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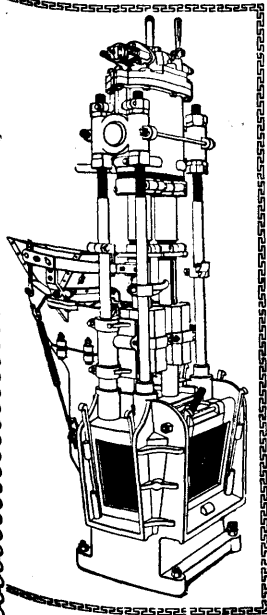
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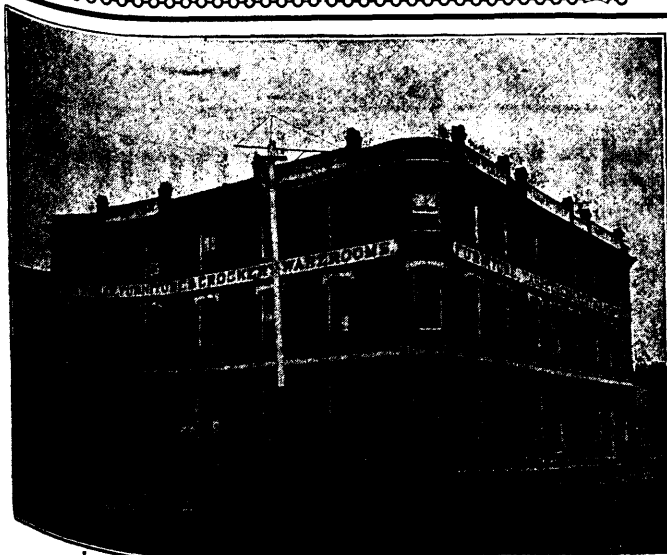
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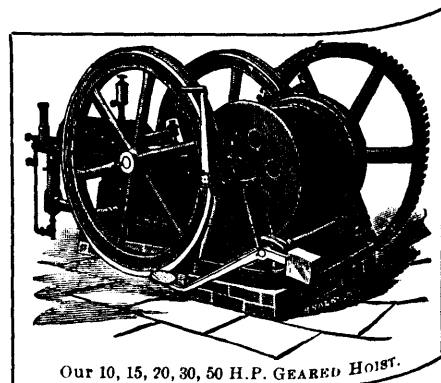
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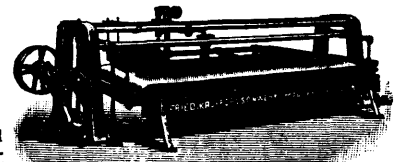
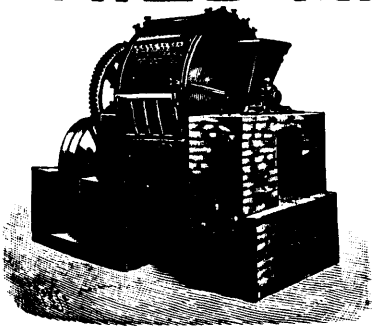
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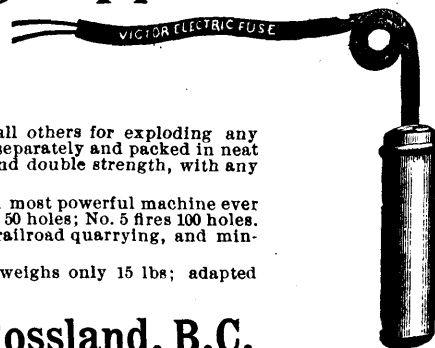
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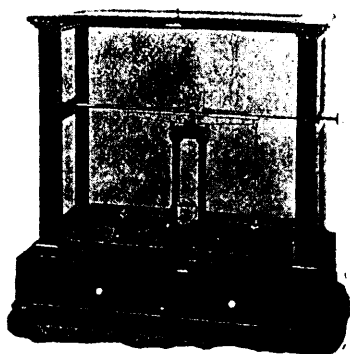
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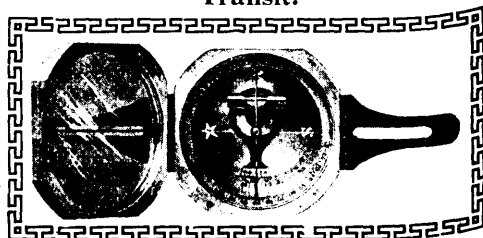
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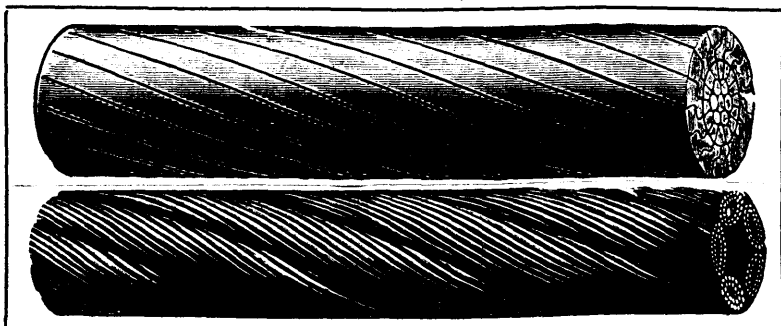
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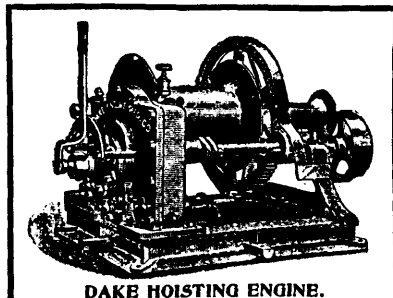
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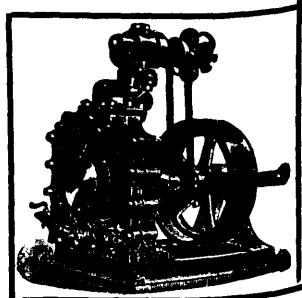
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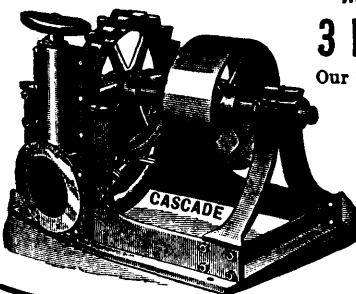
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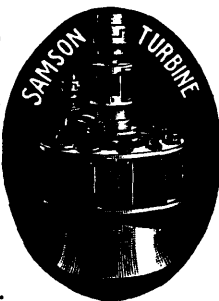


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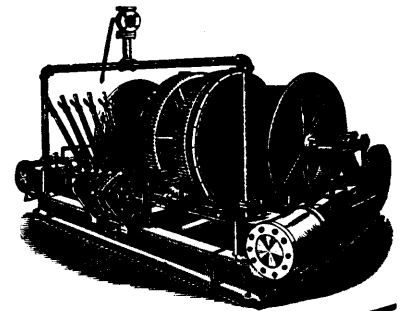
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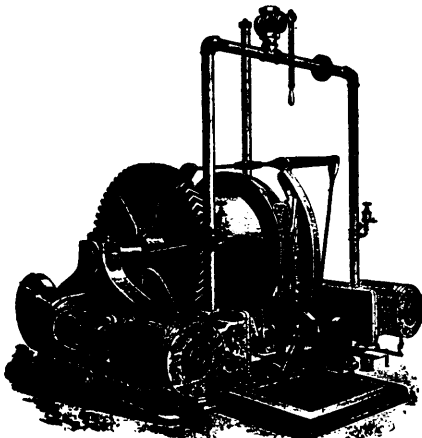
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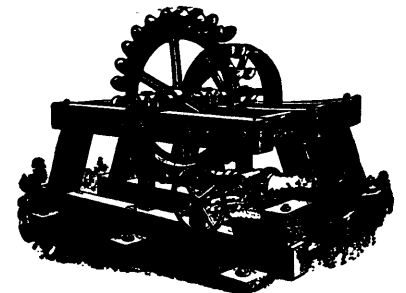
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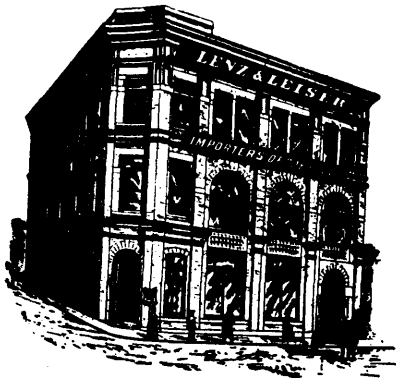
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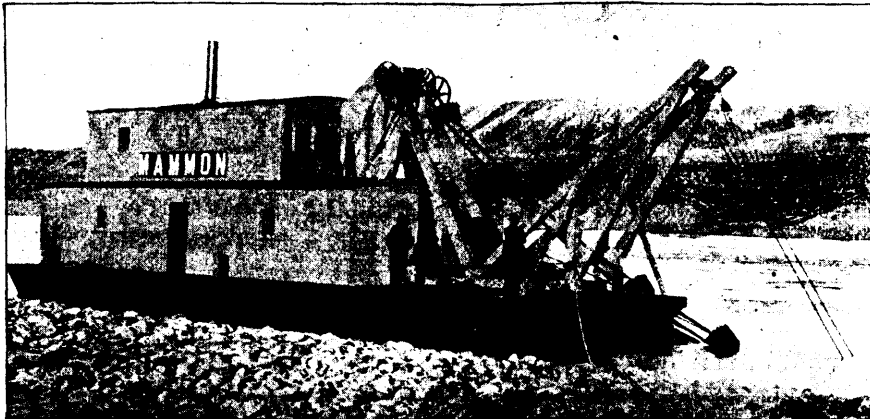
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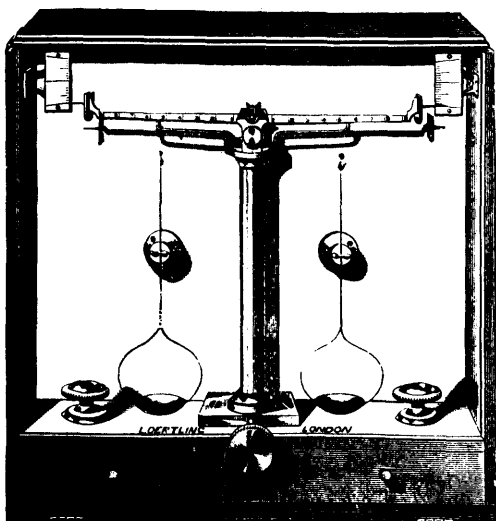
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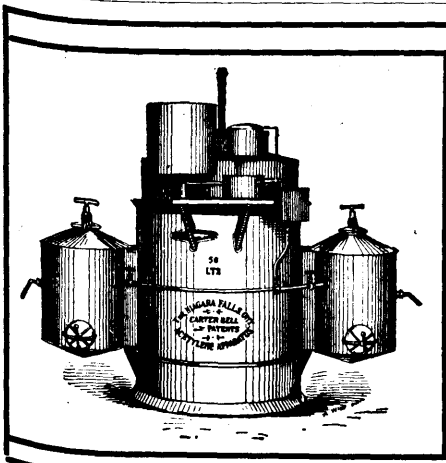
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Smelting Industry of British Columbia.

The above is one of the coming questions to be thoroughly discussed and settled and will, within the next year, enter into practical politics. In order that the fullest light may be brought to bear on the question, I offer three prizes for essays on this subject: How may the smelting industry of British Columbia be most beneficially retained and built up in Canada without prejudicially affecting the interests of the mine owners?"

- FIRST PRIZE.....\$50.00
- SECOND PRIZE.....\$30.00
- THIRD PRIZE.....\$20.00

The essays are to be in the hands of the Secretary of the Board of Trade on or before June 1, 1898. Prof. G. M. Dawson of Ottawa, Prof. W. A. Carlyle of Rossland, and Prof. W. G. McConnell of Victoria, will be asked to act as judges. The decision will be made on or before July 1, 1898, when the money will be paid to the winners.

J. B. MCARTHUR,

President of the Board of Trade.

Rossland, March 30, 1898.

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PROVINCIAL SECRETARY'S OFFICE.

HIS HONOUR the Lieutenant-Governor has been pleased to make the following appointments:

7th April, 1898.

THOMAS TAYLOR, of Trout Lake, Esquire, to be Recorder within and for the Trout Lake Mining Division of West Kootenay, vice W. H. Vickers, Esquire, resigned.

19th April, 1898.

GEORGE SUMNER, of Comaplix, West Kootenay, Esquire, to be Mining Recorder, within and for the Lardeau Mining Division of West Kootenay.

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AMOUNT AND VALUE OF MATERIALS PRODUCED 1896 AND 1897.

	Customary Measures.	1896.		1897.	
		Quantity.	Value.	Quantity.	Value.
Gold Placer.....	Oz.....	27,201	\$ 544,026	25,676	\$ 513,520
“ Quartz.....	Oz.....	62,259	1,244,180	106,141	2,122,820
Silver.....	Oz.....	3,135,343	2,100,689	5,472,971	3,272,836
Copper.....	Lbs.....	3,818,556	190,926	5,325,180	266,258
Lead.....	Lbs.....	24,199,977	721,384	38,841,135	1,390,517
Coal.....	Tons.....	846,235	2,327,145	882,854	2,648,562
Coke.....	Tons.....	615	3,075	17,832	89,155
Other Materials.....			15,000		151,600
			\$7,146,425		\$10,455,268

Production for 1890, \$2,608,608; for 1896, \$7,146,425; for 1897, \$10,456,268.

GOLD.

Gold-bearing lodes are now being prospected in many parts of the province, and at Rossland magnificent ore-chutes of very profitable gold-copper ore are being mined and smelted, the Le Roi having paid to date \$725,000 in dividends, with a large and increasing amount of ore in sight as the workings attain greater depth, while systematic development on other properties is meeting with excellent results, mining having just fairly begun in this camp. Little doubt can be entertained that Rossland will become a heavy producer of gold, and that excellent properties now only await sufficient and abundant capital to become paying mines, to further aid in which the facilities for cheaper transportation and smelting are being now supplied. At Nelson and at Fairview, Camp McKinney, Greenwood, Central and other camps in the southern part of Yale, important work is being done on the quartz ledges there, several new mills being under erection.

Exploratory work has also been in progress in East Kootenay and in Lillooet, Alberni, and on the Gulf Islands and along the coast line of the Mainland, as well as in other parts of the province.

In Cariboo, several large undertakings, involving a large amount of capital, are at work exploring both modern and ancient river channels, the Cariboo Hydraulic Mining Co., on the Quesnelle River, proving, on development, to have in a channel of the latter kind, a great deposit of exceptional richness, while other parts of this district now offer every inducement to capital.

Into Cassiar, Omineca, and the great area to the north, as well as Cariboo, there now promises to be a great exodus of explorers, excited by rich diggings now being mined in the Yukon as on the Klondyke, to the north, and rivers and creeks long reported to be gold-bearing will now be made accessible, and well tested.

SILVER-LEAD.

Despite the drop in the price of silver, the Slocan mines are being much more extensively worked, while the shipments of high grade ore are constantly increasing. The production for 1897 has much exceeded that of 1896, as such mines as the Payne, Ruth, Whitewater and other mines increased their output.

At Nelson, the Silver King or Hall Mines are shipping constantly a large amount of silver-copper ore, and the Lardeau, Trout Lake, Illecillewaet districts, on further exploration, promise to become rich. In East Kootenay large bodies of silver-lead ore will be mined on completion of the railroads now under construction.

COPPER.

Copper is being produced to a limited extent at Rossland and Nelson, but the large deposits of at present low grade ore in the Boundary Creek district will be fully tested when the railroad, now almost assured, is constructed. Prospecting is being done at Kamloops, along the west coast of the Mainland and of Vancouver Island, as well as at many other points, and Texada is producing high grade bornite ore.

COAL AND COKE.

The large collieries on Vancouver Island are producing about a million tons of coal annually, and at Comox an excellent coke is now being produced, much of which is shipped to the inland smelters. The great deposits of coking coal in East Kootenay, at the Crow's Nest Pass, are now being opened, as the C.P.R. is now being built to the Columbia River to supply the great mining regions with cheap coal and coke.

SMELTERS AND RAILROADS.

The smelting industry is now beginning to assume large proportions, as preparations are being made to treat the ores of this Province within her own borders, a most important factor in the increasing prosperity of this country, entailing as it does, and will, the employment of much capital and many men. The extension of the railroad systems to different parts is now in progress, and the next few years will see many parts in which the prospects for good mining are excellent, made easy of access, while ores can be shipped with facility to the smelting centres, where the assembling of the various inter-fluxing ores will make possible the treatment of all British Columbia ores at home.

CAPITAL.

Capital can now find here excellent and many opportunities for investment, if proper business care and the experience of qualified men are utilized, as the values placed on mines and undeveloped properties have reached a reasonable basis.

MINERAL LANDS.

Mineral lands are open to location to any person over eighteen years of age, who has obtained a free miner's certificate and perfect title to lode claims can be easily secured after \$500 worth of work has been done per claim. A great extent of territory has yet to be prospected.

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As the Klondyke and other gold fields in the Yukon in British territory are reached mostly via British Columbia, all supplies and outfits obtained at Victoria, Vancouver, Ashcroft, Kamloops, etc., can be taken in free of duty, which otherwise will have to be paid if not purchased in Canada.

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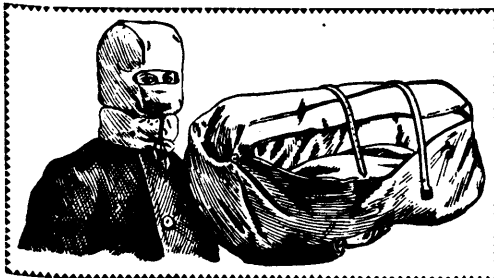
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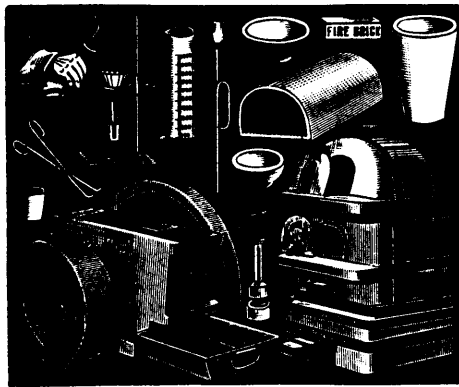
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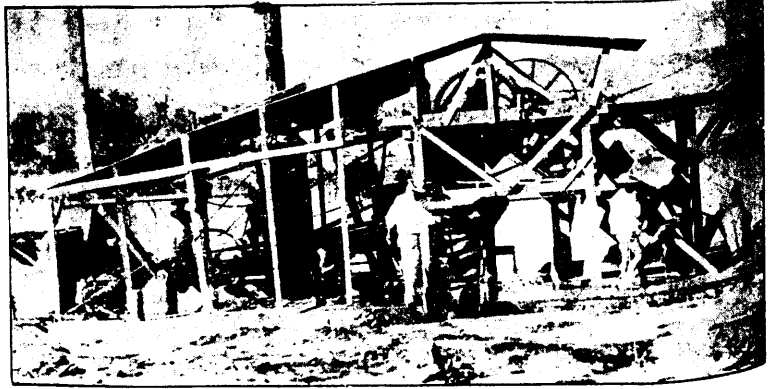
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The Mining Record.

Vol. IV.

MAY, 1898.

No. 5

BRITISH COLUMBIA MINING RECORD.

Devoted to the Mining Interests of British Columbia.

PUBLISHED BY

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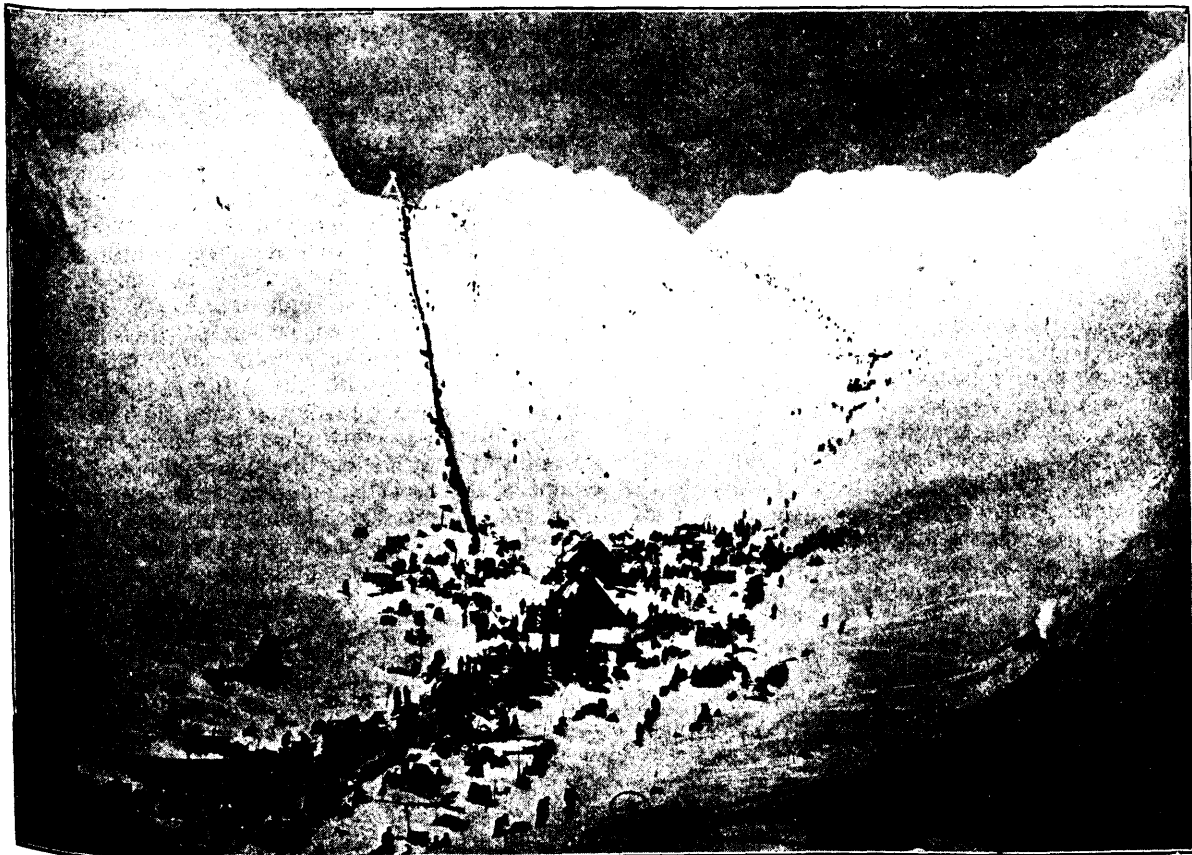
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THE MONTH.

