to be congratulated upon the results.

"While taking out ore for shipment the management has been careful not to strip the mine, but development has been kept well ahead. No ore has been taken out below the 400-ft. level, and on the levels above large reserves are now blocked out and may be mined at any time.

"The financial condition of the company is all that can be desired. There is on deposit with its bankers and due from the smelter the sum of \$12,810, while the net earnings for the year over permanent improvements, development work and all expenses were 20 per cent on the par value of the capital stock issued. In addition to the cash on hand a 10 per cent dividend has been paid, this representing a cash payment of \$15,050.

"During the year permanent improvements of an important character were extensively made. New ore bins were erected and a new road with viaduct built to them. A new spur of the C. P. R. was secured, by which it is possible to load the ore cars by chutes from the new bins, thus doing away with the expensive method of hauling the ore in wagons to the C. P. R. yard and loading the cars by shovels. A new office was erected and comfortable quarters for the employees. A new powder house was built, also a stable and other permanent improvements made. The working of lower levels and the continually increasing output are making heavy demands on the machinery equipment and the purchase of larger machinery is necessary for the more satisfactory working of the mine. The company expects in the near future to install a full equipment of all necessary machinery."

The directors elected are: H. J. Fitzgerald, chairman; Frank Rudolph, D. B. Scully, M. S. Madden, J. B. Heeney, W. S. Macey, Dr. Frank Byrnes, and Mark F. Madden.

The officers appointed are: Mark F. Madden, president; Dr. Frank Byrnes, vice president; M. S. Madden, secretary; John B. Heeney, treasurer.

COMPANY CABLES AND NOTES.

CABLES.

British Columbia.
Cariboo Consolidated.—During September washed 537 cu. yd. of gravel, yielding 242 oz. of gold; everything looks most favourable.

Cariboo Consolidated.—(Published in London during first half of October.) During the present month washed 132 cu. yd. of gravel, yielding 133 oz. of gold. My report will be sent by today's mail.

Le Roi.—September: Shipments amount to 11,880 tons, containing 4,400 oz. gold, 6,100 oz. silver, 221,350 lb. copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, \$28,000. Expenditure on development work during the month, \$13,500.

Le Roi No. 2.—September: Shipped 2,100 tons. The net receipts are \$33,903, being payment for 2,422 tons shipped, and \$645, being payment for 43 tons concentrates shipped; in all, \$34,548. (Note.—This amount is, as usual, subject to mining and development charges.)

Tyee.—September: Smelter ran 14 days, and smelted—Tyee ore, 1,892 tons; custom ore, 219 tons; total, 2,111 tons. Matte produced from same, 181 tons. Gross value of contents (copper, silver and gold), after deducting costs of refining and purchase of custom ore, \$29,083.

Ymir.—September: 15 stamps ran 30 days crushing 1,240 tons of ore, producing 331 oz. bullion, having estimated gross value of \$3,750. Have shipped on account this month 120 tons of concentrates, having a gross estimated value of \$3,360. West drift from raise fine body of ore. Have discovered a good body of ore at level No. 6 east. Have been obliged to mill the ore from the upper workings, owing to new develop-

ments, otherwise returns would be better. The water has increased, but the supply is still short. (Office note—The above return shows an improvement in the value of the ore milled from \$4.45 (the average for the three preceding months) to \$5.73 per ton. The shortage of water has greatly reduced the month's output, as only 15 stamps could be operated instead of at least 30.)

U. S. A.

Alaska Mexican.—September: 120-stamp mill ran 30½ days; crushed 21,247 tons ore; estimated realizable value of bullion, \$33,052. Saved 324 tons sulphurets, estimated realizable value, \$24,057. Working expenses, \$38,605.

Alaska Treadwell.—September: 240-stamp mill ran 30½ days, 300-stamp mill ran 30½ days; crushed 90,580 tons ore; estimated realizable value of bullion, \$90,788. Saved 1,720 tons sulphurets; estimated realizable value, \$85,364. Working expenses, \$84,942.

Alaska United.—September: Ready Bullion Claim: 120-stamp mill ran 30½ days; crushed 21,140 tons ore; estimated realizable value of bullion, \$22,216. Saved 316 tons sulphurets; estimated realizable value, \$10,071. Working expenses, \$27,442.

DIVIDEND.

The interim dividend of two shillings per share declared last month by the Le Roi No. 2, Ltd., on its 120,000 £5 shares, payable in October, made a total of eight shillings per share paid during 1906, equal to £48,000, and a grand total of twenty-three shillings per share to date, equal £138,000. The several dividends paid in 1906 were—three shillings in February, two shillings in May, one shilling in July, and two shillings in October.

NOTES.

The first meeting of the recently formed E P U syndicate was held at Greenwood during September. Messrs. H. Bunting, M. McHale, Wm. Lawson and R. D. McAllister were appointed directors. Mr. Lawson will have charge of the development work to be done on the property, which is one of the high-grade gold mines of the Boundary Creek district.

The *Herald* states that several Nanaimo men who have been working on the hydraulic claims in Cassiar of the Rossella Hydraulic Mining and Development Co. have returned from the North, and continues: "It will be remembered that the party left here last winter to take some machinery into the property. Unfortunately they started too late and, the summer going out, were unable to get the heavy machinery in. They did considerable hand work on the claims, though, running sluicing pipes, etc., and are more than ever convinced of the value of the property."

The lately incorporated Vancouver Island Building Resource Co., Ltd., has in view the manufacture of bricks from lime and sand deposits of the proper character by a process lately perfected, and also the manufacture of lime and cement. The marble properties recently found at Nootka Sound are to be included in the company's operations as well, and 260 acres of land, including the marble deposits, have been secured for the purpose.

A press despatch dated Spokane, Wash., October 10, quotes W. O. Jones, secretary of the American Boy Mining Company, whose property is located near Sandon, in the Slovan district of British Columbia, as having said: "We have sold the right to use our No. 4 tunnel to the Last Chance Mining Company, and the sum received pays about all our debts. We can now use the assessments to continue development of the mine. Six men were put to work last week, and we are making an upraise from No. 5 to No. 4 tunnel."

The following are the officers and directors for the current fiscal year of the Pathfinder Mine Company, Ltd., which held its fifth annual meeting at Grand Forks, B. C., on October 20: W. K. C. Manly, president and manager; Geo. H. Rutherford, vice president; R. F. Petrie, secretary and treasurer; A. W. Fraser, C. M. Kingston and Thos. Newby.

The Northern Gold Mines Company, Ltd., of Indianapolis, Indiana, U. S. A., owning the Del Rey group of mineral claims, situated near Cambridge, Fish River district, is capi-

talized at \$1,500,000. Its officers and directors are: Rev. John R. Henry, president, R. M. Callaway, vice-president; William A. Zumpfe, secretary; J. H. Aufderheide, treasurer; C. E. Averill, consulting attorney, and D. M. Stewart, W. C. Thompson, Captain Byrom Dawson (U. S. A., retired), and R. K. Floeter, directors.

The quarterly meeting of the directors of the Sullivan Group Mining Company was held recently. Bruce Clendenning, the general manager, who had recently returned from the mines and smelter of the company at Marysville, East Kootenay, B. C., reported that everything was going on satisfactorily; that there were several thousand tons of ore broken at the mine ready to be shipped to the smelter, and that enough was delivered at the works to last for some time. He said the coal strike at Fernie will not cause a shutdown of the Sullivan smelter for some time at least, as there is sufficient coke on hand to keep the furnaces running until the last of November. It was also said that should it be closed for want of fuel the mines will be kept going. The foundation for the new Heberlein roasting furnace and the new rock breaker are in, and soon these necessary additions to the plant will be in operation.

WALLACE MOUNTAIN MINING CO., LTD.

The Wallace Mountain Mining Co., Ltd., has been organized at Greenwood, Boundary district. For some time the organizers of this company have been associated as a syndicate and have been working the Duncan and Bounty fraction mineral claims, situated on Wallace Mountain, west fork of Kettle River. The company will work the two claims with greater activity. During the past summer some fine samples of wire silver have been taken out of the Duncan, and work has been done on a ledge 23 in. wide. The same lead runs into the Bounty fraction, and the two will be worked together. Ore is being taken out and a carload shipment is to be made shortly. The Duncan is held at present under bond for \$10,000.

KRAO SILVER-LEAD MINING CO.

"The Krao Silver-Lead Mining Company, for the operation of the Krao mine at Ainsworth, British Columbia, was organized in Butte, Montana, October 13," states the *Miner* of that city. "It will be incorporated under the laws of the Territory of Arizona.

The capital stock is \$3,000,000, divided into 600,000 shares of a par value of \$5 each. The incorporators and directors for the first three months are Henry Mueller, president of the Centennial Brewing Company; George W. Irvin, postmaster of Butte, Carlton H. Hand, mine expert; J. O. Hodgkins, capitalist, and W. C. Lewis, capitalist, and member of the Lewis Dry Goods Company. The officers will probably be Henry Mueller, president; Geo. W. Irvin, vice-president, and W. C. Lewis, secretary and treasurer.

The property taken over by the new company is the Krao mine, purchased a few days ago by Walter C. Lewis and his associates. It is located near Ainsworth, on Kootenay Lake, British Columbia, and is one of the richest silver properties in the Province. The samples of ore from the mine were among the most magnificent ever brought to Butte, and on display at the office of the National Mining and Investment Company created great interest in the property.

"Within twelve hours after the announcement had been made that the property had been purchased by Butte people and that a company was to be organized for its operation, the entire allotment of 100,000 shares had been subscribed, and the books are now closed. The demand for stock was so great that orders for 50,000 shares had to be refused.

"It is the intention of the company to install machinery at once on the property for extensive operation, and W. E. Zwicky, who is in charge, has been instructed to prepare for a thorough development of the claim. Machinery will be installed with a capacity to sink the shaft to great depth.

"The ores being exhibited here are attracting wide attention. Particularly attractive is a specimen of solid silver which Mr. Lewis brought back with him, containing \$22 in value."

COAL NOTES.

Elijah Heathcote, provincial mining inspector for the Blairmore-Frank district, lately paid his periodical visit to the mines of The Pass. Mr. Heathcote makes his headquarters at Lethbridge, Alberta.

It is reported that the final survey of a railway up Elk River valley will be completed in the near future. The line will be about 40 miles long, and will be constructed by the Imperial Coal & Coke Co., which has 94 coal locations on Fording River.

At the Wallace Shipyards, False Creek, five scows are being built for Macdonald, Marpole & Company, for use in the transportation of coal from Vancouver Island mines to Vancouver City. The scows will be used in connection with the coal bunkers just completed by that firm on Coal Harbour.

At Nanaimo the information has been published that between 200 and 300 men are now at work in the Western Fuel Company's Brechin mine, and work is going on steadily. More men are being added, and from the present outlook there will be no lack of orders for all coal mined on Vancouver Island, at least for some time to come.

The West Canadian Collieries Company is making excellent progress with the development of its Bellevue mine, situated near Frank, Alberta. The entry is now in about 4,000 feet with the face in fine coal, and the output now averages about 400 tons a day. A new fan has been installed for the better ventilation of the mine. It is expected the output will soon be considerably increased.