COMPLAINTS emanating from certain sections of the Province,—notably Kamloops, Ilacillawaet and the East Kootenay districts—have been freely made anent the scanty information contained in the

recently issued Report of the Minister of Mines, relative to the progress of the past year's mining in these camps. All sorts of extraordinary motives are imputed to the head of the department as accounting for this apparent neglect; then we are told that the voluminous returns sent in by the Mining Recorder at Kamloops were not included in the Departmental Report for political reasons, and again, an anonymous correspondent in a Fort Steel journal charges the Minister of Mines, who it is true holds large interests in East Kootenay, as wanting in business ability because so little attempt was made through the Report to "coerce attention to this district in order to assist the sale of the produce of the coal fields and enhance their values." All this is very absurd. The people of the districts referred to may and perhaps have reasonable grounds for complaining that the space devoted in the Report of the Minister of Mines to their mineral resources of these particular sections of the Province was inadequate. But, admitting this to be the case, an explanation will, we think, be not difficult to find.

The entire work of compiling last year's Report was in the hands of one man. Mr. Carlyle who lately



GOLD-SEEKERS EN ROUTE—A SCENE ON THE DYEA PASS.

(Photo by Edwards Bros., Vancouver).

occupied the office of Provincial Mineralogist, had the difficult duty to perform of not only preparing reports upon several important mineral sections of the Province which during the previous summer he had not visited and examined, but he had also to edit the returns sent in by Gold Commissioners and Mining Recorders from those districts which with the time at his disposal he had not been able to reach. Now it is a fact which there can be no object in attempting to conceal, that in a majority of cases these gentlemen holding official positions are not in any correct acceptance of the term mining experts, and some of their reports published in the past have been ludicrous and unreliable in the extreme. It is therefore to be presumed that if portions of the entire returns submitted by Recorders to the Department were eliminated from the Report, it was because in the judgement of the Provincial Mineralogist—one of the most eminent authorities on mining in Canada, by-the-way—the statements contained therein were untrustworthy, and to amend them would have necessarily considerably delayed the publication of the report itself.

We do not for a moment pretend to say that this is a satisfactory state of things, or that the deficiencies in the Mine Department's Report with regard to certain districts are wholly condonable. But it is only fair to point out, in view of the criticisms that have been made, that it is manifestly unfair to expect from the work of one man, however capable, results one might reasonably look for from the combined labour of several. Practically speaking there are barely more than six months in the year when it is possible to examine undeveloped mine properties in the interior, and that in this short space of time Mr. Carlyle should have visited and remained long enough to enable him to report as he did intelligently upon such large districts as Cariboo, Trout Lake, Boundary Creek and Texada Island, is itself a creditable record. If an official report of a mining district is to be considered worth the paper it is written on, it is absolutely essential that it should bear the signature of a reputable expert. To issue reports annually concerning each district, would necessitate therefore the engagement of a large staff of expert mineralogists, which, under the circumstances, would be something of an expensive luxury wherein to indulge on the part of the Province.

Meanwhile, it might be very well suggested that more in the way of geological survey work, with special reference to mining possibilities, could be done in this country by that useful scientific department under Dr. Dawson's supervision at Ottawa. But if the truth be told in the publications dealing with British Columbia, issued by the Geological Survey of Canada heretofore, by far too much attention and space has been devoted to the purely scientific rather than the practical side of the geological investigations—that is, if one compares these reports with those published by like institutions established in several of the neighbouring States of the Union.

The acting Secretary of the Chamber of Mines, recently organized in Vancouver, has addressed this month a circular letter to the provincial mining press asking for support on behalf of that newly-fledged institution. The responses, however, to his appeal, we regret to note, have generally been wanting in heartiness and cordiality of tone; and, unhappily, there is now no disguising the fact that outside of a by no means inclusive circle of Vancouver mining men

and brokers, the Chamber is regarded with disfavour.

CHAMBER
OF MINES'
UNPOPU-
LARITY.

This is all the more lamentable because there is ample scope and large opportunity for an institution of the kind to perform useful and necessary work in the advancement and interests of the province. The present unpopularity of the new organization may easily be accounted for, and possibly, therefore, it is not too late to remedy matters. As we pointed out once before—shortly after, in fact, the idea of establishing a Chamber was mooted—the success and popularity of the venture would depend entirely upon the spirit in which it was undertaken, and the efforts made at the outset to establish it upon a broad provincial basis. But almost from the inception the Chamber has been regarded in the Kootenays as a local Vancouver affair, and consequently up-country mining men have held aloof. To make matters worse, there is now a strong suspicion in Vancouver itself that the organization is being "run" for the private advantage of a certain clique. We should be sorry to believe that there was any foundation for so disgraceful a rumour as this, but it certainly would never have received credence, nor, indeed, have originated at all, if steps had been taken in the first place to obtain the consent of representative men from all sections of the province to act as members of the executive council.

Meanwhile, the B.C. Mining Institute, formerly the Association of Mining Engineers, is still in existence, and has much the same *raison d'être* as the Chamber of Mines, but the former has the advantage already of a fairly large and representative membership, and its officers, elected at the last annual meeting, in February, include some of the best known mining men of the country. Notwithstanding this, however, the Institute cannot be charged with possessing a superabundance of energy, and its influence, which might be very great, is never exerted. The difficulty, of course, now, is that men of any professional standing as mining engineers have not sufficient time to devote to work of this kind, and mine managers and owners have been strangely indifferent. Nevertheless, a time has arrived when, in the interests of legitimate mining, organization and action on the part of the leading representatives of the industry in the province is necessary, and it is to be hoped this fact will be speedily realized. The amalgamation of the present Chamber of Mines with the Mining Institute might, perhaps, be satisfactorily accomplished, and at any rate the matter is worthy careful consideration. It is quite likely that if this plan were adopted, the result would be the establishment of a strong and responsible association which would ultimately become a powerful factor in promoting the welfare of the mining industry in British Columbia.

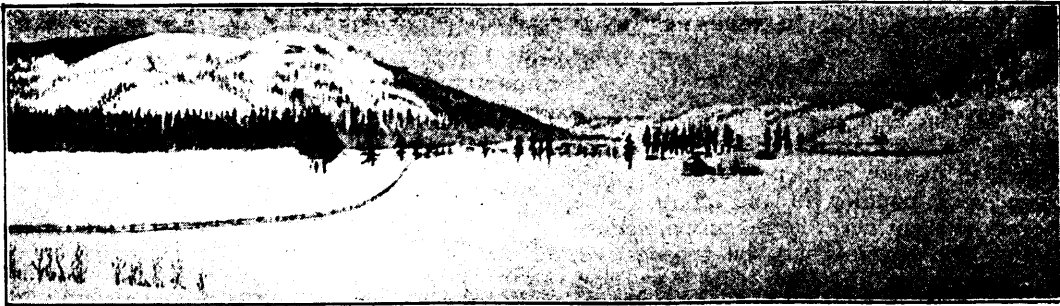
As a general thing, when a measure has, as it were, successfully run the gauntlet of the Parliamentary Railway Committee at Ottawa, its worst troubles are over, and its passage through the House of Commons may be considered as tolerably assured. In the case of Mr. Corbin's application for permission to build a railroad into Canadian territory at Boundary Creek and therewith establishing communication with his Washington State system, a notable exception to this rule has been afforded. The Bill, after being subjected to certain modifications in committee, was sanctioned

DEFEAT OF
THE
KETTLE
RIVER RAIL-
WAY BILL.

by that body by a large majority, only, however, to be rejected in the House by an adverse vote of 64 to 44. The *Toronto Globe* ascribes the defeat of the Bill to a "powerful and persistent lobbying" on the part of its opponents and the C.P.R. agents, but whatever the cause the effect is none the less deplorable, as precluding the possibility of railroad competition in South Yale, unless, indeed, Mr. Corbin refuses to admit that he is beaten, and is able to find a suitable pass over which to build a railway from Marcus, Washington, to the international boundary at Midway without entering Canada at all. If he can carry out this intention the Government will have reason to regret the recent defeat of the Kettle River Railway Bill. Had Mr. Corbin's application been granted, he would have been bound, by a provision of the Bill to charge no higher rate for the carriage of Boundary Creek ores to Canadian than to American smelters, and his line would have been more or less under our own control. Now, however, if the engineering difficulties of railroad construction from Marcus are found to be not insurmountable—and from some knowledge of the country we are inclined to believe that they are not—an American railroad will be built to the boundary and operated in strictly American interests, and thus, if Mr. Corbin can, by offering a specially low

nearly \$20,000, or almost \$10,000 a charter, was made, whilst in other instances the gains of Provincial railroad chartermongers have been far larger. If, as is certain, Provincial railroad charter rights have such very substantial selling values, the thought suggests itself that Acts conferring these special privileges might well call for substantial money payments from the grantees to the Provincial Treasury in sums proportionate to the estimated market or speculative worth of the charter granted.

The statutory meeting of that extraordinary organization the Klondike Hydraulic, Limited—which owns no properties whatever in the Klondike, but has instead very doubtful gold gravel assets in Alaska—was lately held in London, England. It was then reported that the vendor, who, according to the original prospectus, "threw into the bargain" a large quantity of gold which the property had previously yielded, was taking (because compelled to do so by the natural coyness of British investors with regard to new schemes) "the whole of his consideration in ordinary shares," with however, the notable "exception of promotion fees," doubtless substantial. Meanwhile the chairman of the meeting, a gentleman named Pye, said that all the preference shares were



MIDWAY, B.C.—LOOKING DOWN THE VALLEY.

haulage rate, secure the smelting of the higher grade ores of the Boundary Creek camps at Northport, he is very likely to adopt this course. So much for the defeat of the bill on patriotic grounds. Nevertheless, its an ill wind that blows nobody good, and the fight over this measure at Ottawa has at least resulted in a definite promise from the C.P.R. that immediate steps would be taken by the company to provide the Boundary Creek district with railroad facilities.

Railroad charter-selling still continues to be the order of the day, as regards franchise concessions that have long been too unconditionally granted by our Provincial Legislature. Thus, at a recent general meeting in London, England, of the London & Vancouver Finance & Development Company, Limited, Sir Edward Thornton, the chairman, stated that "owing to the smallness of the company's working capital they had been obliged to dispose of the two railway charters they had obtained in British Columbia, but by the transactions they had made a cash profit of over £4,000." He afterwards announced that a dividend of 20 per cent. would be declared that day, though "it was necessary, if the company was to be a success in the future, that more capital should be subscribed." The above is but one of many instances of profitable peddling of Provincial railroad charters, secured at the small incidental expense of parliamentary fees and agents' charges. In this case a profit of

taken up, or at any rate "more than enough for all the purposes of the company." So far as he could remember, the amount was £52,000 or £53,000 out of £60,000. Mr. Pye then told the meeting that "if the statements of the vendor in regard to the property proved correct, the necessary machinery would be in operation by August, so that they would get one month's work from it before the season closed." A pretty company this, called "Klondike," because possessed of no Klondike mining interests at all, with its meeting presided over by a chairman who really couldn't remember exactly how much stock was taken up, and with a property to be worked, if the statements of the vendor—very large, vague and dubious—proved to be correct. The preference stockholders must indeed be men of simple faith to invest in a concern so organized and so run, and dependent absolutely on the verification of an all important "if" for any success achievable.

Now that spring has come, with its mild weather and usual supply of bunch grass for cattle up country, and now that river and lake navigation is about also to open in Cassiar and the Yukon country, much travel is making north via Eastern British Columbia, through Ashcroft and via Lillooet and Cariboo. It is stated that Yukon gold-seekers are leaving Ashcroft at the rate of 450 a month, and the number taking this well-advertised overland route, is steadily increasing.

But Eastern Canadians will indeed be foolish if they follow the example of a party of Montrealers bound for the Yukon, who lately passed through Ashcroft, after expensively outfitting at Spokane, thus adding heavy Canadian import duties to their expenses, and a distance of two hundred miles to their travels. Canadians and Britons should assuredly, if they be wise, outfit in Canada, and by preference for many reasons, in one or other of our leading British Columbia cities.

The English capitalists who have been seeking from the Legislature charter concessions for Queen Charlotte Island exploitation, mining and development, are for the time being postponing their application, desiring to submit, as they state, another (fine and) large proposition at a future date.

Public opinion is very sharply divided over the proposed provincial subsidy to the Mann-Mackenzie railroad project. The sum of \$1,500,000, suggested as the probable amount of the subsidy, is regarded by many as very large, and requiring, for safe securing, as regards principal and interest, larger royalties than one dollar a head on passenger, and fifty cents a ton on freight traffic. Royalties of double these amounts would certainly cause the proposed bill to be looked upon with more favour, it being generally conceded that quick returns must be obtained from any Yukon railroad enterprise.

A School of Mines has been established in Rosslund under the auspices of a number of leading men of that place, and from what we can gather the institution is likely to become very popular in the camp. It is probable, however, that a very large proportion of students attending the lectures will be prospectors, and it is rather unfortunate, therefore, that the school was not started earlier—before, in fact, the prospecting season set in. This must not be construed as suggesting criticism, because the enterprise of the founders of the Rosslund School of Mines is to be very highly commended, but if this example is not followed in other mining towns it will be owing to the fact that the trial at Rosslund was not successful from a financial standpoint, and the reason therefor should be prognosticated.

We have lately learned that an application has been made to the Government by the promoters of the Rosslund School of Mines for monetary assistance, but we doubt if this proposal will be considered unless a guarantee is furnished that the institution will be kept open for some considerable period of time. It would have looked better, too, we think, if the application for aid had come after the school had become properly established, and its utility recognized. On the other hand, if the Provincial Government cannot see the way clear towards establishing schools of mines throughout the country as state institutions, such as has been successfully done in the Australian colonies, the next best thing is to encourage private enterprise to take the initiative by offering as liberal a bonus as possible for the first school of the kind started in each camp of any importance, the money being payable at the expiration of a specified time after the production of satisfactory evidence that a regular course of lectures had been delivered, and attended by a given number of students.

Mr. Eberts, the Attorney-General, in a letter addressed to the Minister of Mines, recommends, in view of the recent alleged scandals in connection with the Mining Recorder's office at Granite Creek, that Government servants in the mining district offices should be "forbidden to act as agents, with or without remuneration, for private individuals doing business with the offices, or to volunteer any information or services not within the strict limits of their duties." But it is one thing to issue instructions and another to enforce them. Supposing the Mining Recorder in any camp you please, discovers from his books that Jack Smith, who is the owner of a very valuable claim, has failed to comply with the requirements of the law in some essential particular, and that the property is therefore forfeitable: what is to prevent him from giving the information to Tom Jones upon the understanding that Jones will, after re-locating the ground, deed him, the Recorder, a half or a quarter interest in exchange for his "tip"? And who, in ninety-nine cases out of a hundred, will be the wiser? Jones, as in gratitude bound, will say nothing about the transaction, and while in due course the bill of sale of the ceded interest is registered, the fact that the Recorder has presumably purchased a share in a mining claim will not necessarily attract attention. If the Government is anxious to put a stop to this sort of thing the only effective course would be to prohibit the officials in question from acquiring mining property in the districts to which they were appointed, increasing at the same time the salaries appertaining to the respective offices.

M. Ogilvie, D.L.S., who is now lecturing in London on the Yukon, has evidently and wisely recognized that while he may hold very optimistic views concerning the mining potentialities of the Northern gold fields, promoters of wild-cat companies will not hesitate to take advantage of his perhaps too highly coloured utterances to serve their own ends, and he has, therefore, we are glad to see, taken the precaution to warn the British public in the most emphatic language, not to put money into Klondike concerns without the most careful investigation. "There is a 'Klondike boom' at present," Mr. Ogilvie is reported to have said, "and it is quite conceivable that a good many people may burn their fingers. Several public companies have been located of late with the object of buying mining claims in the Yukon. Now, the vendor's title to the claims he proposes to sell, should be subjected to the strictest examination. It is necessary to bear the conditions which constitute a mining title in mind. The most important of them is that every claim must be worked continuously and 'in good faith' during the working months. If the claim remains unworked for seventy-two consecutive hours, the title lapses and the claim can be 'jumped.' Subject to these conditions claims may be combined, provided the agreement is recorded." In view of the remarks we published last month regarding the probable results of this well known lecturer's visit to England, it is eminently satisfactory to know that Mr. Ogilvie is taking so sensible a means of discouraging, to the best of his ability, rash speculation in Klondike wild-cat ventures.

Mr. J. B. McArthur, President of the Rosslund Board of Trade, has liberally enough offered three prizes of fifty, thirty and twenty dollars respectively, for essays containing the best suggestions on "How

the Smelting Industry of British Columbia may be more beneficially retained and built up in Canada without prejudicially affecting the interests of the mine owners." This is a hard nut to crack, and any one satisfactorily solving so difficult a problem would truly earn his fifty dollars.

A correspondent writing to the MINING RECORD from Rossland, states that fourteen miners were dismissed last month by Le Roi Company, for no other reason than that they happened to be married men, and hence refused to "board" at the mine mess house. Comment is here quite unnecessary.

The fearful loss of life occasioned by three separate snowslides on the Dyea and Chilcoot trails during the past few weeks will naturally have the effect of largely diverting the stream of travel to the Yukon, at least so long as further danger of the same kind is to be apprehended, to the rather longer but less hazardous route by way of the Stickeen River and Teslin Lake. Railway or no railway, this route is infinitely the easiest and the best for summer going; and with the opening of the rivers to navigation this month the journey directly to the centre of the gold excitement will, as a matter of fact, present less hardships than are commonly faced and disregarded by prospectors in the Kootenays at this season of the year. Meanwhile it is a somewhat noteworthy fact that, according to the published lists, the victims of the fatal Dyea catastrophes were in every case American citizens.

Lord Strathcona, the Agent-General for Canada in London, England, and his secretary, Mr. J. G. Colmer, have lately been doing good work in exposing numbers of attempted swindles based on the Klondike boom, and as a result the police have in several instances taken effective action against the tricksters concerned. These have, however, mostly been practitioners on a small scale, their usual *modus operandi* being to advertise that men were wanted for an imaginary Yukon expedition, and secure from applicants small fees for registering their names and as guarantees of bona fides, etc. The bigger knaves, who have attempted to get up Klondike bubble companies, have been less easy to reach; but not very many absolute swindles have yet been perpetrated on the British public by that large company of fraudulent promoters, which, to the disgrace of English law and the discredit of the English financial world, continues to work almost wholly unmolested in the heart of commercial London.

Another attempt is being made to revive quicksilver mining in the Savonas district by securing a sufficiency of British capital to enable a consolidation of the best cinnabar properties and work them by up to date and economic methods. Those behind the new endeavour assert—rightly or wrongly—that the temporary failure of cinnabar mining in British Columbia is ascribable to former mismanagement or incompetence, and, moreover, assert that these operations were conducted on mistaken lines. It is also insisted that the percentage of quicksilver in the cinnabar deposits, where known to exist in the districts of the Province, is considerably larger than the proportion existent in the cinnabar deposits of California, which have been worked with profit on a large scale for more than a generation. Meanwhile the negotiations for this pro-

posed new departure in British Columbia quicksilver mining have not yet got beyond the stage of the bonding several of the more promising properties.

The rather important announcement appears in a circular addressed to the shareholders of the British American Corporation that the properties purchased by the resident Director, Mr. McIntosh, this spring, in the province, are to be "acquired, jointly and in equal shares with the London and Globe Finance Corporation, Limited." The reason given for this departure being that the interests thus secured by the B.A.C. are so extensive and valuable "that it would have proved impossible for one company to handle them singly." What, not even with an available capital of seven millions and a half? We are more inclined to think the B.A.C. and the London & Globe Finance, being practically one and the same concern, that the announcement of the alleged combination of forces means that the London directors of these powerful syndicates are so satisfied with the opportunities for profitable investment in B.C., that they have decided to operate upon a larger scale than was at first contemplated, and perhaps, therefore, there is some truth in the rumour that negotiations have once more been opened for the purchase of Le Roi at Rossland. This surmise, if correct, is at least gratifying to those of us who believe in the future of this province's mining possibilities, and it is to be expected that with so capable and careful a man as Mr. Carlyle to direct affairs, and under him a skilled force of expert assistants, with the undoubtedly promising mines and prospects that have been secured the shareholders of this octopus corporation will have reason to be satisfied with their British Columbia investments.

Referring to the *personnel* of the B.A.C. official staff at Rossland, a very amusing incident occurred the other day. Our contemporary and namesake, the *Evening Record*, printed a leading article speaking in highly complimentary terms of Mr. McIntosh and his colleagues, including Mr. Edwin Durant, the company's office manager, and a recent arrival from England. But it appears that some of the statements made in this article displeased Mr. Durant, who is not yet accustomed to western journalism, and so, after inviting the editor of the offending, but well-meaning newspaper to visit him at his office, he gave the unfortunate scribe a severe scolding. Probably, however, Mr. Durant got back worse than he gave, for the next day, in the editorial column of the *Evening Record*, the following entertaining paragraph appeared:

We still have every confidence in the B.A. corporation and its gentlemanly officers, but we made the serious mistake of mixing the officers' names with those of the attaches—the chief clerk and his assistant. We won't do it again.