The warming up of the new battery of coke ovens at the International Company's colliery at Coleman, Alberta, says the *Frank Paper* of October 26, was commenced during the week, when fire was put into the first 18 to be completed. The rest of the ovens are now finished with the exception of some filling and all will be ready for warming up in a few days. The tracks will then be laid for the electric larry which fills the ovens, and the battery will be ready for commission. It is expected that another week will see the new ovens ready for operations.

Concerning matters at Michel, the *Fernie Free Press* notes that only about ten men are now employed on the fire that is burning in No. 8 mine. Up to a week ago more than 50 men had employment on this job, but the fire being practically extinguished, only a few men are necessary to continue the work. The new extension to the boiler house is nearly completed. The finishing touches will be put on as soon as the rough work is completed. Some 30 men are employed on the excavation work for the new box-car loader on the west side of the tippie. It was found necessary to put in large pumps temporarily to pump out the large amount of water that seeps into the excavation. The loader, when completed, will be the best in the Pass.

A despatch published by the *Nelson Daily News* states that C. P. Hill, managing director, and G. W. Fowler, M.P., director of the Hillcrest Coal and Coke Company, were interviewed on October 6 by F. A. Sherman, district president of the United Mine Workers of America, and a committee of the locked-out miners of Hillcrest. After a pleasant interview, lasting several hours, an amicable settlement was arrived at. Hillcrest will be a straight union camp in future. The coal company intends to install a new and powerful up-to-date plant and develop the mine to produce 1,500 tons per day.

The Alberta Fuel Company, with a capital stock of \$100,000, in shares of \$100 each, has been organized in Spokane for the purpose of handling coal from the International and Alberta mines. The officers are: President, Andrew Laidlaw, Spokane; vice-president, J. C. Keller, Almira, Wash.; general manager, F. E. P. McMinn, Spokane. The company will handle the product of the Coleman mine, at Coleman, Alberta, owned by the International Coal & Coke Co., in which many Spokane people are interested, and also the coal of the Alberta Coal Company, recently acquired by Messrs.

Flumerfelt and Galer, and in which Spokane people are also extensively interested. The International Company has already shipped 25 cars of coal to the new selling company at Spokane.

A. S. Grant and N. A. Fuller, states the *Yukon World*, have bought the Sourdough coal property of 900 acres and the controlling interest in the Coal Creek Coal property of 480 acres. During the past 60 days 5,000 tons of coal have been mined and marketed from the Sourdough colliery. The Coal Creek Co.'s property is to be worked extensively. New levels are to be driven this winter, and it is the intention to have 6,000 tons of coal in the bunkers at the mines by the opening of navigation next spring. Both mines will be in continuous operation the year round and will not be affected by climatic conditions.

The Diamond Vale Coal Company is busy drilling on its property at the Forks, says the *Nicola Herald*. No time is being lost and two shifts are kept continually at work, with indications of good coal measures gone through on the way down. James Laird, foreman of the work, who is also a skilled diamond setter, came up recently from Vancouver Island to undertake his present duties. The management of the company is naturally reticent as to the results obtained from the drilling operations, but there is no doubt that there are good indications of a large body of coal awaiting development.

A mine managers' examination under "The Coal Mines Regulation Act, 1897," was held recently at Fernie, Crow's Nest Pass, beginning on October 23. There were four candidates for the first, four for the second, and seven for the third class, making fifteen in all. The examination was conducted by R. G. Drinnan of Fernie, for the Government, and John John of Michel, for the miners. All the candidates were from the coal camps of the vicinity. The results of the examination will not be announced for some weeks.

George J. Milton, manager of the company that is developing a coal deposit a short distance above Five Fingers, Yukon, was at Whitehorse on October 9 on his way to Detroit, where the headquarters of the company are situated, and where he will spend the winter. Mr. Milton told the *Whitehorse Star* that he was greatly pleased at the showing made by this season's work at the mine. The seam has been proved to be in place, of good dimensions and of a superior quality of coal. A number of tests have been made, and the coal has been proven to be of excellent quality for coking. Mr. Milton says he will be in position by next year to supply sufficient coal and coke to operate the smelters he believes will be located at Whitehorse in the near future.

TRADE NOTES.

In its review of some of the exhibits at the Canadian National Exhibition at Toronto the *Canadian Manufacturer* last month noted that the only display of leather belting on the grounds was that of D. K. McLaren, Montreal. This display consisted of rolls of belting of various widths and grades and for all purposes—showing that this company is prepared to meet any demand for good leather belting for any purpose.

The Jeffrey Manufacturing Company of Columbus, Ohio, U. S. A., has established a new Canadian branch office in Montreal, Quebec, at Lagachetiere and Cote Streets.

The Nernst Lamp Company of Pittsburg, Pennsylvania, U. S. A., has commenced the publication of "Lux, a Miniature Magazine of Light and Literature," which will be sent free to any address supplied to the publishers. Its contents are a happy mixture of light reading, as ordinarily understood—for amusement and instruction—and of information relative to the advantages of using the Nernst Light.

The United Zinc Company of Boston, Mass., which has been in communication with the commissioner of industries, will establish a factory at Toronto, Ontario. It will employ 20 men at first, and more later on.

BOOKS, ETC., RECEIVED.