To be decoyed to the office of the company in the absence of the real officers—and with whom we have always had the most cordial relations—in such an underhand way as was used; berated and insulted in the ungentlemanly and contemptible manner in which we were treated, was certainly the most low-down trick that has ever been perpetrated upon us.

We probably deserve to be roasted for permitting ourselves to be lured from our sanctum sanctorum by such cheap hirelings, but certainly not for what we wrote. It was entirely on account of the very respectable surroundings of the individual and our own clear conscience that put us within his reach.

A correspondent signing himself "Old-Timer," suggests that it will probably interest a number of the readers of the MINING RECORD to learn that "some rich placer diggings were discovered in the bars of the

Stickine river, over thirty years ago, when nearly six thousand people made the journey thither from Victoria, in canoes, during the time of the Cassiar excitement." Doubtless the territory between Glenora and Teslin Lake, the creeks flowing into the lake, and the Hootalinqua and its tributaries, will be prospected with the best possible results, this season.

The announcement that Mr. R. D. McConnell, of the Geological Survey, has reconsidered his decision with regard to accepting the position of Provincial Mineralogist, made vacant by the resignation of Mr. Carlyle, will be received with regret by a large class of our readers. Meanwhile it is learned that Mr. McConnell modestly concluded, after perusing the recently issued Department of Mines Report for 1897, that he



MR. R. R. M'CONNELL.
(Geological Survey of Canada).

was not sufficiently qualified as a mining engineer—his life having been passed in the special study of geology, upon which he is an eminent authority—to take up the work at the point where Mr. Carlyle left it. The Government is already in communication with a distinguished mining engineer—whose name, however, we are not at present at liberty to publish—to whom the vacancy has been offered.

The C.P.R. generously furnish tickets at reduced rates to commercial travellers visiting the mining towns of the Province on business, and it is asked if the same privilege could not be accorded to professional mining men residing on the Coast, who are employed to examine and report on properties in various and distant parts of the country. This, we think, is a question that might well be left to an institution such as the Chamber of Mines to deal with.

The *Kootenaian*, of Kaslo, whose editor, Mr. King, is taking a pronounced part in the agitation for an imposition of a prohibition duty on lead, in order to

build up the Province's smelting industry, questions the accuracy of the information we published last month, dealing with the effect a change in the tariff as proposed would have on the salmon canning industry. Perhaps, therefore, it is allowable to state that our authority on this point was no less a person than the manager of Messrs. R. P. Rithet & Co., one of the largest canning firms in the Province. We have since learned, however, that the figures quoted were based on last year's pack, and it may strengthen the *Kootenaian's* argument to add that last year the season was exceptionally bad in the cannery trade.

But the *Kootenaian* can compliment—and in, too, a very kindly manner—as well as criticize, for it tells its readers that "with the possible exception of the *Mining & Scientific Press* (of San Francisco) which has the advantage of being a weekly, the *MINING RECORD* is the prince of western mining papers, and should have the support of every miner, prospector and business man in the country." Another paper, the *Kootenay Mail*, of Revelstoke, opines that the *RECORD* "promises to be easily the most interesting publication of its kind in Canada." When one is tired of the exertion of blowing one's own horn, it is comforting to be able to hand the instrument confidently over to one's friends. Gentlemen, "we look towards you and we likewise bows."

The Trades and Labour Union of Rossland, in endorsing Mr. Kellie's Truck Act, are but voicing the sentiments of the majority of the public. In insisting that the clause in that Act which allows the employer to obtain a written agreement from his men permitting him to deduct from the wages of the employee sums representing board and debts due to the company's store be struck out, they are merely ensuring that the whole principle of the bill will not be nullified by the action of this proviso.

It is argued that this Act will be in contravention of the principle of the freedom of contract. This is an extremely specious plea; but as at the present, owing to the crowded state of the labour market, there virtually exists no freedom of contract whatsoever, the advancers of that plea, under the guise of principle, actually grasp at the unjust profit which the very principle they uphold would deny them.

An attack has been made upon Le Roi Company in respect to its boarding house system. This mine employs 200 men. It charges each \$1 a day. Its gross return for the month is, therefore, \$6,000. The profit is not less than \$3,000. It, therefore, is in a position to pay a good round dividend every six months, not out of the mine, but out of the illegitimate profit it makes out of the men. The men themselves can get "board" in the town, not a half-mile distant, for 70 cents per diem, or, if willing to cater for themselves, for half that amount.

But the worst offenders are the smaller men. Take one of the subsidiary industries round a mining camp, or a railway construction camp on the way to it. In these cases the men are still paying \$30 per mensem for very inferior food to that supplied by the Le Roi. In addition they are "laid off" for many days during the month. Often enough ten are idle days, not reckoning the Sundays. At an average wage of \$2.50 a day, which is high pay, the employment merely means \$10

to \$15 in cash on the arrival of the monthly pay-day. From this deduct doctor's fees, tobacco, and the various necessities purchased during the month from the employers' store, on all of which the "boss" squeezes another profit. Should the unfortunate be married his case becomes that of a slave, for he never will have enough money in hand to be ahead with the world and purchase in cash from his own choice of a store.

In Pennsylvania another iniquity is added to this, and the mine owner sets up his own saloon, or pays his men off in a liquor store that is in league with him. In the e cases it is not well with the employee if his principles involve temperance.

We print elsewhere an interesting article by Mr. Thos. Bateman, M.E., of Alberni, contrasting the mining laws of this province with those in force in the Australian colonies. Some of our contributor's suggestions are very much to the point, and we shall be glad if they create discussion. Mr. Bateman is a mining engineer of considerable standing in Tasmania, where he has resided for upwards of 25 years.

The litigation in respect to the ownership of some remarkably rich mining claims on Kokanee Creek, in the Nelson Division, was brought to a head this month, when the case was disposed of in the Supreme Court, judgment being given in favour of defendants, without, however, and unfortunately, perhaps, from the point of view of the onlooker, the real issue at stake being considered, as the plaintiffs were non-suited on a technicality. The interest attaching to the case rested on the following grounds: One of the defendants, Willie, staked three adjoining claims, the Mollie Gibson, the Florence and the Aspen, the discovery post on the centre claim being placed on a relatively worthless quartz showing, the end claims being staked on a galena lead of extraordinary value. Plaintiffs restaked the properties on the assumption that these claims were on the same lead, and consequently invalid according to the provisions of the "Mineral Act," which forbids a prospector to locate more than one claim on the same vein. Expert evidence was engaged on both sides, one party desiring to prove that the galena vein was traceable across the ground of all three claims, and the other that the quartz showing on the centre claim was a true lode and that the galena lead outcropping on the first claim was not the same as that found on the third. The opportunities for technical argument, it will be noted, are here illimitable. However, the plaintiffs lost their case owing to the fact that stone monuments had been used instead of wooden stakes of the prescribed size to mark out the location boundaries, but it is understood an appeal is to be taken from this decision.

That in the legal struggle for the ownership of these properties the game is almost worth the candle may be inferred from the fact that another action is likely to be brought into Court by a gentleman who had a bond on the group for \$85,000 and allowed the time to elapse without making the necessary payments, but who is now anxious to acquire another option on the same terms, alleging the disputed ownership as his excuse for refusing to meet the payments due under the original bond. The ore of the Mollie Gibson is a wonderfully high-grade galena, some specimens of ruby silver from the ledge assaying as high as 10,000 oz., and the showing is reported to be greater than anything yet discovered in the Slocan.

TERMINAL CITY TOPICS.

It is stated that a representative of the millionaire smelting firms of the Elliots and Vivians, of Swansea, is about to visit Vancouver and the Coast, in order to ascertain the possibilities for the profitable working of a large ore smelter and refinery. This is good news for the Terminal City, as the enquiry will be made by men who usually "mean business." Meanwhile two other smelter propositions are more or less before the city of Vancouver. Mr. E. Blewett and his American associates in the Van Anda mine, on Texada Island, state that they intend to locate on the Coast a 100-ton smelter, for which the machinery is, they add, already ordered and in Seattle, en route for British Columbia. They hint that, if encouraged sufficiently—municipally or otherwise—they may locate the smelter, for which the Van Anda and other Coast mines would afford an ample ore supply, in or hard by Vancouver. But a 100-ton smelter will probably be deemed too small to be aided by a Vancouver public subvention. Then there is another and highly speculative proposition before the City Council of Vancouver, made by the Anglo-Continental Public Works Company, Limited, of London, England. They propose to erect a 350-ton smelter, with a small refining plant attached, if the city will find them a free site—itsself worth a big sum and exceedingly difficult to procure in or immediately adjoining Vancouver.

The Company asks next for tax exemption during twenty years—another concession worth much solid cash—and a cash subsidy during twenty years of fifty cents a ton up to 30,000 tons of ore treated—this being equal to a bonus of of \$15,000 a year. In return, if the Company to be established and capitalized in £250,000 should pay sufficiently, the City of Vancouver is, after the Company should have found 6 per cent. interest on £50,000 debentures, to receive a 10 per cent. dividend on £50,000 of fully paid preference stock credited to the city. The proposal is so largely speculative, and asks, among other things, for a land concession of such difficulty, that there is little likelihood of its acceptance. It will almost certainly pass into the "limbo," whereunto are consigned quite a number of previous smelter proposals made to Vancouver, including that of good Mr. Selover, of Seattle, Portland and other places, and that of Mr. Symons, Q.C., of Eastern Canada. Vancouver is, to speak plainly, sick of resultless smelter schemes. But the city has some faith in the possibility of practical work in the desired direction by the great metal men of Swansea.

The Athabasca gold mine, of Nelson, in which New Westminster and Vancouver men are considerably interested, has been sold to an English syndicate.

The exact purchase money is not given to the public, but it will be largely in stock of a new company to be formed by the purchasers. They will also, it is said, find \$100,000 for development, and erect a 10-stamp mill for treatment of such of the ore as is free milling. Probably the deal will prove somewhat advantageous to present holders of Athabasca stock; but few of those who should be "in the know" credit inspired newspaper assurances that Athabasca stockholders will receive the equivalent in cash values of so much as 63 cents a share. Such deals seldom realize the calculations made and pub-

lished by the makers. The sale of the Josie mine at Rossland was a good instance in proof of this.

The Channe Mining Company is busily developing its copper prospects on Hansen Island. Five tons of ore are now being shipped to Swansea for treatment at the Vivian Company's smelter, and the President of the undertaking, Mr. G. W. Willis, of Vancouver, states that very shortly the Hansen Island mine group, which the Channe Company owns, will forward fortnightly shipments en route to Swansea, averaging some twenty tons each, thus making a promising beginning. Only some few weeks' development work has yet been done on the principal lead, which is stated to be a five-foot one, well defined, and bearing fourteen per cent. of copper. The lead cuts into an easily penetrable slate deposit. Mr. Willis states that out of the proceeds of the sale of

some two hundred Australians, bound for the Yukon, the second week of April, the month would have been exceptionally dull for the outfitters of Vancouver. C. P. R. officials declare that the lull merely anticipates by a few weeks, a big summer rush North, from England and Eastern Canada, and assert that many intending gold-seekers in the Yukon have been induced by the representations of the Company's officials to defer departure until nearer the time of the opening of Northern Cassiar and Yukon navigation, and the beginning of the Klondike summer season. If so, early May should witness a big revival of Yukon trading on the Coast. Meanwhile there is no doubt that much Yukon travel is being diverted to the B.C. overland route via Ashcroft, the recent fatal snowslide on the Chilcoot Pass, and many reported temporary difficulties and dangers of the Alaskan



KLONDIKERS ON THE MARCH—NEARING LAKE BENNETT.
(Photo by Edwards Bros., Vancouver).

£25,000 of stock in the Gold Fields of British Columbia, Limited—Grant Govan's concern—the Channe Company, which obtained the stock by a recent advantageous deal, expects to declare a good first dividend, and forward a satisfactory margin in cash. Mr. Willis anticipates a sale at "par," or perhaps at a rather higher quotation, but the time is not quite yet, though the stock of the Gold Fields of British Columbia, Limited, is quoted at something of a premium. The present market for the stock, as for that of almost every other British Columbia mine company organized in London, is however very limited, and £25,000 worth of it cannot at the moment be sold to advantage.

Vancouver outfitters, shipping men and general traders are somewhat alarmed by the temporary decline of the Yukon excitement, and the considerable falling off of Klondike travel via the Terminal City. Had it not been for the somewhat unexpected arrival of

Coast entrance routes, no doubt tending in favor of the Eastern Columbia land route through Lillooet, Cariboo and Cassiar.

As a natural result of the temporary decline of Yukon trade, the merchants of Vancouver are eager for the Province or the Dominion, or both governing communities, to aid by money subsidy or otherwise—and this at once—the building of the Stickine-Teslin Railroad, to be followed next year by a further rail connection with Kitinat Bay or some other point on the North Coast of British Columbia, that would afford good anchorage and harbour accommodation for coasting steamships, and be far removed from obstructive interference of United States officials with British-American travel to the Yukon.

Vancouver merchants seem therefore inclined to

support a big Provincial railroad subsidy, even if it should run to \$1,500,000, saying that we must at almost any cost have provided, without the least avoidable delay, a distinctively all-Canadian route to Dawson City. Vancouver shipping men, who have lately been compelled to cut extremely close both freight and passenger rates to Alaskan ports, take much the same view as the merchants. On the other hand a large body of more or less independently inclined citizens, whose interests are not directly connected with Yukon trading or shipping, hold that the suggested Provincial subsidy is far too large for the means of somewhat heavily encumbered British Columbia. The same people, with whom politicians must reckon seriously enough, hold that railroad aids to Yukon travel should at least as liberally be aided by the Dominion as by the Province, and declare that it is monstrously unfair for Eastern Canadian statesmen and parliamentary members at Ottawa to seek to shoulder most of the responsibility of providing Yukon railroad facilities upon our young and sparsely settled Pacific Province. Yet a third party, representing a considerable, though not the entire labor vote of Vancouver—the Nationalists—take a stand on principle, and declare that further Provincial aid to railroads, whether running to the Yukon or elsewhere, must be accompanied by corresponding state ownership pro rata. Hence, whilst all Vancouver is interested in, and wishes to see further railroad facilities provided for the Yukon, the community is by no means a unit on the issue, as regards the manner of providing ways and means. One thing was clearly shown, however, by the small attendance and politically neutral resolutions passed at the Vancouver citizens' meeting held early in the month, that there is no indignation felt by the local community at large in regard to the Dominion Senate's rejection of the Mann-Mackenzie railroad subsidy bargain. Most here, when regarding the matter dispassionately and apart from considerations of keen political partizanship, agree that if the original bargain had been ratified, the country would "in kind," if not in cash, have paid altogether too dearly for the proposed narrow gauge line of railroad.

It is learned that as a result of a meeting of the Vancouver City Council with Mr. H. W. Treat, a leading director of the Van Anda Gold & Copper Company, Limited, it is likely that the Council will pass, for submission to the voters of the city, a money by-law authorizing a grant of a bonus of fifty cents a ton up to an aggregate of 100,000 tons, on all copper and other ores treated at a smelter of 100 tons daily capacity, which the Van Anda Company would, in the event of the bonus by-law passing, erect on some site approved by the Council, within five miles of the Vancouver City limits. At some such distance, injury to vegetation and property from noxious fumes would be avoided, and there is, moreover, no available site of sufficient size to be found within the city boundaries. The proposed smelter will probably, if Vancouver's citizens approve the project, be built either in North Vancouver or on the Burrard Inlet harbour front, at some point beyond Hastings. At North Vancouver in particular, the Van-Anda people can probably obtain a land grant on very easy terms, some of the large owners there being exceptionally willing to aid the local development of industrial enterprise, with a view to a consequent growth of townsite values.

ROSSLAND NOTES.

THE B.A.C. has, that which is to be expected of a British Company, the courage of its convictions. It has started work. In a short time, if all goes well, and there exists no reason to prognosticate evil, the pay roll of the town will be doubled. At least 500 men will probably have to be engaged during the ensuing month. It is possible, of course, that some of the buys of the B.A.C. may turn out inferior to expectation; but on the whole, opinion is that good judgment was displayed in the purchases.

THE B.A.C. A mine's turn out depends largely upon the efficiency of the superintendent. On this score exception can hardly be taken to the appointment of Mr. W. A. Carlyle as general superintendent. His coadjutors are such men as D. J. Macdonald, late mining inspector, who has been appointed to the Columbia and Kootenay mine; John Long, who retains charge of the Josie group, and "Billy" Haskins, late of the Homestake group, who bears a well deserved reputation in and out of Rossland as a thoroughly experienced mining man. With plenty of funds, good officers and good property, there exists no reason why the B.A.C. should not be a thorough success. It cannot be denied that the B.A.C. entered Rossland at an exceedingly opportune moment. Hostile criticism must always be expected; but a good deal of it proceeds from the captiously inclined of Spokane and Toronto. Rossland, however, is able to stand on its own feet, and is neither an appanage of Spokane nor even of Toronto.

The strike on the Deer Park and the sale of other properties on the south belt tends to show that Rossland not only possesses good mines on its northern side, but is envired with excellent claims. The "wild catter" is leaving us, but many of his million dollar companies are stranded wrecks on our shores.

Apropos of million dollar companies, a defender of them lately objected to a recent criticism of mine on the matter. He declared that everybody knew that they were not worth a million dollars, that the widow and orphan no longer existed, and at any rate they were no longer deceived, having cut their wisdom teeth. Further, he maintained as a company promoter that the figure "million" was extremely convenient, being so easily divisible, and that the real value of the mine was to be estimated so simply by multiplying the value of any share by a million! An illustration in point is the MILLION DOLLAR Red Eagle. That was a \$1,250,000 concern. Its shares were scattered broadcast over the land; the promoters pocketed their sales and their commissions, but one day it was declared that there were no funds, and the company was sold out for debt last December. Now, the property adjoining the Red Eagle, which is in the south belt crossed by the Trail Railway, the Mayflower and the Curlew, are for sale at \$150,000 and \$30,000 respectively. The latter is a mere prospect. There is little doubt, the more especially as the ledge of the Mayflower crosses the Red Eagle, that the property is a really good one, spoiled merely by the methods adopted. The Ottawa Gold Mining Company have reincorporated the mine for a nominal capital of \$230,000, divided into one dollar shares. Half of these shares are offered to the original shareholders at 25 cents a share, or rather, what comes to the same thing, an assessment of five cents per share on their old stock, which is worthless. This is a step

Several interesting letters and articles, including the conclusion of Mr. Howard West's paper on "Silver Occurrence in Kootenay," have been, for want of space, crowded out.

in the right direction, and is, I suppose, as good as we can expect for the present.

A minor evil here is the habit of placing the head office of a Rossland mining company at any distance from 130 to 4,000 miles away, and not even complying with the very moderate law which provides for an office on the spot, where the transfer of stock can readily be made. This is not only a direct injury to Rossland, but is an imposition upon the general public. Some companies do indeed put up a shingle outside some grocery or another, but that possibly proceeds from a laudable desire to save the shareholders office rent. Among the more conspicuous offenders are the Le Roi, War Eagle, Iron Mask, Cliff and Deer Park.

We also suffer from capital at the hands of unscrupulous promoters in Great Britain. A company is being formed in Edinburgh, with a capital of £100,000. Its property is some miserable prospect out of the way of all communication, ten miles behind Sophie Mountain. Its engineer is unknown in the camp, and its accredited agent is a broken down fruit vendor from Spokane. Such adventures merely serve to gull the public and to deprecate the value of *bona fide* properties.

Sophie Mountain properties are claiming a good deal of our attention. The reports from Cariboo Creek on Lower Arrow Lake, show that undoubtedly the great leads of the Slocan country extend through the divide, getting richer in fact in auriferous rock. The Salmo River district has given evidence of vast mineral deposits. The Canadian Pacific Exploration Company is doing good work on the Porto Rico. The Tem has been doing extremely well. Other properties, such as the Ymir, Dundee, Tamarac or Salmo are destined, with the incoming of the necessary transportation facilities, which are being pushed, to add to the list of shipping mines. The Boundary country is attracting numbers of our best men, but it has received a sad blow in the rejection of Corbin's Kettle River Valley scheme. It now remains to be seen whether the C.P.R. will really go into that country this season, or whether it will be left to the Spokane people to run a railway, first south of the international boundary, and by building up a line of towns along its course skim the cream off this exceedingly rich district.

OTHER CAMPS. The Boundary country is attracting numbers of our best men, but it has received a sad blow in the rejection of Corbin's Kettle River Valley scheme. It now remains to be seen whether the C.P.R. will really go into that country this season, or whether it will be left to the Spokane people to run a railway, first south of the international boundary, and by building up a line of towns along its course skim the cream off this exceedingly rich district.

If one may judge from the evidence of journalistic enterprise in West Kootenay, that section of the Province is in an eminently prosperous condition. Both the Revelstoke *Herald* and the Kaslo *Kootenaiian* are now published in daily form.

THE MINING LAWS OF AUSTRALIA AND B. C. CONTRASTED.

(By Thos. Bateman, M. Aust. Inst. C. E.)