- American Institute of Mining Engineers.*—Bi-monthly Bulletin, No. 11, September, 1906. Section I., Institute Announcements; Section II., Technical Papers and Discussions.
- California State Mining Bureau.*—Bulletin No. 42, showing by counties the mineral productions of California for the year 1905. By Lewis E. Aubury, state mineralogist.
- Illinois Bureau of Labor Statistics.*—Twenty-fourth Annual Coal Report of the Illinois Bureau of Labor Statistics, 1905; also the Seventh Annual Report of the Illinois Free Employment Offices for the Year Ended September 30, 1905. By David Ross, secretary.
- Illinois State Geological Survey.*—
Bulletin No. 1. *The Geological Map of Illinois.* By Stuart Weller. Pp. 24; with maps.
Bulletin No. 2: *The Petroleum Industry of South-eastern Illinois.* By W. S. Blatchley. Pp. 103.
- Institution of Mining Engineers, Newcastle-Upon-Tyne, England.* *Practical Problems of Mining*, a paper read before the Institution at its general meeting at London on June 14, 1906; with discussion thereon. By Sam Mavor, M.I.E.E. Pp. 66.
- Michigan College of Mines.*—Year Book of the Michigan College of Mines, Houghton, Michigan, U. S. A., for 1905-6, with announcement of courses for 1906-7. Also booklet containing a number of views to supplement the catalogue descriptions of a portion of the work at this college. Year book and views sent free on application to F. W. McNair, president.
- New Zealand Geological Survey.*—Bulletin No. 1 (new series). *The Geology of the Hokitika Sheet, North West-land Quadrangle.* By J. Mackintosh Bell, director of the Geological Survey Branch of the New Zealand Mines Department. Pages 101. With maps and a number of well finished half-tone views.
- Geological Survey of Canada.*—Annual Report (new series), Vol. XIV., 1901. Accompanied by 25 maps and is illustrated by reproductions of photographs and a number of figures in the text. The several parts composing the volume have been issued previously, as completed, separately. By Dr. Robert Bell, acting director.
- United States Geological Survey.*—
Geology and Underground Water Resources of Northern Louisiana and Southern Arkansas. By A. C. Veatch. Pages 422; illustrated by maps, diagrams and half-tones.
Ore Deposits of the Silver Peak Quadrangle, Nevada. By Josiah E. Spurr. Pages 174; with numerous half-tone illustrations, diagrams and a map.
Report of the Progress of Stream Measurements. Parts VIII, IX, X, and XI.
Manufacture of Coke, by Edward W. Parker; *Production of Sand and Gravel*, by A. T. Coons; *Statistics of the Clay-Working Industries in the United States*, by Jefferson Middleton. Advance chapters from *Mineral Resources of the United States*, Calendar Year 1905.
Geology and Mineral Resources of Mississippi. By A. F. Crider. Pages 99. Illustrated.
A Reconnaissance of the Matanuska Coal Field, Alaska, in 1905. By G. C. Martin. Pages 36. With maps and half-tone views.
The Bryozoa Fauna of the Rochester Shale. By Ray S. Bassler. Pages 137. Copiously illustrated with half-tone representations of many interesting fossils.
Reconnaissance of Some Gold and Tin Deposits of the Southern Appalachians, by L. C. Graton, with *Notes on the Dahlonega Mines*, by Waldemar Lindgren. Pages 134. Illustrated.
Record of Deep Well Drilling for 1905. By Myron L. Fuller and Samuel Sanford. Pages 299.

THE NEW VOLUME OF "THE MINERAL INDUSTRY."*

The new volume (Vol. XIV.) of "The Mineral Industry, Its Statistics, Technology and Trade," has been received from the publisher, *The Engineering and Mining Journal* of New York. As is well known, "The Mineral Industry" is an annual technical encyclopedia, incorporating the most recent developments and advances evolved in the mining and metallurgical world; embracing the latest statistics relating to the production and prices of the various minerals and metals throughout the globe; including, in addition, exhaustive reviews compiled by authoritative international experts on the technical progress made in the metallurgical field, together with detailed accounts of new processes, the whole providing a work of reference invaluable to all interested in mining and metallurgy and the products of these important industries.

The book has lately been reviewed by Dr. R. W. Raymond, whose lengthy and wide experience, and intimate knowledge of its subject matter, makes him especially well fitted to do it justice. The greater part of his comment follows:

The fourteenth volume of "The Mineral Industry," edited by Walter R. Ingalls, and covering the year 1905, appears somewhat late, if news be better than truth, but remarkably early, if truth be better than news. As a compendium of comprehensive and trustworthy information, it is not inferior to the best of its predecessors; and Mr. Ingalls deserves praise for his skillful labours in the preparation of this volume. In fact, it should be noted that the editorial work was finished at the end of May, and the time which has since elapsed has been occupied by the details of printing, proof-reading and binding. Only an experienced editor can realize how much patient toil and how much delay are involved in these mechanical sequences to the comparatively simple act of composition or compilation. In this case, not even the carefully prepared figures given in preceding volumes of "The Mineral Industry" have been repeated without correction. The statistics of former years have been laboriously revised upon later information, so that this volume supersedes as authority the statements of this class presented in its predecessors as the most reliable which could be made at the time of their appearance. Too much praise cannot be given to his patient process of approximation. Nothing is more discouraging or misleading to the student than the retention of inaccurate figures, once recorded, to vitiate all future estimates.

As in former years, the list of contributors comprises many eminent names. Besides Mr. Ingalls himself and Messrs. Hobart, Judd, Meeks, Parsons, Rice and Yale, of the editorial staff of the *Engineering and Mining Journal*, there is a goodly array of 44, including presidents and professors of American mining schools, representatives of state geological surveys, officers of professional societies and consulting engineers of wide repute.

(Note.—Here follows a list of contributors and contributions in full.)

Besides this, the work of high authorities appears in quotation. Thus, the admirable discussion of the present metallurgy of aluminum, presented by Professor Richards, of Lehigh University, at the Bethlehem meeting of the American Institute of Mining Engineers, is contained in Mr. Judd's chapter on aluminum; and abundant quotations and references in other articles put at the reader's disposal the latest technical literature.

To say that some of these contributions are more comprehensive and valuable than others, is not to disparage any of them. Judged by the evident purpose of the writer and the nature of his opportunity and materials, every one of them is worthy of praise. But in many cases there was nothing to do but add one year's record to the description of an indus-

*"The Mineral Industry," Vol. XIV., edited by Walter Renton Ingalls. 1906; 739 pp.; price, \$5.00. Published by the *Engineering and Mining Journal*.

try already exhaustively chronicled up to date in preceding volumes, and this additional record may have involved no important novelty. All that can be required of a contributor is that he shall not overlook such novelties in the field he has undertaken to cover. With this preliminary explanation, I proceed to mention a few of the articles which have impressed me upon a first reading as especially noteworthy:

Professor Autsin's summary of the progress of 1905 in the metallurgy of copper is a very full and interesting compilation, largely from foreign sources, not easily accessible to American students. Thus, M. Guillet's discussion of the alloys of copper with aluminum, zinc and manganese, in the *Revue de Metallurgie* of February, 1905, is here summarized, with numerous graphic illustrations; and Dr. Peters' admirable series of articles in the German periodical, *Metallurgie*, is condensed into a clear statement, and thus made available (I think for the first time) to those who do not read German. Moreover, leading examples of American practice in the smelting and refining of copper at Houghton, Mich., Rapid City, S. Dakota, Anaconda, Mont., Ducktown, Tenn., Cananea, Mex., etc., and of foreign practice at Kedabeg, Russia, (where petroleum is used as fuel) are reproduced from authentic sources. The whole article is a worthy appendix to a standard manual of copper metallurgy, and all the existing handbooks are incomplete without it.

Professor Brinsmade's account of the deposits and mining of tale in northern New York, gives a picture of a characteristic industry, developed under modern industrial conditions. A few years ago no one would have expected the opening of mines to furnish material for the manufacture of paper.

President Fulton's account of the progress of cyanidation during 1905 is intelligent and helpful, mainly as a guide to the literature of the year. Without entering into details, it indicates where they may be found; and it contains sundry general conclusions and criticisms which seem to me to be discriminating and sound. The burning questions and the principal improvements in this department are justly declared to concern the treatment of slimes in general, and the cyanidation of ores containing silver.

Prof. Hofman's article on "Improvements in Sampling and Assaying" is what might be expected from this accomplished and conscientious author. That his critical survey of the year's literature in this department has revealed nothing of special significance is not his fault. For his elaborate review of "Recent Improvements in Lead Smelting," Professor Hofman had a more fruitful field, and this article, covering both ancient and modern, American and foreign practice, is intensely interesting, as well as professionally valuable.

Mr. Hutchins' article on "Gold Dredging in 1905" is full of vigor and hard common sense. The modern dredging process does not require the expenditure of a large sum for pipe lines to bring water a long distance and deliver it under high pressure, or for bed-rock tunnels, to "bottom" auriferous deposits and furnish an escape for their tailings. It carries forward the dredge, in a travelling lake of its own making, provides the necessary hydraulic jet by steam pressure, and leaves the tailings behind without fear of "debris" suits or injunctions. Naturally, these features have powerfully attracted inventors, investors and adventurers, and, in many instances, dredges improperly constructed, or deposits of impracticable character have been included in enthusiastic, but ill-fated schemes. Such a sane discussion of its limitations and conditions as Mr. Hutchins gives is a wholesome corrective of wild schemes, while it does not at all impair the reasonable conclusion that the dredging process is a great improvement, which has come to stay, and which, prudently and skilfully handled, will immensely increase the production of gold by the exploitation of deposits otherwise economically unavailable at the present time.

Mr. James' brief but suggestive account of the "Progress in Gold-Ore Treatment During 1905" will be all the more welcome to American readers in that it chronicles chiefly the practice of South Africa and the Australian colonies, of the progress of which the author, as an officer of the Institution

of Mining and Metallurgy, in London, has special opportunities to keep himself posted.

Mr. Lesley's account of the cement industry, though much briefer than the importance of the subject would justify, is a stimulating and suggestive view of one of the greatest advances in modern constructive engineering.

Mr. Phillips furnishes, in his account of the quicksilver mining industry in Texas, an addition to our knowledge of the mineral resources of that vast, rich and still (to most of us) little known state.

I need not say that the contributions of Professor Richards on the year's progress in gold milling, ore dressing and coal washing are thorough and masterly. These subjects he long ago made his own, and so long as he continues actively to study, criticize and record the advances of theory and practice in these fields, no one will contest his leadership.

Professor Stoughton's review of progress in the metallurgy of iron and steel confined to a discussion of the improvements and changes of practice which seem to the author to have permanent value. Under this head, he includes, as real novelties, the Gayley dry-air blast and the application of electric smelting to the production of iron and steel. In both cases, his judgment is unquestionably correct; but in another particular, I think he has failed to realize the overwhelming significance of a feature of modern practice which he indeed mentions, but only to say that it has made no further progress in this country. I refer to the use of gas engines, run upon blast-furnace gas. In this country, only the Lackawanna Steel Company, I believe, has thus far adopted this improvement, and this company has encountered, as is usually the case with new devices, more or less difficulty in its operation. But if Professor Stoughton had been with us this summer, in England and in Germany, in which latter country engines furnishing more than 300,000 h.p. are already running upon the waste gases of blast furnaces, which we Americans simply throw away, he would not have lost the chance of declaring, as he might have done with perfect safety, that this great new economy is sure to conquer us, as it has victoriously conquered our brethren beyond the sea. In fact, the ironmasters of Germany, handicapped by scanty supplies of lean and impure ores, inferior fuel, and sundry other unfavourable conditions, have developed a degree of thorough and precise scientific management and minute and manifold economy far surpassing the present features of average American practice. We could learn much from them now, with immediate advantage. By and by, when we shall have skimmed and consumed the rich cream of our iron-ore deposits, and come face to face with more severe conditions, we shall be glad to learn many things to which we are now, in our wealthy way, relatively indifferent.