THAT evidence of really valuable mineral wealth awaiting exploitation exists both in British Columbia and the North West Territory is beyond a doubt, the production of which may, in time, equal if not exceed the output from any of the Colonies in the British Empire. Americans from the United States are beginning to realise this, for wherever you may go you are almost certain to meet American agents quietly buying up partially developed mines, or securing good prospecting interests. Fortunately for us, the mineral resources of Canada are now attracting the attention of the world and, as a consequence, the factors required for its development—capital and skilled labour—will naturally be drawn to it. What, in my opinion, is needed particularly now is wise statesmanship to so frame the mining laws as to retain these factors permanently by the encouragement and protection of both. That our mining laws and regulations require



ON THE DVEA TRAIL—AT THE CUT OFF.
(Photo by Edwards Bros., Vancouver).

revision, is patent to all mining men. The "dummying" of claims is a serious hindrance to the development of the country; even the small amount of assessment work necessary to hold the ground is burked by re-location. The country is staked out indiscriminately, and the genuine mining prospector is baffled and discouraged at every turn by improperly staked claims, undecipherable notices, and want of charts, showing ground held in each district, to guide him in his search for vacant ground to prospect. These are the kind of men required in this country, and if the dummied claims were thrown open to them to prospect, many valuable discoveries would, I believe, result.

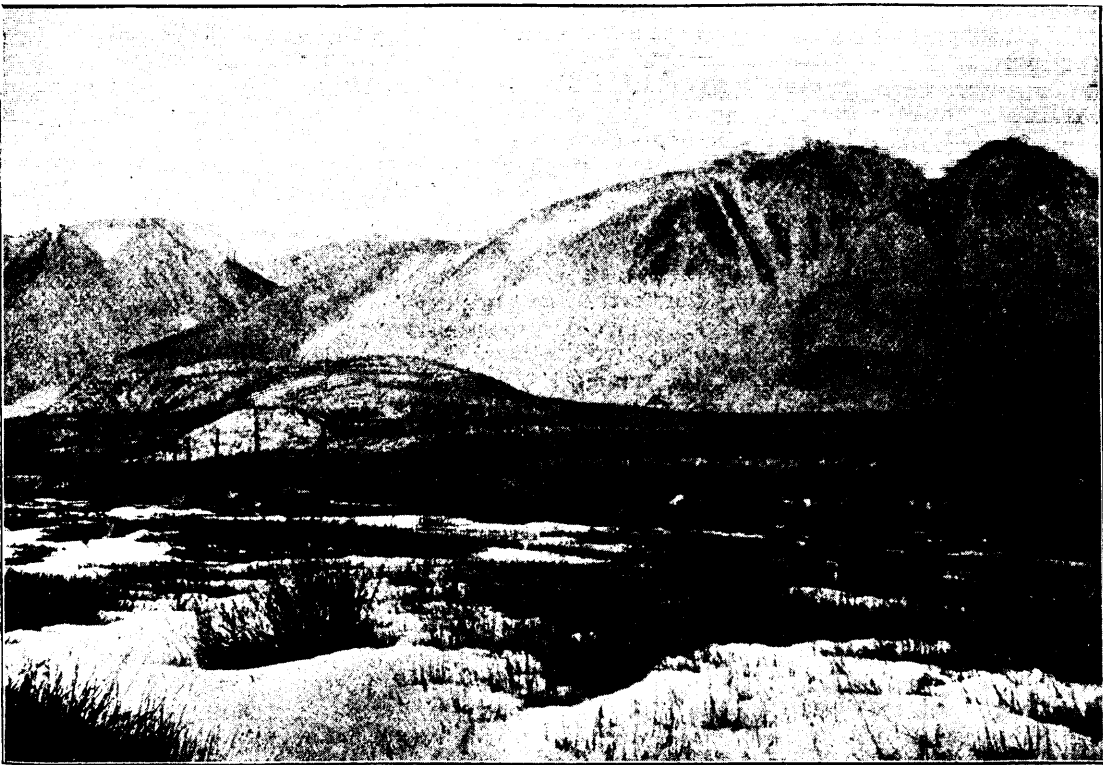
In Australasia there are no crown grants of mineral areas given. All mineral claims are held under lease from the Crown, at a rental, generally speaking, of twenty shillings per acre per annum for gold, and five shillings per acre per annum on other minerals, and two shillings and sixpence per acre on coal leases. Stringent labour conditions have to be complied with, or the ground is liable to forfeiture at any time, by any person applying for it. When locations are recorded, Government surveys of these are compulsory. Rent in advance, and survey fees, (at fixed rates under Government supervision) are deposited at the time of recording. These surveys, when made, are charted on the maps of each mining district, and the maps can be purchased at any mining recorder's office at one shilling each. These charts are of great assistance to mining prospectors. Locators of mining claims

have to blaze boundary lines, erect angle-posts, and cut L trenches at each corner showing direction of boundary lines, place legible notices on datum posts, and maintain them until survey is made. Any default in any of these conditions invalidates the claim. The mining prospector, by virtue of his miner's right and license, can secure any vacant ground as a "Miner's Protection Area," without recording it whilst prospecting, providing he labours continuously thereon, but he cannot be absent from his claim, without exemption, for more than from forty-eight to seventy-two hours, without danger of forfeiture of his ground by any person staking it.

These are, briefly speaking, the main conditions of lode mining throughout Australasia—though the conditions vary somewhat in each colony—and are generally approved of by both miner and capitalist. I have seen good claims in this country, that have been

upon any disputes arising out of mining claims—or of a Council of Mines, consisting of the Minister of Mines, presidents of the Miners' and Mine Managers Associations, chairmen of the principal stock exchanges, and representatives of mining companies. The Council should have the following powers and duties:—

1. To advise and report to the Minister with respect to the amendment and codification of existing regulations;
2. To report to the Minister as to any breaches of covenants of any mining claims;
3. To make such proposals to the Minister as may be advisable for the purpose of stimulating and encouraging mining and aiding it in its development;
4. To generally advise as to any matters whatever connected with the mining industry of British Columbia.



THE INDIAN VILLAGE OF KITWANGAT, ON THE SKEENA RIVER.

held for several years—by re-location—without any work whatever having been done upon them, and owing to selfish principles involved, I find that it is not popular to advocate any change in the law on this point, or in limitation of the immense areas allowed for mining claims, but it is impossible for such a state of things to continue, without serious detriment to the country at large. It is said, that the conditions of this country are not similar to that of older mining countries, and that their mining laws are not applicable. That may be a matter for discussion, and a practical solution would be found by holding a mining conference, composed of representatives from every district, to which the Minister of Mines and the parliamentary representatives of those districts should be invited, and discussing the regulations, clause by clause, and suggesting additions and amendments. Out of this might grow the constitution of mining boards in each district, to hear, and if proper, to decide

The subject is a very large and important one, and it is impossible, even to fringe it, in the short space of one paper.

OMINECA AND ITS POSSIBILITIES.

FROM the numerous enquiries that are being made by intending gold-seekers and prospectors concerning the Omineca and Skeena River districts, it may be inferred that this northerly section of the Province, once before the scene of a gold excitement, will again, and doubtless during the late spring and early summer months of the present year, be visited by hundreds of white men, intent on the search for the precious metal. Omineca is a district of great mineral possibilities. Its climate for six months of the year, that is, from May to October, is delightful; game is abundant; the streams are full of fish, and from the prospector's point of view these are highly apprecia-

ble conditions. But—and this is a question very frequently asked—what about the topographical characteristics of the district? Is it a count-
 APPRECIABLE try that may be easily prospected?
 CONDITIONS. From accounts given by old timers, who took part in the Omineca gold rush of “seventy-two,” it is learned that in those days a great obstacle in the way of travelling in the bush was presented by the quantities of fallen timber, caused by the fierce and destructive fires which had raged some years previous throughout the country. But this is over thirty years ago, and an old miner who visited Omineca last year, after a long absence, states that there is now nothing remaining of those fallen tree trunks, which have since rotted away, hence travel is much easier than it was.

The best route to the gold fields of Omineca, is by way of the Skeena River to Hazelton. The
 THE Hudson Bay Company have two small 100-
 BEST ton steamboats on this river, but the passage
 ROUTE. can be made easily enough in canoes by experienced boatmen, or Indians can be hired to navigate the stream for a very moderate remuneration. The river is, however, only dangerous at one season of the year—during the June freshet—when the current rushes through some of the canyons at the rate of from ten to twelve miles an hour. From Hazelton, at the forks of the Skeena, there is an excellent Government trail for sixty miles to Babine, the first portage; from Babine to Tatlah Lake, forty-five miles, and from Tatlah to Manson, the heart of the gold-bearing territory, for fifty miles. The old trail travelled by the miners of the “seventy-two” rush, was through the “Livepan” Pass, the summit of which has an altitude of about 9,000 feet, and meant a tremendous climb, which is now avoided. The pass was called “Firepan” by the Indians, from a volcano which though at present extinct, was active enough fifty years back, and the ground for the space of nearly four acres in the neighbourhood of the crater, is still so warm that the snow never lies on it, notwithstanding the altitude.

The Indians in the district are a peaceable and industrious lot, and many of them are making large sums of money at mining. One man, “Plug-hat” Tom, so named from his “swell” head-gear, is said to have taken out of a claim on Tom Creek, \$80,000 in gold dust, last year. In the early days an
 THE attempt, at least, was made by them to com-
 INDIANS. pel the white man to pay for the privilege of entering their territory, but the demands were only made by the christianized tribes at the prompting of the priests, and were not acceded to by the miners.

The stampede to Omineca really occurred in the spring of 1872, although some mining had been carried on in the district previous to that date.

EARLY It is estimated that as many as six
 DISCOVERIES. thousand men took part in this “rush,” but the district was by no means thoroughly prospected. The largest nugget found was taken from the discovery claim on Lost Creek, and was valued at \$200, but fifty, sixty, and a hundred dollar nuggets were not at all uncommon, though gold the size of wheat grains was more usually met with. The principal gold bearing creeks were Manson, Germansen, Slate, Lost, Black Jack, Tom, and Vital, and each of these streams produced a large quantity of gold. A claim on Black Jack paid, for instance, \$50 per day to the man for some time. On Slate Creek

two or three miners cleaned up from six to seven thousand dollars in two seasons; on Germansen a dozen or so claims yielded from five to six thousand dollars. Discovery Bar paid over six thousand dollars to the interest. Robert Howell, the locator of the first claim on Manson Creek, took out \$5,000 worth of gold in one day; and from a claim called the “Toboggan,” as a result of six days work the five partners obtained \$1,200 worth of coarse gold each. The gold from this claim was found on the top of the sand, which clearly indicated that it had been carried down in a slide from the hill. The owners of the ground, however, never succeeded in tracing the direction of the channel, indeed, no very systematic attempt was made to do so, and shortly afterwards the men, in company with the greater number of the miners in the country, left to join in the rush of '74 to Cassiar. Thus the Omineca gold excitement barely lasted two seasons, although five years later the country was again visited by prospectors. In the opinion of old miners, very few of the claims were located on the original river bed which, they opine, is a cross-country channel, intersecting some of the creeks at the spots where the rich claims were struck. This point may ere long be cleared up, as all the ground in the vicinity of the creeks flowing into the Omineca River has been leased to companies, and extensive preparations for hydraulic mining on a large scale are being made.

For those intending to prospect in the Omineca district, this summer, the most promising
 WHERE TO field, according to our oft-quoted author-
 PROSPECT. ity, the “old timer,” is the Nation River section, about twenty-five miles to the south-east from Manson Creek. Here some very fair prospects have been found, and the country is not difficult of access.

It will be some time, doubtless, before quartz mining is attempted in Omineca, taking into consideration the difficulties in the way of transportation, the cost of supplies and the price of labour. But there
 QUARTZ can be no question that the district has great
 MINING. quartz possibilities. Exceedingly promising galena reefs have been uncovered, and specimens of ore brought down eighteen years ago, assayed \$120 in silver. In fact, a Swansea smelting company offered to purchase the ore at this figure, we are informed, if brought to Victoria. Then the miners frequently discovered native silver and copper in the streams, besides a curiously heavy metal which looked like “plumbago with a white coating,” and which, very probably, might have been platinum. In short, Omineca offers fully as great opportunities to the prospector as the Yukon, with a tithe less of the dangers and hardships that must be encountered in the latter country.

Heard in the lobby of the House: First Kootenay Man—“What do you think of this proposed import duty on lead?” Second K. M.—“Well, I don't know exactly.” First K. M.—“Eh!! What?” Second K. M.—“Oh, you misunderstand me. What I am doubtful about is this. If we practically prohibit our lead from going into the United States, they may want to make good the deficit; and I have gathered together enough mortuary statistics to be able to inform you that there is enough lead in the graveyards of the United States, west of the Missouri, to supply the Orient market for two generations.”

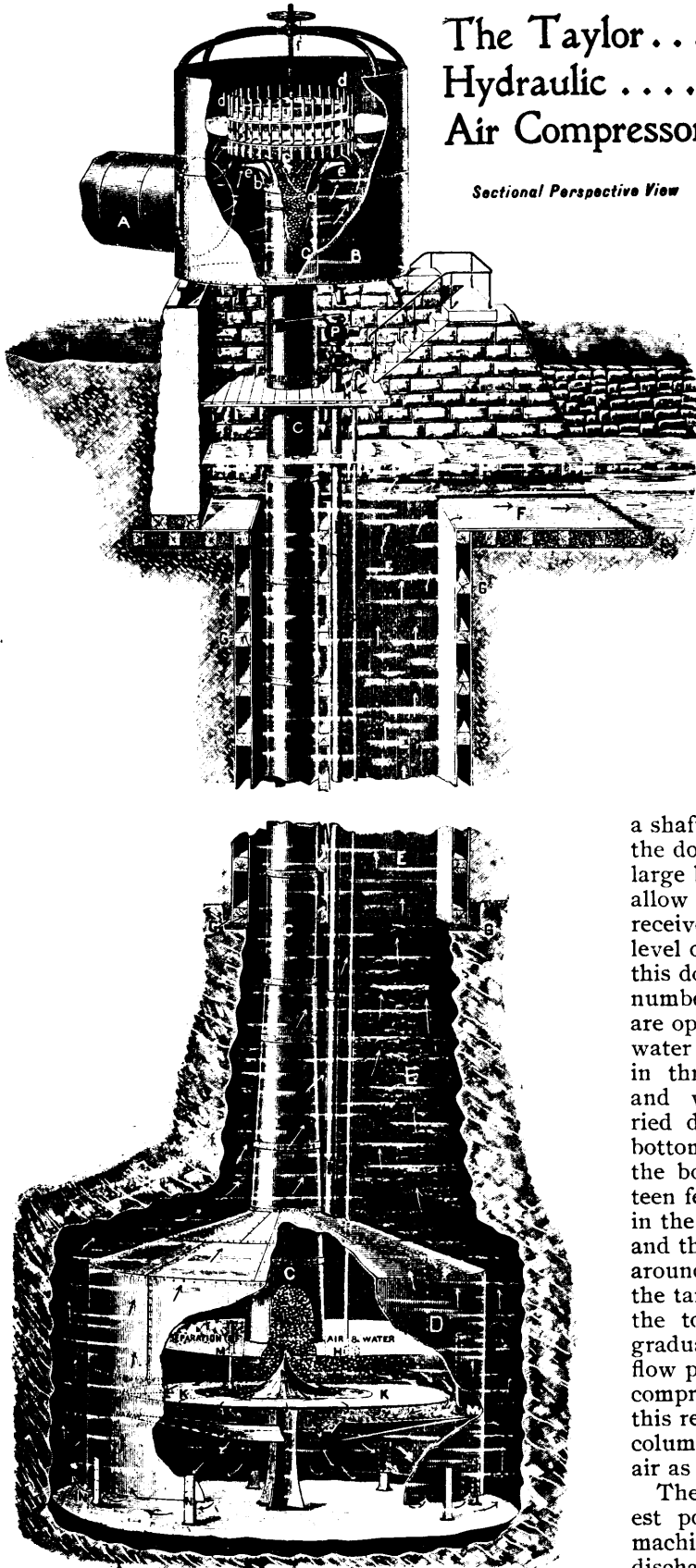
A NEW SYSTEM OF AIR COMPRESSION BY THE ACTION OF FALLING WATER.

GREAT interest has been aroused in engineering and mining circles by the completion of a novel air compressing plant now in operation at the Dominion Cotton Mills, Magog, Canada, the invention of Mr.

C. H. Taylor of Montreal. A similar plant is now being installed in the mining camp of Ainsworth by the Kootenai Air Supply Co., which holds a license for the patent rights of the district, from the Taylor Air Compressing Co. of Spokane, the latter company having acquired the rights of the system for British Columbia and the States of Oregon, Washington, Idaho and Montana.

The Taylor... Hydraulic... Air Compressor

Sectional Perspective View

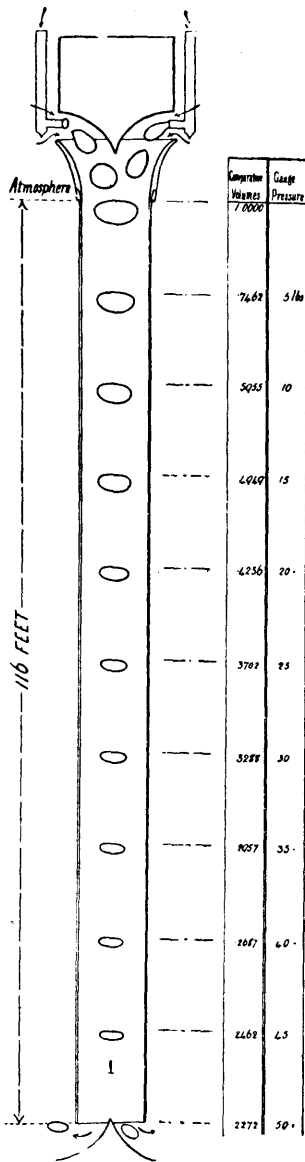


The system is simplicity itself. It utilizes a great principle of nature, namely, that falling water will entrain air and carry it down, producing its compression by the weight of the water, no moving machinery of any kind being required, and the system being absolutely automatic.

A description of the Ainsworth plant, now in course of construction, and which will be completed in August next, cannot fail to be of interest to mining men, as the use of the system wherever a water power is available, is destined to revolutionize the cost of compressed air.

Coffee Creek, two miles from Ainsworth, upon which the company has acquired its water rights, is a rapid mountain stream with a fall of ten feet in the one hundred, and a flowage varying from 2,500 to 5,000 cubic feet per minute. Here the company is building a dam across the stream and conducting the water in a stave barrel flume, five feet in diameter, with the intention of developing a power having 110 foot head. The water from the flume runs into a receiving tank which stands on a trestle 110 feet from the surface of the creek, and from the center and bottom of which the down-flow pipe, two feet nine inches in diameter descends perpendicularly into a shaft sunk below the level of the creek 210 feet, the down-flow pipe terminating at the bottom in a large bell-shaped tank, open at the bottom, so as to allow the free passage of the water. The water is received in the upper tank, where it rises to the level of the water in the creek above and flows down this down-flow pipe, passing over the orifices of a number of small tubes, which at their upper ends are open to the air. In the rapid descent of the water a vacuum is produced, and the air is drawn in through these tubes at considerable velocity, and when once entrained in the water, is carried down the down-flow pipe to the tank at the bottom of the shaft. The capacity of the tank at the bottom, in the Ainsworth plant, will be seven-teen feet in diameter, and about twenty feet high; in the center of the side of the tank is an indentation and the water coming down the flow-pipe rushes around this indentation before finally falling into the tank. The air leaves the water and rises to the top of the tank, the water passing out, and gradually rising through the shaft outside the down-flow pipe, discharging itself into the creek. The compression of the air is produced by the weight of this return column, every 27½ inches of the return column producing one pound of air pressure in the air as it descends in the down-flow pipe.

The air discharge main taps this tank at its highest point, and runs to the drill, hoist or other machinery. Another pipe, open at the bottom and discharging at the tail race, extends to the center line of the tank, and in the event of more air being



made than is used outside, the air passes up this pipe, and thus automatically regulates the plant, so that should all the demands for air suddenly cease, the plant would still keep running, and the air made would discharge itself naturally through this exhaust.

In the Ainsworth plant the delivered air pressure will be 90 lbs. and this will be carried through a 9-inch pipe two miles to the center of distribution in the Ainsworth camp. This 9-inch pipe will carry between 400 and 500 h.p. with a loss of 5 pounds.

The total cost of plant, exclusive of pipe lines, will be in the neighbourhood of \$15,000, and \$15,000 will be required for pipe lines. The air will be "laid on" to the various mains in the district, and supplied to the customer direct to his drill at either so much per cubic foot, or so much per drill delivered.

The efficiency of this system of

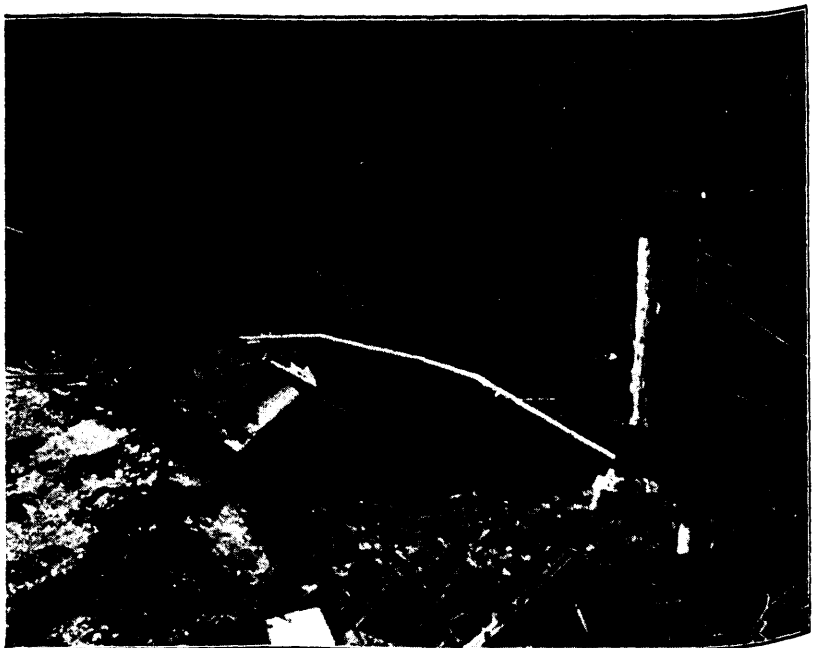
water wheel, that is developing more than thirty-five per cent. of the h.p. efficiency of the water used.