I must put an end to this desultory review, for lack, not of materials for further comment, but of available time on my part, and space on the part of the *Engineering and Mining Journal*. As I am quite aware, my notice of this volume contains little or no adverse criticism, and therefore reads like a "puff." But I cannot help that: I have gone through the book and honestly set down what I thought about it. It is a good book; and, being a good critic, I am obliged to say so, at whatever sacrifice of such reputation as I might have won by slashing and destructive comment.

* * * * *

Thirty-one collieries in the Newcastle district, New South Wales, Australia, and six interstate steamship companies, have established a combine with the object of controlling the output of the northern collieries of that State, amounting approximately to about 4,000,000 tons per annum, and regulating the price.

Hugh L. Cooper, the engineer who devised the plans to utilize the water power of Niagara, proposes to construct a dam 6,000 ft. long at Keokuk in order to utilize the water power of the Mississippi River. If built this will be the greatest dam in the world.

Malthoid Success Built On Merit

In less than five years' time Malthoid Roofing has become an established success among builders, architects and contractors throughout the civilised world.

THE REASON

Twenty-three years' experience and practical tests in the manufacture of durable weather and water proof roofings by The Paraffine Paint Company has enabled this Company to put into Malthoid the necessary materials and quality to withstand all the destructive agencies which a practical roofing must overcome to give proper protection to a building.

Malthoid is the standard of quality and is so considered by all competent judges.

Booklets free for the asking.

"We have just issued a special booklet showing the re-building of San Francisco, together with views of the ruins and will mail this book to you free if you mention this paper."

The Paraffine Paint Co.

405 Union Savings Bank Bldg., Oakland, Cal.

408 Occidental Avenue, Seattle, Wash.

MINING MEN AND AFFAIRS.

George H. Dickson, mining engineer of Coleman, Alberta, was a recent visitor to Rossland.

H. E. Croasdale, of Nelson, has gone to England. It is probable he will be absent from the Province about a year.

Mr. Leonard Leigh is directing prospecting work on the Camborne group of mineral claims, in Fish River camp.

J. E. Griffith, gold commissioner for Golden district, North-east Kootenay, has been spending a vacation at the Coast.

James Blick, manager for the Livingstone Creek syndicate, southern Yukon, has gone south on a four months' trip.

Carlton H. Hand, of Butte, Montana, U. S. A., was at Ainsworth early in October examining the Krao mine.

Henry Harris, superintendent of the Hall Mining and Smelting Company's smelter, has returned to Nelson from a visit to various smelting works in Colorado and Utah, U. S. A.

Frank B. Smith, chief of the provincial coal mine inspection department of Alberta, has resigned that office to take the management of a coal company at Edmonton, Alberta.

F. C. Merry of Ferguson, Lardeau, superintendent of the Ferguson Mines, Ltd., lately paid a visit to the Ruth mine near Sandon, Slovan, work at which he is supervising.

A Reuter despatch from Washington, D. C., states that the directors of the United States Mint have purchased 600,000 oz. of silver at 60.11 cents per fine oz.

B. N. Ouimette has removed from Rossland to Nelson. Near the latter town is situated the Referendum mining property, operations at which Mr. Ouimette will direct.

H. L. Frank, president of the Canadian-American Coal and Coke Company, reached Frank, Southwest Alberta, early in October from Montana on one of his periodical visits.

B. P. Little, who has charge of the Diamond Vale Coal and Iron Mines, Ltd.'s Garcia property in Nicola district, left on a visit to the Coast on October 29th.

Mr. D. D. Cairnes, of the Geological Survey of Canada, has been examining coal properties in the Whitehorse district, Yukon Territory.

A. N. C. Treadgold, of Dawson, came down from the Yukon by the S.S. "City of Seattle," reaching Vancouver on October 25.

N. A. Fuller, who with Dr. A. S. Grant has acquired various hydraulic mining, coal and electric light and power interests in Yukon Territory, arrived at Vancouver from Dawson late in October.

George T. Coffey, manager for the Anglo-American Mining Company, on Bonanza Creek, Yukon, left Whitehorse on October 20 on his way to California, where he will spend the winter.

Walter S. Keith, furnace superintendent of the Mammoth Copper Company's smelter at Kennet, Shasta County, California, has resigned to join the metallurgical staff of a large smelting company operating in Utah.

Alexander Sharp has returned to Nelson from the Windy Arm district, Southern Yukon, where he examined a number of mining properties for Wm. McKenzie, of Toronto, Ontario.

J. B. Tyrrell, formerly of Dawson, Yukon, is now making Whitehorse, Southern Yukon, his headquarters, having to look after the mining interests of Wm. McKenzie, of Toronto, at Windy Arm and neighbouring parts of the Yukon.

A press report states that Constable John Phillips of the Northwest Mounted Police has returned to Ontario from a two years' expedition to the Arctic Ocean, where the party he was a member of visited Herschel Island and other northern points. Coal in abundance was noticed along the banks of the Mackenzie River. One of it seems to have been burning for years. At some point on that river ignited gas was pushing skywards to a great height, and the natives said it had been burning for a great many years.

A. Blomfield Smith, of London, England, supervising engineer of the Klondike Mines Railway, came down from the Yukon early in October.

J. Cuthbert Welch, superintendent of the Alaska Copper Company's smelter at Coppermount, Prince of Wales Island, Southeast Alaska, according to the *Ketchikan Mining Journal*, intended visiting Seattle, Washington, during October.