In lecturing on the subject before the McGill College at Montreal, Professor Nicholson showed that in this system there are two elements of loss, first loss due to friction and, second, loss due to the rising speed of the air-bubbles. In the Magog plant the loss due to friction amounted to seven per cent., while the loss due to rising speed of bubbles was twelve per cent., making a total loss of nineteen per cent. Another loss in this plant was due to ineffective separation, and in his lecture he remarks:

"In future plants this loss will doubtless be avoided, and we may expect as high an efficiency from this system as when power is given off a turbine jack-shaft, when it is not by any means in such a fit state for transmission as it is in the state of compressed air."

This rising tendency of the bubble is a very interesting problem. The force with which the water drags the bubble down is always much greater than the buoyancy of the bubble, so that the bubble always moves down. In the case of the Magog plant, where the downward speed of the water was 6.3 feet per second, the bubble, says Professor Nicholson, "would have to be 17 3/4 inches in diameter in order to have a buoyancy equal to the force with which the water forces it down. The air-bubbles of this plant were, as a matter of fact, three-eighths inches in diameter at the top and one-fourth inches in diameter at the bottom of the 143 foot deep down shaft; the speed with which they moved upward relatively to the water was eleven inches per second at the top, and nine inches per second at the bottom, so that they actually moved down at the rate of 5.4 feet per second at the top and 5.53 feet per second at the bottom of the down-flow pipe. The deeper the shaft the smaller the bubbles become at the bottom, and the more slowly they move upwards through the water. In other words the deeper the shaft the less the percentage of loss due to rising of the bubbles. The bubble absolutely must go down when once entrained in the water, no matter how deep the shaft."

air compression is quite remarkable. In the first plant installed at Magog, which was very thoroughly tested by the Faculty of Applied Sciences, Mechanical Department, McGill College, Montreal, an actual efficiency of 62 1/2 per cent. of the hydraulic h.p. of the water was obtained and delivered in compressed air, and Professor Nicholson, who made the test, demonstrated that even above this there was considerable loss due to ineffective separation of the air on account of the separator or tank at the bottom being too small, and he points out that the centrifugal principle for the air separation which will be used in the Ainsworth plant now being installed, will increase the efficiency from sixty-two to seventy-five per cent. In other words, the system delivers in compressed air as high an efficiency as the best known turbine can be relied upon for ordinary power on the jackshaft, and it is safe to say to-day, that there is no compressor plant actuated by a



WATER-BLAST FOR VENTILATING JUMBO MINE, ROSSLAND.
An old-fashioned method on the same principle as the Taylor System of Air-Compression.

It will be seen that this compression of air is isothermal, and that the compressed air will always be at the same temperature as the water, no matter what may be the temperature of the free air used. It is well known that the amount of moisture which is contained in any given quantity of air, depends upon its temperature and pressure. Its capacity for moisture varies as the temperature and pressure varies. The capacity of air for moisture increases with the temperature and decreases as the pressure increases. The pressure remaining constant, the moisture capacity of air increases with the temperature and *vice versa*. In all mechanical compressors up to the present time, the compression of air is invariably accompanied by a considerable increase in temperature. The moisture capacity of the air is raised in the same proportion. This moisture is absorbed from the surrounding atmosphere and other sources. When the air passes from the mechanical compressor to the conducting pipes, or when it is discharged back to the atmosphere after performing its work, it reverts to normal temperature or falls below normal temperature, hence its capacity for moisture is correspondingly reduced, and the moisture which it absorbed during its rise in compression is deposited on the pipes and apparatus, sometimes freezing up and causing very often serious inconvenience, annoyance and loss of efficiency. In the Taylor compressor the air is not permitted to rise in temperature during compression, and there being no increase in temperature, it can absorb no moisture on this account, and the air passes into the conducting pipes or other apparatus perfectly dry. In fact, in tests made by Professor C. H. M'Leod, of McGill College, Montreal, the compressed air was delivered to the machinery at Magog *five times* drier than the atmosphere from which the free air was drawn. The isothermal compression is an ideal condition which can never be reached by mechanical compression.

The system being absolutely automatic, and having no moving parts, no attendance whatever is required at the point of compression, and this absence of operating expenses brings long distance transmission of air forward as a powerful competitor of electricity. On a ten-miles transmission plant, where the amount of air required at the end of the line is 1,000 h.p., by starting with an initial pressure of 135 pounds, and dropping to 90 pounds at the terminus, (which represents a loss of ten per cent.) the delivery can be performed with a 15-inch pipe, and such a plant can be installed complete at a cost of not less than \$150,000, and when the plant is once installed, like Tennyson's brook, "it runs on forever" without attention, except a comparatively small cost of maintaining the pipe lines. Then again, on a rapid mountain stream, all the power of the stream can be utilized by the installation of a series of compressors, the air from each compressor being gathered into a common main for distribution. The Taylor Company is now working out plans for the installation of an air-plant for the Rosland area, where the distributing plant will be nine or ten miles in length. It can be stated that the air h.p. ready for the drill, at the end of the ten miles, can be delivered at a cost of \$25.00 per horse-power per annum, (after paying seven per cent upon the capital investment) or approximately fifty-five cents per diem per drill for the ordinary 3½ inch drill. The present power cost for the same drill, where steam is used in West Kootenay, is \$5.00 per diem, and electricity, since it has an operating charge at both ends, and one h.p. of electricity

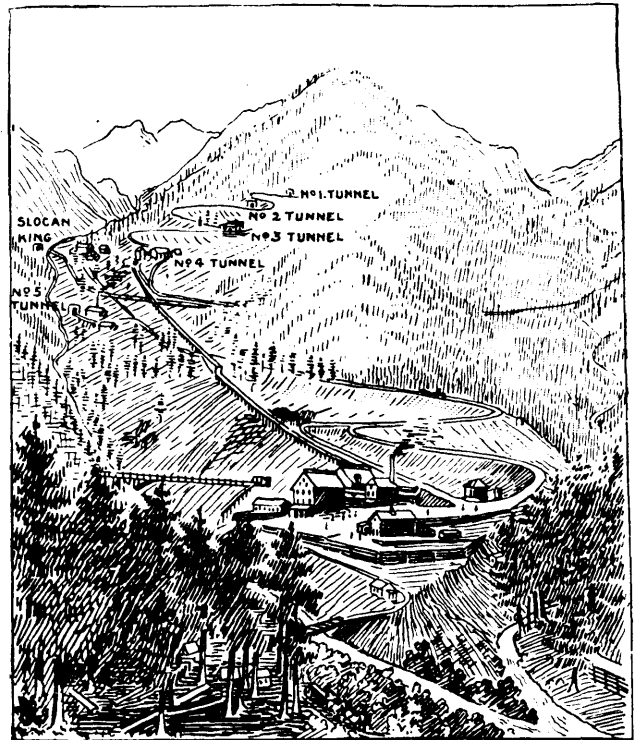
can produce but half a horse-power of compressed air, cannot reduce this charge more than twenty or twenty-five per cent.

THE SLOCAN STAR.

THE RESULT OF RECENT DEVELOPMENT WORK.

SINCE the closing down of the Slocan Star last winter a force of some thirty men have been employed on development and timbering work. The cause leading to the cessation of the mill operations may be said to have been the lack of development in the mine, which in its turn was stopped by the impossibility of "traming" the rock and timber incidental to development without interfering too seriously with the work of supplying the mill with ore.

The management thereupon considered it advisable to close down the mill entirely at this season of the year rather than employ one shift only, on account of the fact chiefly that steam for power must be used



SLOCAN STAR MINE—SHOWING SITUATION OF TUNNELS.
(From a Crayon Sketch).

now, whereas ample water power is obtainable by the first of June, and such ore as is being broken in the course of development now proceeding being readily stored in most conveniently handy old stopes. The development of the past two months has been of a most satisfactory nature, not only in the more important matter of placing ore in sight, but also as demonstrating some features in connection with the vein's formation not previously known, or perhaps rather hitherto not properly understood; for instance, the "zone" of mineralization has extended to far greater dimensions than till now supposed. This mineralization beyond "supposed footwalls" has always been most notable in the "Star." General experience leads miners to expect such phenomenon to occur mostly on the hanging wall, but in the Star's development to date the hanging wall, which is of the same nature as the footwall (the vein lying in a plane of fissure cutting the formation obliquely), seems to have presented a surface comparatively impervious to

the mineralized circulating liquids at the time of vein-filling, as well as a plane separating the shattered ore from the unshattered country.

Prior to the recent development it had been supposed that the vein split into two branches, but now it is found that those branches reunite, forming a large horse of country slate, which on the No. 3 level is 110 feet long and 35 feet across in its widest part, and lengthening in depth at either end of this "horse." The mineralized body is here larger than elsewhere in the mine, being in places 30 feet wide and as much as 10 feet of actually solid galena has been mined from the westerly end. The vein at the east end of this horse has only recently been opened up, although previously a drift had been run through on the third level without, however, the value being demonstrated. It now appears possible that this portion of the vein may develop as large an ore body as that at the opposite end of the horse. The development at the Slocan Star illustrates a most typical example of a vein requiring the closest study and the maximum quantity of crosscuts.

The management are assured of a long and prosperous mill run upon the resumption of operations at the Star concentrator.

A curious cave occurred in the Star during the past winter. Although the mine is comparatively a dry one, yet a considerable stream of water poured out of the hanging wall on the third level until a couple of days prior to the cave. Immediately the cave occurred this flow made its appearance on the fourth level 210 feet below, and within forty-eight hours all further caving ceased also, so that in many instances even the timber that had been badly crushed appeared to retain strength sufficient to resist further pressure. It would appear that a hydrostatic pressure had been caused in seams in the hanging wall which before had no outlet into the workings below the third level. Under such circumstances no amount of timbering could withstand such pressure.

LABORATORY EXPERIMENTS WITH THE CYANIDE PROCESS UPON DRY ORES OF SOUTHERN SLOCAN DISTRICT.

(By W. S. Johnson, B.A., B.A.Sc., Slocan City, B.C.)

NOW that the cyanide treatment of ores has become a recognized metallurgical process for the profitable extraction of silver and gold from various classes of ores, not only on this continent, but in Australia and Africa, where, in the latter country, it has added so much to the production of gold and the prosperity of the country, it occurred to me that possibly the cyanide treatment might be applicable to the dry ores of this district, and the present paper is the result of some experiments that have been carried on during the past winter.

It is not the intention of the writer to enter into a discussion of the theoretical side of the question, but to record results obtained from a close attention to a series of experiments lasting over a period of four months. This to me seems more relevant to the furtherance of the practical success of any process of extraction than the hypothetical discussions indulged in by many writers in our mining journals. It is most probable that those same writers never carried

out any experiments, but no sooner than a paper is written giving results obtained from actual experiments, are ever ready to pull it to pieces.

During the prosecution of this work, literature on the subject by Alfred James, Prof. Christy, Dr. Scheidel and A. Van Furman was consulted. To these gentlemen I wish to express my indebtedness for the assistance their researches have given me.

The mode of procedure as outlined below is somewhat upon the same lines as that given by H. Van-Furman.* Wherever a departure was made the advantage was first proved before employed.

CHARACTERISTICS OF ORE BODIES.

The ore bodies of Southern Slocan District may be divided into three classes:—

I Galena :

II. Dry silicious ore bodies containing silver, sulphide (Ay-2 S), and gold, with more or less iron pyrites (Fe S-2);

III. Silicious ore bodies containing gold

I. Galena ore bodies are probably of the same origin as those around Sandon, and as they are smelting ores, are foreign to this paper, and a more detailed description is unnecessary.

II. Dry silicious ore bodies containing silver, sulphide (Ay-2 S) and gold, associated with more or less iron pyrites, zinc blende (Zn Fe) S., etc. This class, a very important one, extending over a large area, beginning at Ten-Mile Creek, on east side of Slocan Lake, and extending in a southerly direction to Lemon Creek, or that portion of country enclosed by Ten-Mile and Lemon Creeks, which have their origin from a common source, and are approximately 200 square miles.*

This class may be again divided into two sub-classes for cyaniding purposes:—

(a.) Silicious ores in which silver values are predominant;

(b.) Silicious ores in which gold ores are predominant, or of about equal value.

As sub-class (a.) is rather a smelting ore than one fitted for cyaniding purposes, I will confine myself to sub-class (b.)

(b.) This class of ore is chiefly found along 1st and 2nd North Forks of Lemon Creek and vicinity. As the main characteristics of this class are similar, a description of one will apply to all, but it must not be understood that the same treatment will apply to all, for each ore body may have physical and chemical composition differing from that of its neighbour, although apparently the same to the eye, necessitating a difference in its treatment.

As an illustration of sub-class (b.), the Chapleau mineral claim, situated on the 1st North Fork of Lemon, about three miles from its junction with Lemon Creek. This is a silicious ore with silver sulphide, (Ag-2 S) (both in a fine state deceminated through the quartz and also in crystals) as well as gold; 20 per cent of the latter is free-milling.

Shipping returns from three car-load lots gave respectively \$132, \$141, and \$85.

Value ratios of gold and silver ores as 4.1.

III. Dry silicious ores containing gold with a little silver alloyed. This class of ore bodies to the south and head of Lemon Creek, and across the divide into Ainsworth and Nelson Divisions.

*A Van Furman, Trans. A. I., Sept., 1896.

*Map by J. C. Gwillim, B.A.Sc., in B.C. MIN. REC., Feb., 1898.

Represented by Golden Wedge, Black Prince, Alpine, etc.

This class better suited for cyanide treatment than II., being more granular, less basic, and contains little argentite.

The ores experimented on were from sub-class (b.) II, and III.

METHOD OF PROCEDURE.

As the reliability of experiments of this kind depend to a great extent upon the method adopted, as well as the ability of the operator, it seems to me that an outline of the method is in place.

Ores of value of \$40 per ton and over, where not free-milling, are better fitted for smelting or some other metallurgical process, than cyanide treatment, for this purpose it has been my care to limit myself to a value of about \$40 per ton.

Of the various ores experimented with, a sample of ten pounds was taken, when found by an approximate sample to assay about \$40. This was crushed to pass through screens of 10, 20, 30, and 40 meshes to the linear inch. This pulp was thoroughly mixed and quartered down to about 250 grammes. The 250 grammes taken were then crushed to pass through a screen of 100 meshes to the linear inch. Four half assay tons of ore taken and assayed separately, and the average of the four assays being taken as the value of the silver and gold per ton.

An analysis from this pulp was made to determine the different constituents.

One hundred grammes of the 10, 20 and 30 mesh and taken and percentage of free gold determined.

ACIDITY.

To ascertain the acidity of an ore for cyanide treatment it is important to know the acidity due to soluble acid salts, and acidity due to insoluble acid salts; the former of which can be washed out by water, the latter having to be neutralized by some alkali.

Two portions of 50 grammes were weighed out. One portion was washed with water and the washed ore treated with a known amount of deci-normal sodium hydrate sol. (Na.OH-10), stirred and allowed to stand for twenty minutes. The sodium solution filtered off into a beaker and ore washed, and wash water then filtered into same beaker.

The excess of sodium hydrate was determined by titrating against deci-normal sulphuric acid (H-2 SO-4/10). This quantity from known quantity first taken gives the amount of sodium hydrate required to neutralize acidity of ores due to *acid salts insoluble* in water.

The other fifty grammes, treated with a known quantity of deci-normal sodium hydrate sol., without previous washing with water, and excess of sodium hydrate solution determine as above with (H-2 SO-4/10).

This quantity of Na. OH, subtracted from known quantity first taken, will give amount of Na. OH required to neutralize acidity due to soluble and insoluble acid salts, or the total acidity of ore.

Now data for determining acidity of ore due to soluble acid salts and that due to insoluble acid salts.

Example :—

Let x = quantity of Na. OH required to neutralize insoluble acid salts ;

Let y = quantity of Na. OH required to neutralize both soluble and insoluble salts ;

Then y — x = quantity of Na. OH required to neutralize soluble acid salts.

Having found the quantity of Na. OH required for acidity of ore ; the equivalent of Na. OH in terms of lime can easily be calculated by following equation :

Na. OH : quantity of Na. OH :: Ca. O : required amount of lime.

Example :—

Suppose 15lbs. Na. OH required to neutralize acidity of a ton of ore ; what quantity of lime (Ca O) would we have to substitute for this ?

Na OH : 15 :: Ca O : required lime ;

23	
16	40
1	16
—	—

40 : 15 :: 56 : lime ;

Lime ... 15 / 56 = 21lbs. lime.
40

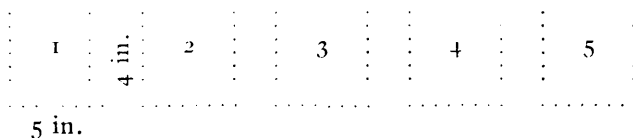
Equivalent for any other alkaline compound can be worked out in similar manner.

Some writers* state that when ore is treated with water and no acid reaction is given with litmus paper, it may be taken for granted that acid salts are absent.

If litmus paper is freshly prepared this may work ; but it is very unreliable, as I had a case where 25lbs, of lime per ton was required to neutralize acidity of ore, still this did not give an acid reaction with litmus paper.

Having taken all the required preliminary precautions treatment of the ores with cyanide of potassium was proceeded with.

For this purpose I found, for laboratory work, that 1/2 gall Winchester bottles, with the upper portion cut off, answered very well, the proportions corresponding with size of vats in practical treatment. The *modus operandi* was as follows :—



Five bottles were placed side by side ; 200 grammes of ore weighed into each of the first 4, with the requisite amount of Na. O.H. or its equivalent in lime (Ca.O) 200 cc. of Kcy. solution added to each, the strength of which is known, say to begin with 0.1000 per ct. K cy. (Pot. Cyanide).

At end of 24 hours 5 cc. of No. 1 drawn off with a pipette, and its strength ascertained by titrating with standard silver nitrate solution. Then 29.2cc. of clear solution drawn off with a pipette and placed in a lead tray, evaporized to dryness on asbestos card. This lead tray is then rolled up and marked No. 1, and put aside.

At end of 48 hours 5 cc. of No. 2 taken, its strength ascertained. and 29.2 (equivalent to 1 A.T. of ore) of its solution evaporated to dryness, rolled up and marked No. 2, and put away with No. 2.

Also, strength of No. 1 again ascertained, and after making correction for lesser amount of sol. 29.2 cc., evaporated to dryness, lead rolled up and marked No. 1a. This serves as an excellent check on No. 2.

At end of 72 hours No. 3 tested as above, No. 2 this time serving as check.

Finally, at end of 96 hours, No. 4 treated in same way.

*E. B. Wilson, E.M., Cyanide Process.

After No. 4 has been finished, wash out K. cy. from ore with water, saving slimes on a filter, dry and when necessary crush finer, and run through crucible assays; this will give value of gold and silver left in the ore after lixiviation with K. cy.

Whilst this is going on the resulting lead buttons arising from evaporations of 1, 2, 3 and 4 solutions are cupelled, and gold and silver ascertained. The gold and silver arising from No. 4 should make up, when added to gold and silver of No. 4 crucible assay, the original value of ore. By drawing off clear supernatant liquid, scorification of lead button unnecessary.

Contents of the bottles were stirred every five or six hours during the leaching.

As 200 grammes of ore were taken and 200 cc. of solution, 29.2 cc. of solution is equivalent to 1 A.T. of ore, i.e. the gold and silver found from evaporation of 29.2 cc. (1 A.T.) of solution will equal the amount of gold and silver extracted from 1 A.T. of ore, or the number of ozs. per ton extracted.

As there is always more or less acid fumes in a laboratory, it was found necessary to run through a blank experiment, i.e. 200 cc. of K. cy. solution, of same strength as used with ore, were placed in a bottle alongside of those containing ore, and at the end of experiment the quantity measurement and its strength ascertained; quantity measurement to ascertain the loss of solution by evaporation.

A blank experiment was made in a room free from acid fumes, and at end of four days the strength of solution had not apparently altered; so it was assumed that any decrease in strength of blank solution run through with ores was due wholly to acid fumes in its laboratory, which decomposed the K. cy., forming H. cy. as:—



SLIMES.

As formation of slimes of various ores during crushing interfere with subsequent lixiviation of ore with

K. cy., No. 2 bottle was washed several times and wash water decanted through a filter, these slimes dried and weighed. Amount of slimes per ton can be estimated from this where crushing of ore in practical work is same as that employed in laboratory.

The above method I found to work very satisfactorily, and believe that evaporation of solution in lead tray for laboratory work will give better results than any method of precipitation.

The precipitation of silver and gold from solutions, by adding Fe-s for precipitation of silver and zinc chloride for precipitation of gold, is very unreliable, as considerable gold comes down with the silver, and only traces of gold are precipitated with zinc chloride. Zinc oxy-chloride precipitates nearly all the gold and should be substituted for the chloride when this method employed.

Prof. Christy's method of precipitating gold from solutions by acidifying K.C.N. solutions with H₂So-4, then adding a cuprous sul., a very neat method, but for laboratory work, when solutions containing less than an oz. of gold per ton, I prefer the evaporation of an assay ton of solution, as in the precipitation of small quantities of gold from limited quantities of solutions, there is likely to be an error introduced by loss in manipulation, filtering, etc.

The above method is rather that of the agitation process than percolation. The latter process is generally used in practice, the only difference is that leaching by percolation takes more time to get the same percentage of extraction.

Having given a general description of the *modus operandi* employed during these experiments, I will now give the results in a tabulated form. It will not be possible to give results of all experiments, as it would take up too much time and space; however, enough will be given to elucidate the work.

There are four tables in all, I., II., III. and IV. Experiments of tables I. and II. are upon the same ore; III. and IV. upon different ores.

TABLE I.

No. of Exp.	Duration of Exp. in hours.	Preliminary Treatment.	Strength of K cy solution.	Mesh.	Assay of ore before treatment.		Assay of ore after treatment.		Percentage of Extraction.		Lbs. K cy consumed per ton of ore.	Lime required for ton of ore to neutralize acidity.	Cost of chemicals per ton.	Other treatment costs, crushing, labour, &c.	Total cost of treatment per ton.
					Silver	Gold.	Silver	Gold.	Silver	Gold.					
(A)	24	Lime	0.095	20	38.04	1.10	33.10	0.78	13 p.c.	29 p.c.	1.5	25			
	48		.043				32.10	0.72	15 "	34 "					
	72		.031				32.40	0.75	15 "	34 "					
(B)	24	Lime	0.235	20	38.04	1.10	37.00	0.70	3 p.c.	36 p.c.	6.6	25			
	48		.051				32.14	0.36	16 "	67 "					
	72		.021				25.40	0.30	33 "	72 "					
(C)	24	Lime	0.272	20	38.04	1.10	32.20	0.56	16 p.c.	49 p.c.	4.5	25			
	48		.160				25.72	0.30	32 "	67 "					
	72		.051												
(D)	96	Lime	0.404	20	38.04	1.10	22.00	0.36	42 p.c.	67 p.c.	4.00	25			
			.171												

An analysis of the ore in tables I. and II. gave—

Si. 0-2	91.66 per ct.
Fe-2 0-3	2.13 " "
Fe s2	5.34 " "

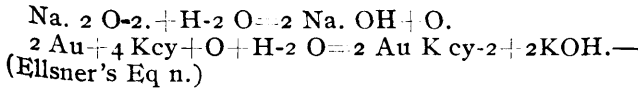
99.13 per ct.

Silver, 38.04 oz. per ton. Gold, 1.10 oz. per ton.

A and B were neutralized by lime alone; C and D with lime almost to point of neutrality, and finished by adding sodium peroxide (Na. 2 0-2) in excess.

The reason for finishing the neutralization with sodium peroxide was to prevent an excess of lime in the ore, which excess would consume potassium cyanide forming calcium cyanide, (Ca. cy-2), an inert compound; whereas if neutralization finished with

sodium peroxide, the excess of sodium peroxide over that required for neutralization of acid in ore, would form sodium hydrate and at the same time evolve oxygen, which decomposes K. cy. and accelerating solution of gold, as—



From the percentage of extraction obtained in (c)

and (d) in comparison with quantity of K cy. consumed, it is probable that too much of an excess of sodium peroxide was used. The rapid evolution of oxygen decomposing K cy. more quickly than the nascent cyanogen could be taken up by the gold to form the double cyanide (K Au cy-2) potassium aurocyanide, hence the surplus cyanogen would form para cyanogen (cy-2) and as this para cyanogen will not form with gold the double cyanide (K Au cy-2) it passes off as a gas, causing useless waste of K C N.

TABLE II.

No. of Exp.	Duration of Exp. in hours.	Preliminary Treatment.	Strength of K cy solution.	Mesh.	Assay of ore before treatment.		Assay of ore after treatment.		Percentage of Extraction.		Lbs. K cy consumed per ton of ore.	Lime required for ton of ore to neutralize acidity.	Cost of chemicals per ton.	Other treatment costs, crushing, labour, &c.	Total cost of treatment per ton.
					Silver	Gold.	Silver	Gold.	Silver	Gold.					
(E)	48	Lime	0.161	30	38.04	1.10					1.9	25	\$1.05		
	96		.130				25.00	0.28	34	74 p.c.					
(F)	24	Lime	0.323	30	38.04	1.10					4.00	25	1.88	\$3.00	\$4.88
	72		.282				17.56	0.18	54	83 "					
	96		.220				32.00	0.76	16 p.c.	30					
	96		.191				18.16	0.21	47 "	80					
							12.10	0.09	68 "	91					

By inspection of table II. it will be seen that percentage of extraction has reached the maximum.

This ore is the same as that used in I., but was crushed to 30 mesh, and only a slight excess of sodium peroxide used. This treatment gave better results than any other tried by the writer, and am of the opinion that the consumption of K cy. by careful work can be further reduced.

It will be noticed that strength of K cy. solutions exp. (E) was 0.161 per ct., and silver and gold extractions were 54 per ct. and 83 per ct. respectively,

with consumption of 2 lbs. K cy. per ton; whilst (F) whose solution was 0.323 per ct., gave extractions of 68 and 91 per ct., with consumption of 2 lbs. K cy. per ton. It is therefore evident that the most efficient strength lies between 0.161 and 0.323 for above ore.

Other experiments were tried upon this ore with solutions of greater strength, 0.5, 0.7 and 1.0 per ct. K cy., but the increased percentage of extraction would not compensate for the additional quantity of K cy. consumed, which amounted in 1 per ct. solutions to almost 10 lbs. per ton.

TABLE III.

No. of Exp.	Duration of Exp. in hours.	Preliminary Treatment.	Strength of K cy solution.	Mesh.	Assay of ore before treatment.		Assay of ore after treatment.		Percentage of Extraction.		Lbs. K cy consumed per ton of ore.	Lime required for ton of ore to neutralize acidity.	Cost of chemicals per ton.	Other treatment costs, crushing, labour, &c.	Total cost of treatment per ton.
					Silver	Gold.	Silver	Gold.	Silver	Gold.					
(G)	24	None	0.202	20	3.12	0.16					1.2	0.00	\$0.05	\$2.50	\$3.05
	48		.178				1.82	0.06	42 p.c.	62 p.c.					
(H)	24	None	0.383	20	3.12	0.16					3.0	0.00	1.54		
	48		.323				0.76	Trace.	78 "	94					
	48		.306				1.44	0.03	54	81					
							1.21	Trace.	62	98					

The ore from which results in table III. compiled, is a better one for cyanide treatment than the above one, being a somewhat granular quartz with crystals of iron pyrites disseminated throughout ore.

COMPOSITION.

Iron pyrites amounted to 2.38 per cent of the whole. The consumption of cyanide per ton should be even

lower than is shown in the table, as acidity indicated by litmus paper was practically nothing, after the exp. had been made I found that there was a latent acidity not neutralized, this would lower the consumption of K cy. when neutralized.

High extraction of silver no doubt due to the fact that silver here is alloyed with the gold and not as Ag-2 S as in former tables.

Again by referring to table IV., the ore used was pure iron pyrites of low grade, per centage of extraction is very low, when compared with the quantity of K cy. consumed. The results of experiments as shown in (J) are best obtained yet. As I am still experimenting with it, yet may find a strength and mesh to suit it.

RECOVERY OF GOLD AND SILVER K CY. SOLUTION.
Have not done any work in this line in laboratory; as to get the gold in solution is the important point.

ZINC METHOD.

The one most widely employed is to allow the solutions, holding the double cyanides of gold and silver

TABLE IV.

No. of Exp.	Duration of Exp. in hours.	Preliminary Treatment.	Strength of K cy solution.	Mesh.	Assay of ore before treatment.		Assay of ore after treatment.		Percentage of Extraction.		Lbs. K cy consumed per ton of ore.	Lime required for ton of ore to neutralize acidity.	Cost of chemicals per ton.	Other treatment costs, crushing, labour, &c.	Total cost of treatment per ton.
					Silver	Gold.	Silver	Gold.	Silver	Gold.					
(I)	24	Lime	0.262	40	14.36	0.76	13.18	0.74	8 p.c.	v. sml	4.2	24			
	48		.222				13.15	0.73	8 "	"					
	72		.153				13.15	0.71	8 "	6 p.c.					
(J)	24	Lime	0.363	40	14.36	0.76	12.32	0.66	14 p.c.	13 p.c.	7.00	24			
	48		.303				12.32	0.55	14 "	31 "					
	72		.202				11.64	0.40	18 "	47 "					

(K Au cy-2 and K Ag cy-2), to run through a series of boxes charged with zinc shavings. The solutions are so conducted that they always enter into bottom of boxes and ascend through zinc shavings. The gold is precipitated in metallic state and falls to bottom, whilst some of the zinc goes into solution.

When K cy. solution has passed through the series of boxes only a small percentage of gold is left in the solution; this solution is then pumped back to be used over again when made up to the required strength.

CUPROUS METHOD.

Another method elaborated by *Prof. Christy for precipitating gold from solution is by adding cuprous salts to acidified solutions, the gold being precipitated as Cuprous Auro Cyanide (Cu S Au cy-2). As this method necessitates the destruction of all of the free K cy. it is only applicable to weak solutions where the destruction of the K cy. is of no importance.

From laboratory experiments the author says* the total quantity of gold is recovered, which is not the case when zinc is used.

His method of procedure is as follows: Solution with Potassium Auro Cyanide is acidified with H-2 SO-4 then would be added the proper amount of copper sulphate and common salt, the whole solution stirred and allowed to stand 12 hours, then filtered. The residue is called Cuprous Auro Cyanide. This may be easily refined.

This method of recovery of gold might possibly be applicable where strong solutions were required, by following procedure.

In ordinary practice a weak cyanide solution is first used, followed by a stronger one. Where there are a series of vats the strong solution of No. 1 might be used as weak solutions for 2, 3, 4, etc., ultimately the solution containing a maximum of K Au cy-2 and minimum K cy.

This solution could thus be treated by cuprous method, the destruction of the little K cy. remaining in the solution being of little moment.

This is a very promising field for further investigation and should be looked into by those intending erecting cyanide plants.

PROBABLE COST OF TREATMENT.

This is a very important question and as a paper of this kind would fail in attaining its object unless an estimate of cost of treatment were appended; owing to this I will make an estimate with data I have on hand.

Owing to the great many factors that enter into a consideration of this kind one will understand that such an estimate is only an approximation to accuracy. To make an accurate estimate of costs, data in above tables should be supplemented by work on a larger scale at some place fitted for the purpose. Also quantity of ore "in sight," accessibility of ore deposits, price of chemicals, freight, labor, etc., should be ascertained.

Assuming the laboratory experiments as fairly accurate, (as indeed they should closely duplicate larger tests when made at a mill), the cost of chemicals can easily be estimated. For the rest of the data one can make use of that given by competent authorities upon similar ores in other places.

The data used in making following estimate was from tables II. and III., and from Dr. Scheidel's Cyanide Process.

Referring to (F) table II., as being the more satisfactory of the two as regards percentage of extraction, it will be seen that consumption of K cy. is four lbs. per ton of ore.

New York quotations upon carload lots of 98 per ct. K cy. is 28 cts. per lb. Freight, duty and carting to mill, brings price to 0.42 cts. pr lb.

Consumption of zinc, 8 ozs. per ton, 0.05; assuming lime at mill @ \$12.00 per ton, this amounts to 0.006 cts. per lb. So cost of chemicals for such an ore as (F) table II., is—

4 lbs. K cy. @ 0.42	\$ 1.68
8 oz. of zinc	.05
25 lbs. lime @ 0.006	.15
Total cost of chemicals per ton	\$ 1.88
The cost of labour and crushing per ton upon a similar ore at Revenue, Madison Co., Mon., is	2.00
Royalty, per ton	1.00
Total cost of treatment per ton	\$ 4.88

or say \$5 per ton for ore (f.) Table II.

*Prof. Christy Transactions of A. I. M. E., Sept., 1897.

Now referring to (g.) Table III, as being the better suited strength for economical extraction of maximum value:—

Cost of treatment of this ore per ton—	
Chemicals.....	{1.15 Kay = 0.50 Zinc .05
	0 55
Labour and crushing.....	1.50
Royalty.....	1.00
Ore exclusive of royalty, 2.05 per ton.	

COMPARISON OF POTASSIUM CYANIDE PROCESS WITH SMELTING.

Now let us compare the costs of treating ores of class (f.) by K cy. with such smelting costs as obtain here at present from a miner's point of view.

Take a case of a mine upon the 1st or 2nd North Fork of Lemon Creek:

Cost per ton for packing to railroad at present is \$15, and freight and smelting charges \$13.50-\$15 per ton.

Take case of ore (f.) Table II:	
Here total value of silver per ton, 38.04 at 56 =	\$21.28
“ “ “ “ 1.10 at 20 =	22.00

Total value per ton..... \$43.28

The smelters pay for 95 per cent. of New York quotations of silver, and \$19 per oz. for all the gold.

So shipper is paid upon above ore per ton—	
1.10 oz. gold at \$19 =	\$20.90
95 per cent. 38.04 oz. silver at .56 =	\$20.21

Total..... \$41.11

Less \$15 for packing, and \$14 for freight and smelting charges.... \$29.00

Net value of ore per ton... \$12.11

Or ore originally valued at \$43.28 nets the shipper \$12.11 by smelting treatment less cost of mining.

Now, same ore by cyanide treatment:—

[See (f.) Table II.]

68 per cent. of total silver value....	\$21.88 = \$14.47
91 “ “ “ gold “ ..(\$22.00) =	20.20

Total value per ton..... \$34.67

In this case mill would be in the vicinity of mine; packing would be reduced at least two-thirds, or to about \$5 per ton. So \$34.67 less \$5 for packing to mill, and \$5 for treatment, \$10 in all, leaves net value to shipper \$24.67 per ton, or a difference of \$12.67 per ton in favour of the cyanide treatment.

From the fact that there are so many fair prospects of same general character along 1st and 2nd North Forks of Lemon Creek and neighbourhood, and that now it does not pay to ship ore under value of \$40 per ton, so all ore under this value is thrown aside, and the ratio of ore under \$40 is to that over \$40 as 5 is to 1; so one can readily realize what a boon it would be to the district if some such cheap method of treatment of such ores were established in the district.

Before this can be successfully accomplished, careful investigation by laboratory work, supplemented by experiments upon a large scale, at places fitted for that purpose, must be carried out, as well as finding out extent and character of ore bodies. It may happen that an ore may be suited to cyaniding purposes until the line of "vadose circulation" is passed, and after that some other process may be required. Hence

it is necessary to prove the ore bodies to some depth.

When upon this subject, I hope it may not be taken amiss by saying to capitalists (who have had little experience in such processes as cyanide, chlorination, etc.) intending investing their money in such processes, is to employ competent men, as there is no existing metallurgical process that requires such a close attention to the chemical side of the question in order to make the method a financial success, as the difference between success and failure, or at any rate indifferent results, may be due to very little.

Even practical men in charge of a cyanide mill in one place could not be expected to inaugurate one upon apparently the same class of ores in another place. Once the mill has been placed upon a good footing the ordinary mill man may manage it; and to place a man in charge of the work in its initial stages who has had neither the practical experience nor technical training would be suicidal.

Also, when intended investor is satisfied as to quantity of ore visible, and laboratory tests shew it suitable for cyanide treatment, a considerable shipment should be made (and if possible accompanied by their chemist) to a mining school of repute, where appliances are designed for all classes of ore.

Sending it to a mill designed and treatment elaborated for a special ore, is of doubtful value, as it presupposes for the ore sent identical physical and chemical composition with that class of ore the mill was designed for, something which will seldom occur, consequently the results are not conclusive.

It must be borne in mind that treatment and mill must be designed for the ore, not the ore for the mill, as above procedure would imply.

In conclusion I wish to say that I have tried to make this paper as non-technical as possible, consistent with efficiency; and to have made it more so would have lengthened and rendered it more confusing.

A VISITOR'S IMPRESSIONS OF WEST KOOTENAY.

(By W. M. Brewer, M.E., late of the Alabama State Geological Survey).

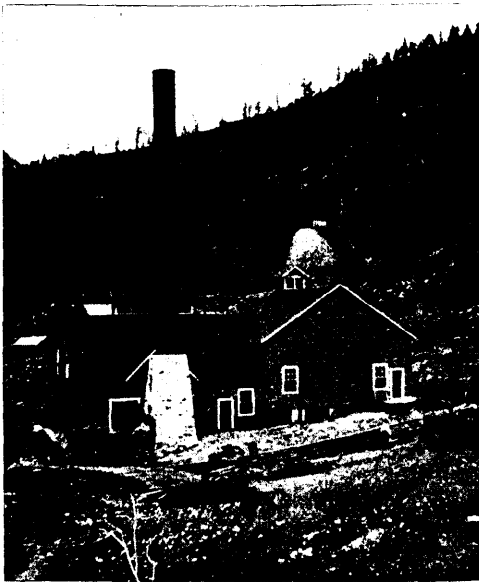
DURING the recent flying trip which I made through the Slocan and West Kootenay districts I was very strongly impressed with the magnitude of the superficial area which is known to be mineral-bearing in the Province of British Columbia. I use the expression "known to be," although large portions of the province are to-day comparatively unexplored, because when the main rivers which drain the entire territory west of Calgary are to-day producing placer gold in paying quantities, after having been, many of them, mined for upwards of thirty years, it is a very safe conclusion to arrive at, that within the confines of this territory occur the source from whence all this placer gold has come. The magnitude is also determined by the fact that nearly every range of mountains which has received the attention of prospectors, mineral-bearing ore has been found, both in paying quantity and grade.

Another feature with regard to the mineral resources of the province which cannot fail to create a most profound impression on the mind of a visitor who gives the question serious thought, is the fact that such a large area of the province is practically unknown to any except the Indians. Not only does this apply to districts remote from railroad trans-

portation, but it is true of localities in the immediate vicinity of many of the railroad towns, and especially, also of the richest mining camps

I do not mean by this that around the mineral camps the ground has not been covered by prospectors, but that even these prospectors who have staked locations themselves know practically little with regard to occurrence, extent or permanency of the

ore in the claims they have recorded. That such a condition exists is the only weak point in my opinion of the mining laws of the province, because prior to recording a claim no definite work, even to show the "rock in place" is required of the discoverer. And by this omission the custom has resulted not only of staking and recording claims without previously having determined the actual occurrence of ore—"rock in place"—beyond the finding of a few surface out-croppings or float which may have been carried for miles, but also of relocating year after year these same claims through collusion with friends.



LE ROI COMPRESSOR PLANT, ROSSLAND.

The answer of one prominent mining man to my criticism on this subject a few days since was:—"You see we have so many brokers who are engaged in floating mining companies and who are perfectly willing to pay a prospector a few hundred dollars merely for the acreage of the location, caring nothing at all whether there is any value attached to it beyond that. By these promoters the prospector is urged to stake claims and rush through the country from one district to another with only one aim or ambition ahead of him; that of recording as many locations during the year as possible to turn in to the promoter at the price of one, two or three hundred dollars apiece."

Of course many locations made in this manner are eventually developed to a more or less extent, but usually not until the broker has transferred the "location" to some corporation capitalised at six or seven figures, the shareholders of which are rarely local residents. According to the old maxim "All is well that ends well," it would make but very little difference if all of the locations were developed or

thoroughly exploited, whether the work was done by prospectors themselves or by corporation, but only a very small proportion of such locations up to the present time have received any attention further than the recording and the relocating.

To remedy such a condition of things is not so easy but your provincial mineralogist, Mr. Carlyle, has offered a suggestion which I find mining men in the country endorse. This is the passage of a law compelling the performance of a certain amount of work within ninety days after recording the claim.

Of course it may be urged that a stranger has little right to criticize the law or regulations under which the people of the province have lived and prospered for many years, but in this and the articles to follow I propose to comply with the request of the editor of the RECORD and relate my first impressions of the mineral producing districts of the province exactly as they occurred to myself during my travels.

Of course the fact of snow being on the ground in all of the mining camps south of the Canadian Pacific Railroad to depths ranging from three to twelve or fifteen feet reduced my opportunities of observation to a minimum so far as the surface indications were concerned. But through the courtesy of several of the superintendents of mining companies in the districts I was enabled to take advantage of other men's experience by seeing several mines which had been developed quite extensively through their underground workings,—many of them dividend payers.

The policy of paying dividends is certainly a most praiseworthy one, but the premature idea occurs to me that sometimes the payment of greed for dividends is satisfied at the expense of the mine, and really eventually dividends ally to the cost or sorrow of the shareholders themselves. Because when the ore in sight is mined, and treated from hand to mouth as it were, instead of development work being carried ahead, so that at all times there is always blocked out in the underground workings sufficient ore to guarantee a steady average output for months or even years to come, some contingency may arise at any moment through "faulting" or some freak of nature which causes a cessation of shipments, and not only are dividends then out of the question, but by want of funds the mine operations themselves stop. It occurs to me that all the shareholders in British Columbia companies would in the future be very much better satisfied if a policy were adopted which compelled the directors to not only keep at all times a proportion of the labourers in the mines engaged in prospecting or development work for future stopping, but also a certain percentage of the earnings in the treasury as surplus to be used in case of such a contingency as I have mentioned occurring.

The bounty of Nature in providing the highways which the waterways of the province really constitute, is another feature which cannot fail to impress the mind of the observant visitor. The system of lakes reaching southerly from the Canadian Pacific main line, has afforded a means of ingress and egress to the Slocan and Kootenay districts, without which their development would have been impracticable because of the enormous investment which would have been necessary in the construction of railroads.

Although the outside world has heard of the Kootenay mines since their discovery, yet but comparatively

few of the people residing beyond the boundary have any intelligent idea of the routes by which these mining districts are reached. And even those few who know through information gathered from reports and maps the best route by which to travel have no conception of the grandeur and picturesqueness of the trip from Victoria by the C.P.R. I doubt if the beauty of the

scenery even can be equalled anywhere else in the world. Of course there are many grand and beautiful spots which stand unsurpassed for beauty and grandeur, such as Royal Gorge, of the Arkansas River, in Colorado, spots in the Yellowstone Park in Wyoming, to say nothing of scenes in the Alps and mountainous sections in other foreign countries. But by the route I have mentioned, one is travelling through scenery which for the entire distance keeps one's attention absorbed.