R. G. McConnell, of the Geological Survey Department of Canada, passed through Whitehorse on October 18 on his way from Dawson to Ottawa, having completed his field work in the Yukon for the 1906 season.

Chas. E. Sweiberg, of Chicago, Illinois, U. S. A., secretary of the Laborers' Co-operative Mining Company, has been visiting the company's properties, situated in the Golden section of Northeast Kootenay.

A. B. W. Hodges, of Grand Forks, Boundary district, local manager of the Granby Consolidated Mining, Smelting and Power Company, Ltd., has gone to New York and other Eastern places on a business visit.

Thomas R. Drummond of Greenwood, general manager of the Dominion Copper Company, Ltd., came to Victoria at the end of October to recuperate after having been ill with typhoid fever.

F. W. Guernsey of Trail, one of the engineers of the Consolidated Mining and Smelting Company of Canada, has been examining mineral claims on Hall Creek, in the Duncan River section of the Ainsworth mining division.

Mr. M. S. Davys of Nelson, who has for several years been successfully operating silver-lead mines in the neighbourhood of Slocan Lake, contemplates shortly leaving British Columbia for England.

R. H. Stewart, manager of the several mines of the Consolidated Mining and Smelting Company of Canada, Ltd., has returned to Rossland from a month's holiday trip to Eastern Canada.

Maurice M. Johnson, of Salt Lake City, Utah, in his capacity of consulting engineer to the Dominion Copper Company, recently visited the Maple Leaf in Franklin camp, north fork of Kettle River, which property the company is prospecting under a working bond with option of purchase.

J. J. Fleutot, one of the directors of the Silver Star Mining Company, owning and operating the Cork mine and concentrating mill on the south fork of Kaslo Creek, lately paid a visit of inspection to the company's property, which is managed by A. Fournier.

W. F. Almy, of Boston, Massachusetts, U. S. A., president of the Argenta Mines Company, operating the Argenta mine on Hamill Creek, Ainsworth mining division, left the district on October 22 on his return to Boston after having spent several weeks at the mine, of which A. C. Garde is manager.

H. N. Galer, vice president and general manager of the International Coal and Coke Company, operating coal mines and coke ovens at Coleman, Southeast Alberta, was in Spokane early in October. Afterwards he left Coleman on a business visit to Winnipeg, Manitoba.

Mr. Byron N. White has returned to Spokane, Washington, from the Whitehorse district, Yukon, where he has been opening up some copper properties. He appears well satisfied with the prospects of his Yukon enterprise and will return in the spring to again supervise development.

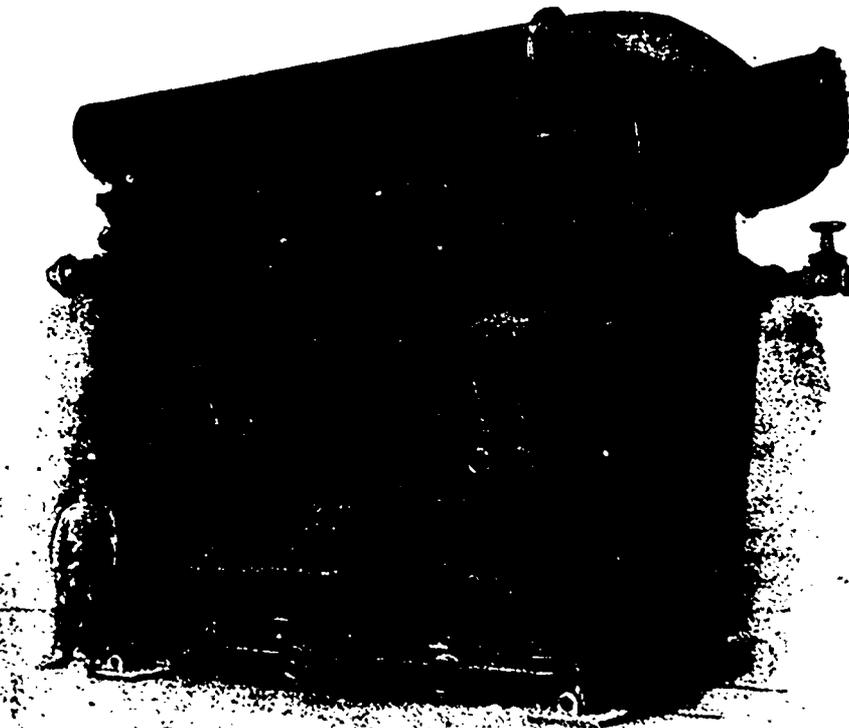
Conrad Wolfe, now of Chewelah, Washington, U. S. A., where he is manager of a copper mining property, lately revis-

Complete Mining And Metallurgical Plants

Engines and Boilers
Air Compressors
Stamp Mills
Safety Fuse
Wilfley Concentrators
Rock Crushers
Huntington Mills
Copper Furnaces
Winding Engines
Ore Cars
Locomotives
Rock Drills
Cyanide Plants
Chlorination Plants
Gold Dredges

W. H. C. MUSSEN & CO.
MONTREAL

SOLE CANADIAN AGENTS FOR
FRASER & CHALMERS, LTD.
ENGLAND.



COPPER FURNACE—Steel Water Jackets; Size 36 in. x 120 in. Steel Jacketed Matte and Slag Spouts.

ited Ymir camp, in which he continues to be interested in a number of mineral claims.

F. A. Hill has resigned the position of general manager of the Canadian-American Coal and Coke Company, Ltd., of Frank, Alberta, and George E. Wilstie that of secretary-treasurer. The latter had been the company's secretary for four years. S. M. Moore of Great Falls, Montana, has succeeded Capt. Hill as general manager.

James McKen, who was appointed gold commissioner for Cariboo, and to other offices previously filled by the late John Bowron, has severed his connection with the Provincial Government service so as to be free to give attention to his personal business affairs. Mr. McKen has resided in Cariboo for twenty-six years.

A. W. Geiger, superintendent of the Alaska Smelting & Refining Company's smelter at Hadley, Prince of Wales Island, left Ketchikan late in October for Tacoma, Washington, en route to Boston, Massachusetts, U. S. A., where he will spend a few weeks with his family, returning about the end of the year to Hadley.

Dr. J. Bonsall Porter, professor of mining at McGill University, Montreal, Quebec, when at Nelson lately with the Civil Engineers' excursion party secured a good collection of ores representative of mines in the Nelson mining division. It is understood that this lot of specimens will be added to the mineral collection at McGill.

H. H. Claudet, of the firm of Claudet & Wynne, assayers and metallurgists of Rossland, has gone to Mexico to supervise the installation of an experimental Elmore Vacuum Oil plant in connection with a process which is expected to quite outclass the old Elmore Oil concentration process in regard to simplicity, efficiency and economy.

Paul S. Coudrey, of Rossland, manager of the Le Roi No. 2 Company's mines, was at the Vancouver group mine, near Silverton, Slocan, about the middle of the month, directing operations there. The aerial tramway from the mine to the Wakefield mill is about completed, so the more expeditious handling of ore between those two points will be practicable hereafter.

Arthur Hickling, managing director of the Vermilion Forks Mining and Development Company, Ltd., has left Princeton, Similkameen district, for Vancouver, whence he will proceed to Ontario before returning to England. He has spent about three months in the Similkameen, where his company has varied interests, including coal lands, placer and lode mineral claims and townsite and ranch property.

R. B. Lamb has been replaced by F. A. Ross as general manager for the Daly Reduction Company, operating at Hedley, Similkameen. Mr. Ross is stated to have been a resident at Rossland in the early days of that camp. He was accompanied from Butte, Montana, to Hedley by J. C. Lalor, president, and Marcus Daly, vice president, of the Daly Reduction Company.

Charles Camsell, of the Geological Survey Department of Canada, who spent the 1906 field-work season at geological work in the Similkameen, visited the Boundary district en route to the Coast. He is now in Vancouver, where he pro-

poses remaining until next February, afterwards going to Ottawa for about two months, prior to taking up next season's field work.

Chas. Remy, of Douai, France, who some time since spent about two years in the Crow's Nest Pass District, and afterwards became one of the organizers of the West Canadian Collieries, Ltd., of Blairmore, Southwest Alberta, sends greeting through the *Frank Paper* to his numerous friends in the Blairmore-Frank district.

W. S. Drewry, of Drewry & Twigg, surveyors and mining engineers, has removed to Nelson from New Denver after having resided in the latter town eight or nine years. This firm has done much useful work in the Slocan district, including compiling and drawing the map of the Slocan mining camp reproduced as one of the illustrations of the valuable Report of the Zinc Commission now attracting much attention.

J. P. Rogers, formerly superintendent of the White Pass & Yukon Railway and recently manager of the several Conrad mining companies operating in the Windy Arm section of southern Yukon, has resigned to accept a responsible position with J. Heney, of the Copper River Railway, Alaska. H. W. Vance, formerly superintendent, has been appointed manager for the Conrad companies.

Neil McL. Curran, manager of the North Star mine at Kimberley, East Kootenay, is back from the East, whence he went to make arrangements for the working of the Stemm-winder property, upon which he lately discovered a promising showing of ore. The Cranbrook *Herald* states that Mr. Curran formed a company for operating the Stemm-winder and that the mining of ore will be proceeded with. It is intended to install a power plant on the property early next spring.

W. W. Leach, of the Geological Survey of Canada, the staff of which department he rejoined last spring, after having been for several years engaged in geological and engineering work, first for the Crow's Nest Pass Coal Company and later with the West Canadian Collieries, Ltd., both working coal mines in the Crow's Nest Pass district, shortly after his return from his season's field work in the Bulkeley country, Skeena district, was married to Miss Jean Johnson. The ceremony took place in Vancouver, whence Mr. and Mrs. Leach proceeded to Fernie, Southeast Kootenay, to visit friends before making their home in Ottawa, Ontario.

W. C. Thomas, superintendent of the Dominion Copper Company's smelter at Boundary Falls, Boundary district, is back from a visit to New York and other Eastern points. While away he succeeded in hastening the shipment from the manufactories of plant and machinery ordered by his company some time since in connection with the considerable enlargement of its smelting works. Mr. Thomas afterwards made a hurried trip to Butte, Montana, to see a sick daughter.

R. H. Eggleston of New York, secretary of the British Columbia Copper Company, lately paid his first visit to the company's mines and smelter in the Boundary district. While at Greenwood he saw blown in the first of the three 600-ton copper blast furnaces, the installation of which at the company's smelter is now about completed.

SCHOOL OF MINING

A College of Applied Science,

KINGSTON, ONT.

Affiliated to Queen's University.

For Calendar of the School and further information apply to the Secretary, School of Mining, Kingston, Ontario.

THE FOLLOWING COURSES ARE OFFERED:

1. Four Years' Course for Degree of B. Sc.
2. Three Years' Course for Diploma.
 - a. Mining Engineering.
 - b. Chemistry and Mineralogy.
 - c. Mineralogy and Geology.
 - d. Chemical Engineering.
 - e. Civil Engineering.
 - f. Mechanical Engineering.
 - g. Electrical Engineering.
 - h. Biology and Public Health.