These mining districts can be now conveniently reached either from the north or the south, because from Revelstoke, on the Canadian Pacific, there is being operated a direct system which connects the main line with the various camps, the trip being made partly by rail and partly by water. From the south the mines can be reached by railroad from Spokane Falls, in the State of Washington.

The trip by Canadian Pacific system is divided as follows: Rail from Revelstoke to Arrow Head, distance 27 miles down the Columbia River. Here the head of the lake known as the Upper Arrow is reached, and thence to Nakusp, at the foot of the lake, the traveller is transported by steamer. From Nakush to

Sandon, in the heart of the Slocan, the railway is used; but between Sandon and Nelson Slocan Lake is traversed its entire distance by steamer, and at Slocan City one again takes to the cars. This branch of the railway follows for a long distance down the Slocan River, then crosses a narrow divide to the Kootenay River, along the south bank of which it ascends to the southern extremity of the west arm of the Kootenay Lake, which it crosses almost within the city limits of Nelson. On the return trip it is not even necessary to travel over the same route, but instead, the cars are used from Nelson to Robson, where transfer is made to steamer, and the entire length of both the Lower and Upper Arrow Lakes, as well as the portion of the Columbia which connects them, is traversed, the only portion of the round trip which is necessarily repeated is that from Nakusp to Revelstoke. I have volunteered this information for the sake of the many from the States and elsewhere who now propose visiting this section.

THE
KOOTENAY
RIVER
WATER
POWER.

Before attempting any description of the mines or mining districts, I desire to mention the water-power which is being improved on the Kootenay River, and by which it is proposed to generate electricity and transmit it to Rossland and Nelson to furnish motive power to run the machinery and drills, as well as to afford light in the different mines and smelters. It is estimated that 2,200 horse-power will be furnished through the canal now being constructed to carry the water which falls over the precipitous natural dam formed by an immense ledge of rock, and makes one of the grandest and at the same time most awe-inspiring sights imaginable. The work of construction is being carried on as rapidly as possible, and it is expected that the power plant will be complete in the near future, when the connection with wire will be made between the plant and Rossland first, and afterwards, if the service there is satisfactory, the system will be extended as desired by mine owners and smelter men. Some slight apprehension is felt as to whether the transmission will be adequately made, the distance being about 30 miles; but as the

transmission of electricity from Niagara Falls has been successfully performed, although the distance for transmission is, I believe, hardly so great as in this case, still there would appear to be little cause to apprehend failure. This undertaking is in the hands of a Rossland syndicate, and that fact alone is worthy of remark, because it demonstrates the enterprising spirit and energy which prevail among the leading men of the camp.



LE ROI SHAFT HOUSE, ROSSLAND.

Sandon was the first mining camp I visited. Owing to the extreme depth of snow it was impossible to obtain any information from observation as to the surface outcroppings here, but through the courtesy of Mr. Rathborne, superintendent of the "Queen Bess," which is located about four miles west of the town, I was afforded an opportunity to see the underground workings in this mine. The system of working by tunnel, which is almost universally adopted throughout the Slocan and Kootenay Districts, has been followed at the Queen Bess. Of the advantages of mining by this system I will refer to later. The ore body in the Queen Bess is found usually in the metamorphosed argillites, but at some points the vein has cut across the eruptive porphyrites, which as dykes are intrusions and have cut off the slates. The trend of the argillites is north-westerly, while the strike of the vein is north-easterly. Some idea of the complicated structure can readily be conceived when these facts are considered, as well as that the ore body in some places is exposed at the contact between these

different rocks, and at others 15 or 20 feet distant from the contact and in the eruptive. But with all this irregularity, which would be very puzzling to a man not thoroughly acquainted with the formations in the district, yet the experienced miner finds a certain regularity has been demonstrated when he thoroughly exploits the underground workings. In these it has been demonstrated that the highest grade ore and largest pockets are found in the argillites, rather than in the eruptive rock, which evidently resisted fracture with a much greater force than in the case of the slates.

The thickness of the ore body varies from a few inches to about four feet. At the points where it is thickest the mineral occurs as solid galena, carrying silver and lead, or as carbonates. The proportion of the latter mined up to the present time is probably 25 per cent. of the entire product of the mine. There shows in the workings a smaller vein parallel with the main ore body to which I have been referring.

Five drifts at different levels have been run, which have developed the main ore body to a vertical depth of about 400 feet, and two have been run on the smaller vein. In the aggregate the length of the various openings, including cross-cutting, is about 3,000 feet. But comparatively little stopping has been done. In fact, at the time of my visit, only one man was employed at that work, because no effort was being made to ship ore in greater quantities than sufficient to meet current expenses. The purpose of the management is to thoroughly develop the mine, and determine the quantity of ore "in sight" and the probable permanency of the veins.

Mr. Rathborne accepted the superintendency of this mine after it had been very much "butchered" by his predecessor, and I am satisfied that with the former's intimate knowledge of the district, if he had had the management from the first opening, a great deal of money would have been saved which has already been spent in performing unnecessary work. The Queen Bess is a property which, to be successfully opened up, requires to be managed by an engineer skilled and experienced in the complicated formations of the district, and it is manifestly foolish for a company owning Slocan claims to engage men unacquainted with the locality to direct operations.

The Queen Bess ore is of such a grade that when the mine is properly exploited, unless some unexpected contingency arises, this property should rank among the profitably worked mines of the district.

Because of the complications in the formation it is impossible to measure up the ore in sight, even with the levels opened by the usual method, because development has shown that the squeezes and pockets

occur so irregularly. About the only method by which a reliable estimate can be reached is by checking the quantity of ore taken from the drifts and figuring the quantity between the levels on the basis of that taken from the drift. Even by this method, the result, after the stopes are worked out, may be found to not agree with the figures, because it has been already ascertained that the pinches and pockets in the stopes do not agree with those occurring in the horizontal drift. At the time of my visit about forty miners were employed on the property.

I unfortunately did not have an opportunity, owing to the impassable state of the trails, to visit the underground workings in any other mine in this vicinity, but when due consideration is given to what has been done in the district, the large sum paid in dividends—taking into account the difficulties under which the miners have had to work, because of the lack of good trails and roads—the fact that there are now no less than thirty-two shipping mines within this limited area, one cannot help but be favourably impressed, and conclude that this portion of the Slocan has a brilliant future before it.



CENTRE STAR GULCH, ROSSLAND.

The different systems of transportation employed for bringing the ore from the mine to the point of shipment make an interesting study, and demonstrate the reason why the mines of British Columbia can be worked to better advantage during the winter than during the summer, notwithstanding the deep snow. The practice of raw-hiding ore down a narrow switchback trail has been the almost universal method adopted, but from now on aerial tramways will certainly become very popular. One of these of the Bleichart pattern, has re-

cently been erected between the Payne mine and the switch alongside the C. P. R. track. The length of this is about 1,500 feet. There are three spans, the longest being about 800 feet, and the ore is dumped automatically from the buckets into the bin, from which it is loaded into the cars. The Reco company, I understand, propose to construct a tramway 9,993 feet in length, which will ascend the mountain 2,600 feet, and cross the Noble Five slide at a height of 560 feet, with a span 2,750 long. The method of transportation employed at the Idaho mine is a gravity tramway built up the gulch connecting the mine with the concentrator, the latter being located on a siding of the C. P. R. When this tramroad was built sheds were constructed in order to keep the track clear of snow during the winter. These were supposed to be sufficiently substantial to withstand the weight of a snow slide, but during the winter of 1896 and 1897, when a slide occurred, it was found that the strength of the timbers was quite inadequate.

When it is considered that one horse can easily pull from one to one and a half tons of ore properly loaded in a rawhide, and that the same animal can only pack about 300 pounds down the trail during the summer, it may be readily understood why the mines, up to the present time, have proved more profitable to work during the winter seasons than at any other time.

I understand that a sufficient sum of money has been set aside by the Provincial Government for the construction of waggon roads between the principal mines and Sandon. This will of course aid very materially in further developing the camp, but I am of the opinion that the aerial tramways will prove the most economical method for transporting ore from the mines, as the workings are all located at a much higher altitude than the towns.

This, of course, makes it easy to construct these tramways in a straight line, and the distance is, therefore, very much less than in the case of the waggon road.

(To be continued.)

OUR LONDON LETTER.

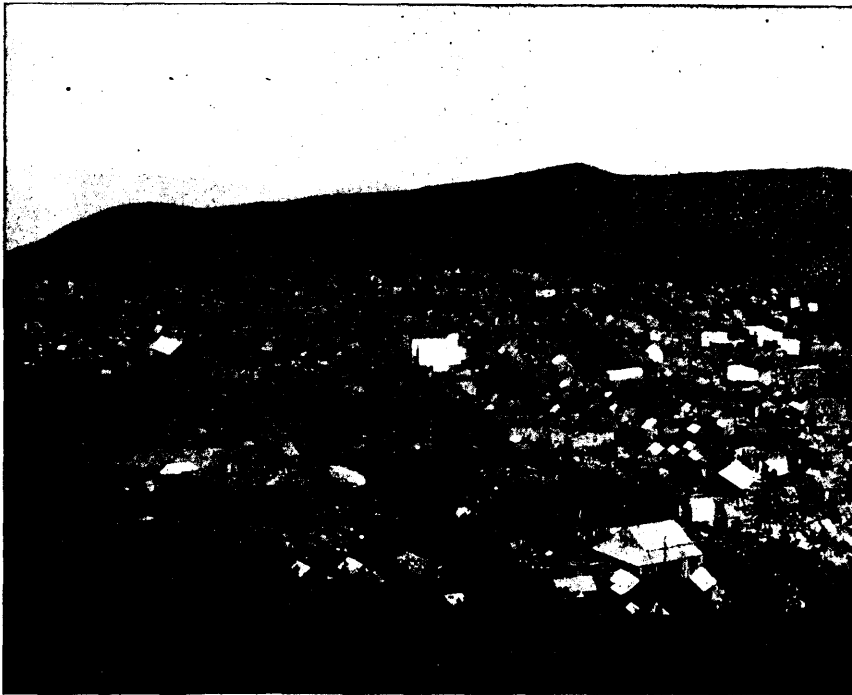
MR. OGILVIE, who is now in London, has met with a very favourable reception. Descriptive writers hasten to let the readers of newspapers know the figure he cuts. "He is a man of middle age, middle height, black-bearded, stalwart, tanned, and tough as leather," we are told. In his interview published in the *Financial News*, Mr. Ogilvie spoke optimistically of the Yukon possibilities.

Referring to the richness of the country he said: "I have no hesitation in saying that there are a hundred millions in sight to-day, tested and proved, not to speak of what may be found the next year or the year after. It will take years merely to prospect the country, and there is a field which will require the labours of at least 100,000 men for several generations to thoroughly test and examine. The race is to the man who has strength and enterprise, and a means of getting a field for their operation. Of course, a company stands a better chance than an individual, especially when you consider what the country is, and the labour involved in getting there." Then came the unsatisfactory part about his information

MR. OGILVIE'S OPTIMISTIC STATEMENTS continue operations during the mining season, and that if a claim remained unworked for seventy-two consecutive hours, it was

deemed open to all new-comers, unless sickness, absence from unavoidable cause, or other valid excuse can be pleaded in extenuation. No doubt you throttle the jumper, but what has become of the individual who has gone to England to sell his claim? What is to become of the Company which has bought him out? Some amendment to the provisions must be made, unless the journey home is to be considered as a "valid excuse." To these companies he also proffers the advice not to send out men to conduct negotiations on the spot who are only capable of drinking champagne. "It simply means that those people will be dined to their heart's content, and "champagned" out of their senses and their money." Mr. Ogilvie has, in addition to being interviewed, been lecturing on the gold fields at Burlington House. He spoke to members of the London University. His speech was enthusiastically received. Prophecying the chances in the Klondike he stated that some will realize fortunes, perhaps a good many may do so; on the other hand a great many, perhaps a very great many, will be disappointed.

But we all know that much. What happens to ten men who embark on mercantile careers in London, or in any other great city? One may make a fortune, some a mere livelihood, and others may fail altogether. The same in gold mining. In this the element of luck is very marked. Men who have no capital, no industry, may incidentally stumble on a rich find; others, much worthier in every respect, may labour on for years, and



A RECENT PHOTOGRAPH OF ROSSLAND.

hardly realize anything. In February, 1897, two men worked on what is known as "a lay," and realized a hundred thousand dollars for less than five months' work."

Mr. Ogilvie showed that real development could not take place until the projected road at Teslin Lake was constructed, thus lessening the heavy freightage on machinery. For the agriculturist there was little opportunity in the region, for there was a frost every night." It is quite possible that the lecturer may receive the gold medal of the Royal Society ere he returns to Canada, the birthplace of the metal.

Mr. F. M. Stevens, who has lived one year longer in the Klondike than the above speaker, has come to London for the first time, and says that young men who have strong constitutions, with grit and nerve, could find no grander opening than to prospect in the Klondike, but with the chance of returning after five years without success. For all that, the region will yield millions of dollars, and when the hydraulicing

plants are fixed Klondike will supply the world with all the gold she wants, and a trifle more. At the same time expensive mining plants are not wanted.

With regard to companies new and old there is a fair amount to be said. With respect to the amalgamation of the London & Globe Company the *Westminster Gazette* expresses itself pretty frankly when it remarks that the shareholders find themselves between the devil of reconstruction and the deep sea of amalgamation. They are choosing the latter, probably to be

buffeted about in the waves like a ship without a rudder. The amalgamation is only for the benefit of the companies, inasmuch as it is one way of staving off reconstruction. More capital, however, has to be found somehow to go on with, and unless the shareholders seize a favorable opportunity to get out they may find their last state worse than their first. This is hardly a pleasing prospect for a company which has some stake in the Yukon region. Apparently the

directors claim to have the entire right to use their own discretion in regard to the purchase of property equally in West Australia as in Canada. The London & Globe and the British American Corporation are to become the proprietors of the Standard Exploration Company, and "through such co-operation the Exploration Company should prove to be a successful under-

taking." "It will have one arm in Australasia, and the other in British America," continues the Managing Director of the L. & G., "and be prepared in any colony to take up the best business offering. It will represent a combination of valuable interests rather than an interest in one solitary mine, which may or may not fulfil expectations." Apropos of the B.A.C. some grumbling is heard on the ground that though the application shares were forwarded in December the allotments had not been made three months later, which is scarcely a businesslike proceeding.

Mr. Stevens alluded above to the possibilities of hydraulic mining in the Yukon. The Klondike Hydraulic Company have forestalled him, and stated to their shareholders that the vendor was taking the whole of his consideration in ordinary shares, with the exception of promotion fees. No dividend was to be paid on the ordinary shares until the preference holders had

received back the whole of their capital in the shape of dividend, and no ordinary shares were to be issued until the large quantity of gold, said to be in possession of the vendor at the mine, was handed over to the company. The chairman of the company, Mr. Williams, had gone to Klondike to see that everything was carried out properly. They hoped to get at least one month's working before the season closed.

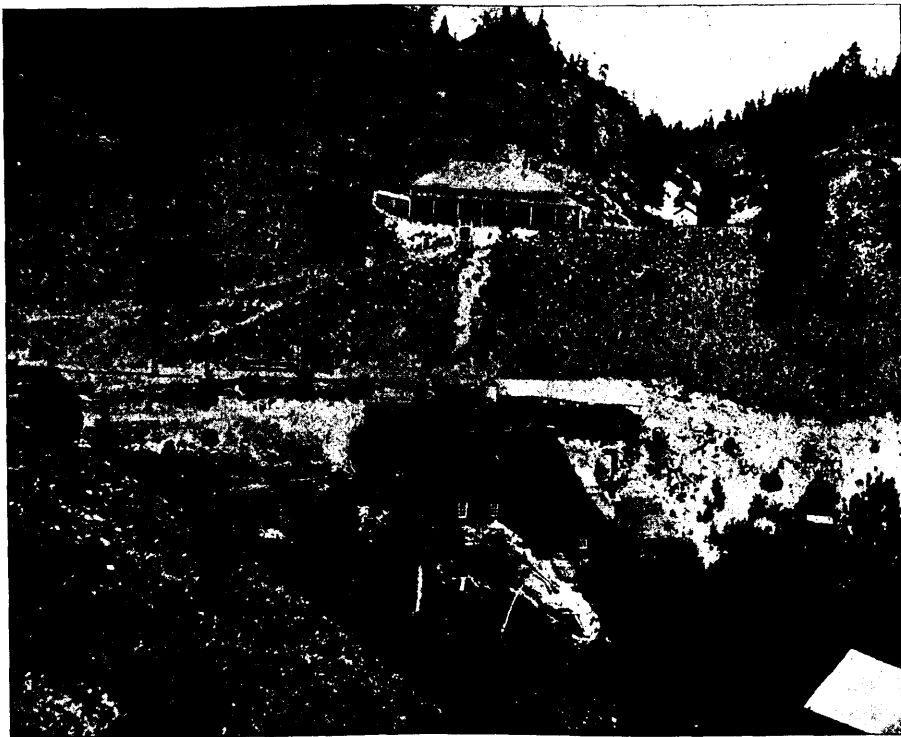
At an extraordinary meeting of the Yukon Goldfields the Board declared their intention of calling up further capital. Hitherto they had only asked for five shillings per share because they were anxious, when so little was known of the Klondike and its auriferous deposits, to limit their liability to the smallest possible amount compatible with the risks which must always be expected in such an enterprise. As they were the first company to start an expedition into the Klondike they ought to follow up the success they have achieved by still further establishing their position from a financial point of view. Their investi-

gator, Mr. Wood, had purchased three claims on the Eldorado, Bonanza and Henderson Creeks, and required more money to purchase others.

They ought to acquire as many claims as possible on reasonable terms, which could either be worked by them or disposed of at a profit when the great influx of population found its way into the country.

The largest of the new companies re-

cently formed is the Smelting Corporation with a capital of £600,000 which, however, does not intend to confine operations solely to Canada, but to pick its gleanings in every portion of the world. It has acquired from the Burnham Syndicate their business and patent rights for the treatment of refractory sulphide ores of silver, lead, zinc, gold, etc. Upon the Board are the Hon. William Lidderdale, Sir Gerald Fitzgerald, K.C.M.G. and others who form a strong body, but as the *Daily Chronicle* carefully reminds us, companies which work processes for the chemical reduction of ores are almost, if not quite, as speculative as gold mines themselves, for there is no guarantee that chemical science will not discover a process to-morrow as superior to the present one as this process is apparently to those which have gone before. The Lake Bennett & Klondike Steam Navigation Company is another concern, though of less pretensions, being satisfied with a capital of £150,000



THE STRATHYRE MILL, FAIRVIEW.

which is ample enough for the purpose. It intends to run steamers from the head of Lake Bennett through Marsh Lake and the Upper Yukon River to Dawson City, the monopoly for which route during the ensuing season has been practically secured by this company. They expect to carry at least four-fifths, of course, of the hundred thousand passengers bound for the golden district. Other companies are the Canadian Goldfields with a capital of £150,000, the Klondike, Cassiar Miners & Traders with a small account of £25,000. This latter, however, proposes to deal in mortgages, charges, patent rights, etc., also as hotel and tavern keepers, brewers and corn merchants—a somewhat strange combination, but calculated to secure the miner's money both when he is prosperous and bankrupt. The British East Kootenay Syndicate with a capital of £10,000 has much the same end in view.

NUMMUS.

FROM FAIRVIEW.

THE return of spring and pleasant weather has also ushered into Fairview the promise of, if not a "boom," at least a decided activity in mining matters. Kruger Mountain, about twelve miles south of Fairview, seems to be attracting the attention of investors to its—according to surface indications—vast bodies of gold and copper ore. I understand that Capt. Duncan, of the Duncan Mines Co., is expected shortly, to direct the development of his Company's claims on Kruger Mountain and here.

Owing to the delay in shipment of some detail of the mill machinery, the Joe Dandy mill has not yet commenced work, but by the 1st of May it is expected that work will be in full swing, and in my next

I hope to give a favourable report of the first clean-up. On the Joe Dandy mine a good deal of stoping is being done to expose an inclined ledge which is shortly to be subjected to a mill test. The ore appears to be very rich, carrying galena, and, in places, large specks of gold are to be seen.

A tram line has just been surveyed from the mouth of the Smuggler tunnel to the mill-site on Okanagan River; the distance is about two and one-half miles, and the fall 1,000 feet. I hear that the B.C. Lumber Company is to get out the lumber necessary for construction works, at once. In the Smuggler mine the upraise is still being continued, and on the tunnel level two drifts are being run in opposite directions along the ledge, which still shows up well.

A new strike of considerable value is reported on the Tinhorn, but at present only a few miners are employed there, as the management is waiting the arrival of a compressor plant before proceeding further with the old workings.

The plant for the Stemminder has now arrived, and will be put in place with the least possible delay. It is said that the tramway to the Tinhorn mill is to be commenced shortly.

There are many claims with big surface showings in this camp, and of these the Orofino and Independence (Orofino Mines, Ltd.) are by no

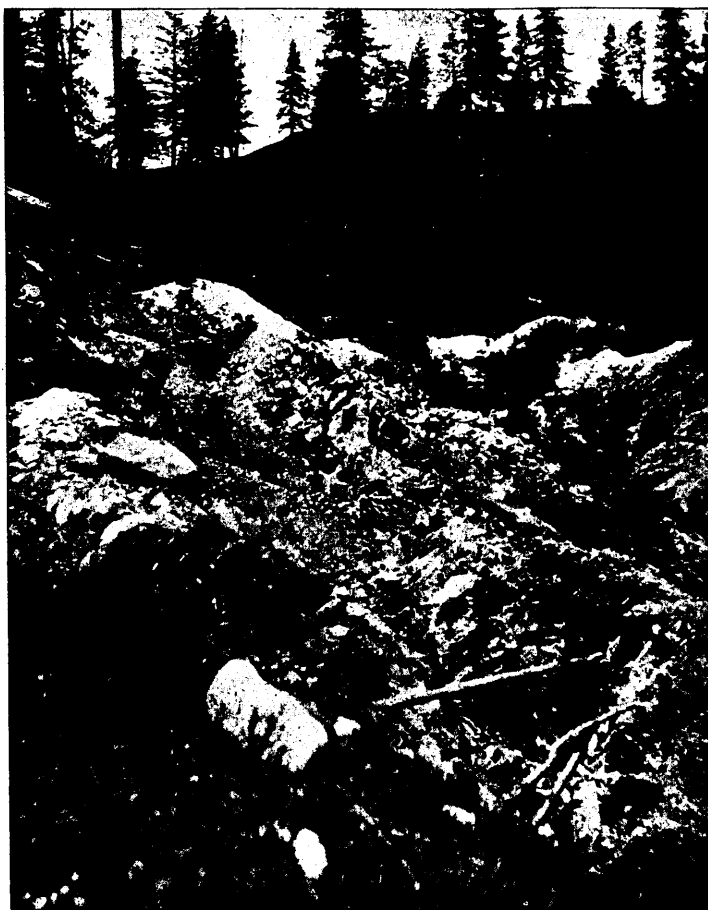
A PROMISING MINE. means to be overlooked. These claims lie on the summit of the divide between Fairview and Keremeos, and contain

ledges from three and one-half to fifteen feet wide, and carry values in gold of from \$1.60 to \$804.00 per ton; average samples from shafts and

tunnels yielding as much as \$90.00 per ton. On this property about two hundred feet of tunneling and sinking has been done, besides innumerable open cuttings and stripping. The ledge is of red and white quartz, of free milling character, shewing well in galena and iron pyrites. The Orofino Ltd. is of Vancouver birth, and is not yet a year old. The local manager is Mr. F. Robinson, and great credit is due him for the way in which he has shewn up the property in so short a time.

A case of ore salting occurred here the other day, and resulted in the sale and purchase of what may yet prove a good claim. It happened thus: Two free but not independent miners, possessing an everlasting thirst and a claim containing

a very large and handsome-looking ledge of yellowish quartz, approached a local capitalist, intent on making a deal. After a good deal of bargaining the price was agreed upon, and the deal concluded, subject to the condition that the sellers were to pan the samples selected by the capitalist, and produce colours—which they were sure they could do. The quartz was then crushed and panned, and sure enough, there were colours as large as pinheads, so the money was paid and both parties were jubilant until next morning, when the capitalist tried to pan out some more colours, without success, and then looking over his samples, found some small pieces of unmistakable "Smuggler" ore, taken from



30-FOOT QUARTZ VEIN OF THE "MORNING STAR, FAIRVIEW.

the richest pay-streak of that mine, and this explained the affair.

We are at last to have direct wagon road communication with Keremeos, and about the middle of May construction work will commence, and be pushed as vigorously as Mr. C— knows how. In the Keremeos and Similkameen valleys, there are a great number of mineral claims located, and many of these are being thoroughly prospected. In many places large surface deposits of hornblend, carrying a large percentage of native copper, have been discovered, and there seems to be a bright future before this camp. A townsite has been laid out near the junction of the two valleys, and already we hear of stores and dwelling houses that are to be erected there.

RICARDO.

FROM NELSON.

MR. KELLIE'S "Truck Act," is meeting with great opposition in this country. There is, of course, no question that the system has been abused, and labourers of different kinds have met with much hardship under it, but to condemn good and bad alike in one sweeping measure, hardly seems to be a good policy. The boarding houses attached to the various mines, are as a rule, well run, the men being provided with ample food and lodging for about five or six dollars a week, a small sum out of their earnings, which run from fifteen to twenty. Large concerns like the Hall Mines know that it is to their benefit to make their

men comfortable, and their boarding houses are excellently managed. Most of the mines are in inaccessible places, and if the owners are prevented from running a boarding house, the business will fall into the hands of contractors, whose only ambition will be to squeeze the last dollar out of the men's pockets.

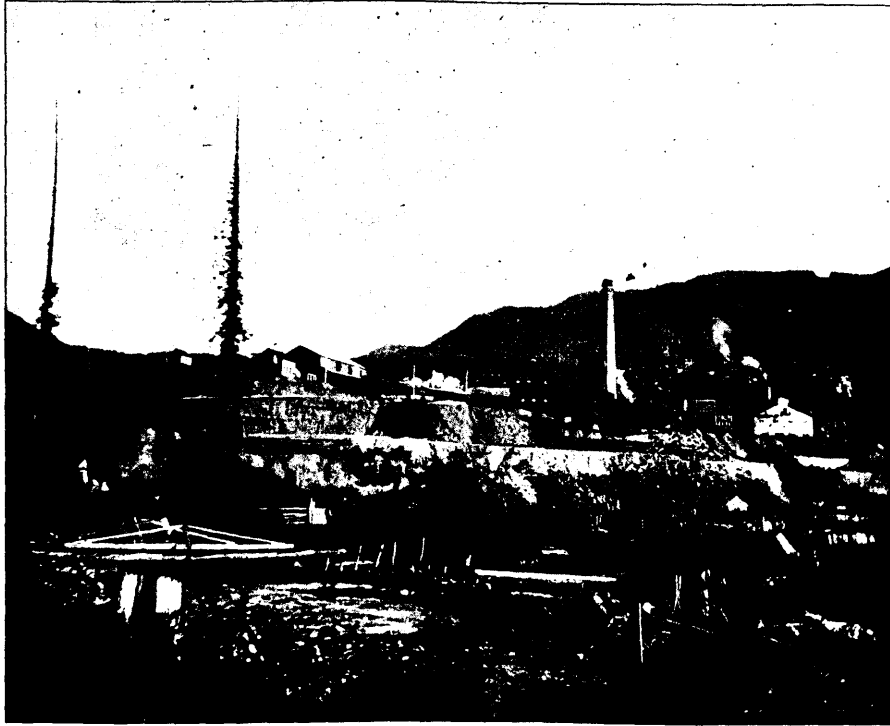
Mr. G. O. Buchanan goes as a delegate of the Kaslo Board of Trade, to urge the Dominion Government at Ottawa to put a duty on lead and lead products that will be sufficient to keep out the American article and encourage the smelting of lead ores in Canada. To attempt to argue with people bred and born in a hotbed of protection, is worse than battling with

the wind. They are so rabid that they do not accord their adversary the usual courtesies of debate, but reply solely with abuse and ridicule. However, the Government is scarcely likely to accede to their demands, but if it does what is to become of the surplus product after Canada has taken all she can use. The advocates of a duty talk glibly of a Chinese market, and other outlets in Asia; but they will find that to divert the course of trade and obtain a dumping-ground for its products, is not quite such an easy task.

The Noble Five mine is on its feet again, under the control of Mr. James Dunsmuir, the new President of the Company. It is generally admitted that the mine suffered from mismanagement after its incorporation as much as it did before, and it will take time and money to put it on a good working basis again.

The Slocan Star is at work again, and so is the Dardanelles, whence a fine strike of rich ore is reported. The Athabasca, just above Nelson, has, it is stated, passed into the hands of an English syndicate. There are four claims in the property, with three distinct leads. Some of the ore has been reduced at the Hall Mines smelter, with results of about \$80 a

ton. It works very well with the Silver King ore. A rich pocket was found in the Juno, which is just above the Athabasca. All over the mountain on which these claims are situated there are reefs of quartz with more or less free gold in them. Usually they are small, but there are so many that some day it is expected the main reef of which they are stringers, will be discovered.



THE HALL MINES SMELTER.

We are not quite satisfied with the Government's new Redistribution Bill. Rosland gets a member under it and so does East Kootenay, but Nelson and the Slocan are still in one, and their development is probably greater than either of the other districts.

The shipments of minerals up to date for the year 1898, amount to \$3,090,085.

PICK.

THE MONTH'S MINING—A SUMMARY.

ALBERNI.

Nothing of particular interest has been heard from this district during the month, with the regrettable exception, perhaps, that the negotiations for the sale of the Alberni Consolidated failed to materialize. It is understood, however, that another deal is in progress for the bonding of this undoubtedly prom-

ising property. The B.C. Gold Trust, Ltd., is steadily developing the Oronoca and other claims at Uchucklessit Harbour, and under the direction of Mr. Thos. Bateman, M.E., more satisfactory work is being done.

SHOAL BAY.

(From Our Special Correspondent.)

About one mile and a half from the shore of Fanny Bay, on the west side of Phillips Arm and on the south side of the Bay, is situated the Dorothy Morton, which was bonded last fall by Mr. J. J. Lang for \$20,000. Work was then commenced, and considerably over 500 feet of tunnelling has been done in two places, which crosscut a lead of 106 feet of quartz, in which there is a pay streak 8 feet wide heavily mineralized with pyrites, and said to assay \$40. Assays of from \$2 to \$92 have been got from various parts of the lead, and it is probable that the average worth will be at least \$10, the whole of the value being in gold. A limited company has now been registered as the Fairfield Exploration Syndicate, owning the Dorothy Morton and nine other claims adjoining. They are now establishing a large camp for the accommodation of employees on the shore of Fanny Bay, preparatory to putting in an aerial tram from the mine down to the water front. The timber is being cut away for 200 feet along the proposed tram line, which will be installed as soon as this work is completed. The company, moreover, propose to install two power drills at once, and to build a cyanide reduction plant on the water front. Coal will be brought on scows from Nanaimo, and the water in the bay, which is nearly fresh, will be used. Some of the gold in this mine is said to be free and the results and the method of treatment to be employed by this company will be watched with great interest. The concern is capitalized at £50,000 in £1 shares. I hear that the Company have purchased the Dunn block and other real estate in Vancouver, but if their mining operations here prove successful the future of the district will be assured, and with the profitable working of the Blue Bells, the Champion and the Dorothy Morton, Shoal Bay will consequently attract great attention. There are many other prospects which should be as good as these when developed. The main tunnel on the Blue Bells is being driven further in and another large ore body of phyrrotite was reached last week. The owners of the Champion seem well satisfied with their prospects and work on this mine is being rapidly prosecuted. Mr. John Cobeldick is now at work on his claims in Estero Basin and some sixty feet of tunneling cross-cutting the lead has been done. Some very fine looking specimens have been brought down. The tunnels are in quartz for the entire distance. The big wheel installed by Col. Forsyth is now in running order, but rock work has not yet been started, the intention being to use power drills from the beginning of operations. The owners of the Ajax have completed \$1,600 worth of work on this property including sixty feet of tunneling and considerable open cutting. They have some hundreds of dollars worth of grey copper ore on the dump and in sacks, the ore assaying in the neighbourhood of \$100. The face of the tunnel is in a fine showing of bornite which carries a good proportion of precious metals with the copper.

FIRE MOUNTAIN AND HARRISON LAKE.

Very gratifying accounts have been received of the progress of mining in this district. The properties of the Fire Mountain Gold Company are being thoroughly exploited and developed, the Money Spinner lode having now been opened up by a 231-foot tunnel, a 96-foot winze, and an upraise of 55 feet. This is the most developed prospect in the district, but there are many claims which promise equally well. Prospectors are now going in by the Harrison route to a new field beyond, as far as the Lillooet River, which has hitherto been practically unexplored.

LILLOOET.

Good reports continue to be sent in from the superintendent of the Golden Cache, and seemingly the nickname this mine received of the "Golden Catch" will shortly be proved inappropriate. The main tunnel is now over 175 feet, and the pay streak, which is reported to be two feet wide, assays from \$3 to \$211 in gold. The company are installing a large electric plant and other machinery. A dam is being built, and the flume chamber and power house will be completed in June. Meanwhile the season is somewhat backward in the district, and the trails are in very bad condition. Prospecting, however, will fairly commence by the first week in May, and a very active summer is anticipated. On the Forty Thieves group, the Blackbird, Mineral King, Ben D'Or and other Bridge River claims development work is being prosecuted.

CARIBOO.

The season in Cariboo has fairly commenced. Work has been started on the Horsefly, Cariboo Consolidated, Maud and other large properties. A company has been formed to dredge on the Quesnelle River, and the machinery was shipped this month. The company hope to derive much benefit from the damming back of the river by the Golden Quesnelle Company. Ashcroft, the starting point for Cariboo, is now very crowded with parties of prospectors and gold-seekers who propose travelling by this route Yukonwards. At present, however, the road is not in a particularly good state, the season being somewhat later than usual.

KAMLOOPS.

(From our special correspondent.)

Work on the Noonday is being vigorously carried on. There is an 18-inch ledge of quartz carrying visible free gold. Further development is awaited.

The Iron Mask is still tied up.

Now that the Iron Cap is bonded, pot-hunters are scrambling for bonds on surrounding claims.

The Pothook-Bonanza group is showing up well. The ledge of high grade copper ore encountered while cross-cutting shows there is more in this claim than a certain expert imagined. New claims are being staked out daily, and claim holders continue pegging away at assessment work.

BIG BEND, ILLECILLEWAET AND TROUT LAKE.

The announcement is made—but of its truth we are unable to vouch—that the British-America Corporation contemplate acquiring copper properties in Illecillewaet. It is, nevertheless, certain that this district is beginning to attract much attention, and a number of mining claims are now being developed with excellent results. Among others, the Donald, whereon a large body of low grade ore is being opened up with a tunnel, which is to connect with an 80-foot shaft already sunk, promises well.

Placer ground on French Creek, in Big Bend, is being taken up, and the several companies owning properties here are installing machinery and otherwise preparing for active work.

In the Trout Lake district extensive development operations are being carried on at the Silver Cup, owned by the Sunshine, Limited, a subsidiary company of the Lillooet, Fraser River & Cariboo Gold Fields, Ltd. A depth of nearly 250 feet has been reached in this mine, and a large body of high grade ore has been shown up. A shipment of 250 tons of ore was made this month. On the Free Coinage, a ledge of 14 inches of high grade ore was recently struck, and equally good reports have been received from the Carbonate Chief, on Keystone Mountain, the Union Jack, Ottawa, on Lardeau Creek, Mountain and Blue Jay, on Silver Tip Creek.

VERNON.

In the Vernon district the principal matter of interest is the proposed amalgamation of the Morning Glory and Ruby Gold Mining companies. The Morning Glory has from all accounts been in a somewhat bad way of late, a telegraphic despatch announcing that a part of the machinery had been sold by the sheriff to satisfy judgments amounting to \$270. On the Moffat Creek Gold Mining Company's hydraulic claim, situated upon Moffat Creek, a small tributary of the Salmon River, which empties into Shuswap Lake, a prospecting tunnel is being driven. Should the work being done at present prove satisfactory, and demonstrate that the gravel deposits are sufficiently rich in alluvial gold, it is said the company will then commence the construction of a large flume for the conveyance of water over a distance of about ten miles, the water to be used for hydraulic and ground sluice purposes. Seven men are now at work on the property, but under the changed condition indicated this number would be greatly augmented.

THE SIMILKAMEEN.

For some time past quartz mining has been in progress on Tulameen River claims, in the Similkameen, and several excellent prospects have been found here. The Crown Point has four veins of galena and copper pyrites from one and one-half to four feet in width, and assaying \$20. The Gold Coin, developed by an open cut which crossed two veins, assayed from \$6 to \$22 in gold. The Bonanza Queen, which adjoins it, has a tunnel of 50 feet showing a vein of from three to six feet, from which assays from \$20 to \$210 have been obtained. The Nevada, adjoining it on the north, has the same indications. The Copper Ring, about a mile away, has a vein carrying gold and copper assaying from \$30 to \$40. Farther to the westward are several claims which are showing up well.

BOUNDARY CREEK.

On several of the better known and more developed properties in the Boundary Creek district, work is now proceeding, and particularly favourable reports have been received from the Golden Crown and Winnipeg claims, in Wellington Camp. On the Winnipeg, a lead, thought to be an entirely different one from the two already known to cross the claim, was encountered in an open cut run near the line separating the Winnipeg from the Golden Crown. The width of the ore vein met with in this open cut has not yet been definitely determined, but it has already been shown that there is a large body of ore, chiefly solid pyrrhotite, an assay from which went over \$50 in gold. The occurrence of a big deposit of ore, returning so comparatively high an assay value close to the surface, is regarded as of much importance. It is stated that ore from this new find can be shipped at once, and that consequently upon this valuable discovery the Winnipeg Company's stock has been withdrawn from sale. On the Golden Crown a tunnel, cutting the six leads, has been driven for over 300 feet. Work is now being centered in sinking a main shaft which is already down to some depth. The Golden Crown is rightly considered one of the most promising properties in the camp. On the Old Ironsides operations have been temporarily suspended, owing to some mishap with the pumping appliance. A new pump has however been ordered, and work will shortly resume. The Snowshoe, in Greenwood Camp, is showing up well under development, and work will shortly be again started on the Sunset, in Deadwood Camp, the Last Chance, in Sky Lark, and other properties. Prospecting will be largely confined, this season, to the West Fork and the main Kettle River on the west side of Boundary Mountain, and to the Christina Lake section on the East.

ROSSLAND.

To the operations of the B.A.C. in the Rosslund camp, the present activity in this district is largely ascribable, and the increased demand for Rosslund stock during the past month has been marked. Work on the principal properties acquired by this Company by Mr. MacIntosh, is to be commenced at once, and if the ore bodies are there it may be taken for granted that under the official direction of Mr. Carlyle and his colleagues, the Columbia & Kootenay, the Josie, Nickel Plate and Great Western, will ere long be placed on a shipping and dividend-paying basis. The property of the Iron Colt Gold Mining Company, Limited, which consists of the Iron Colt mine, situated on Columbia and Kootenay mountain, has been optioned to an English syndicate. The terms of the option are private, but it is said to be about \$100,000.

The War Eagle threatens to even rival Le Roi in the near future, so satisfactory is the present showing of ore in sight. This, according to the Rosslund *Miner*, has trebled in the last six months, and the visible supply of ore is now perhaps rather sanguinely estimated as valuing in the neighbourhood of three and a half million dollars. The mine has been opened to a depth of 625 feet. Rich strikes are reported to have been made on the Jumbo and Iron Mask, and operations are proceeding steadily on the Sunset No. 2, the Deer Park, the Victory, Triumph, the Big Four, the Velvet, the Evening Star, and other properties. Important changes are taking place at the Trail Smelter, the old reverberatory matter furnaces being removed, to be replaced by new blast, with double the original capacity of 250 tons. Shipments are being made to the smelter from the War Eagle, but the furnaces will probably not be blown in before the 1st of July.

YMIR.

This camp is beginning to attract a great deal of attention, and the fact has already been established beyond question that many of its mines are extraordinarily rich. The population has lately increased to 1,000, and the pay roll now exceeds \$20,000 a month. Another encouraging sign is the large amount of machinery that is being installed at the several mines, notably a 50-ton concentrator at the Dundee, a large stamp at the Ymir, and hoisting machinery and a 50-ton concentrator at the Tamarac, and a concentrator is to be erected on the Porto Rico. The Dumas is at the head of the north fork of Wild Horse Creek, and has a tunnel of 100 feet, which has been run on the ledge from the start. There are from three to five feet of quartz containing zinc, galena and iron. Four average assays gave 20 ounces of silver, 32 per cent. lead and \$40 in gold. Work of crosscutting has been commenced, showing the hanging wall to be in quartz and ledge matter. At present there are several tons of ore on the dump. Near the Dumas is the Elise, on which there are two shifts employed, and it is expected to tap the lead after running 100 feet more. On the Summit property, on the north fork of the Wild Horse, a crosscut tunnel of 175 feet is being run.

The Ymir, Dundee, Tamarac and Porto Reco all have ore on the dump ready for shipment. Several properties have been sold at good prices to English and American companies during the month.

NELSON.

The most important happening at Nelson for April is, doubtless, the sale of the Athabasca to a strong English Company for the relatively large sum of \$750,000. The new owners propose setting aside \$100,000 to equip the mine with a plant which will consist of a compressor and stamp mill, besides the necessary pumps and hoist. The Athabasca was taken over by a joint stock company in 1896, and for almost a year a force of from twenty-five to thirty men have been employed. Ore taken and shipped out then paid running expenses, and about 600 tons is on the dump, ready to be crushed. Two shipments of 60 tons averaged \$107 to the ton. About 30 tons of ore are being daily crushed at the Fern, and the mine is on a most satisfactory basis. The installation of automatic sizers has been accomplished.

AINSWORTH.

Some promising finds have been made near the new town of Kuskonook, on Kootenay Lake, and the Last Chance in the same neighbourhood is now shipping ore of fair value. The Black Diamond at Ainsworth is shipping regularly, and the No. 1 Mine has commenced shipments to the Hall Mines smelter.

WHITEWATER.

A correspondent writing from Whitewater reports the strike of ten inches of clean galena—which has since widened to eighteen inches—at a depth of 1,000 feet on the Whitewater Deep. The importance of this strike cannot be overestimated.

SLOCAN.

While business is generally in a somewhat depressed state at present in the Slocan, this is not due to mining inactivity, and shipments continue to be made from the principal mines. At the Noble Five operations have again been resumed, and the Slocan Star will again shortly ship heavily. It is stated that a large body of clean ore was recently struck in the lower tunnel of the Payne.

On the Dardanelles, a drift on the seventh level, at a depth of 340 feet, cut the ore chute last week and encountered a good body of ore. The ore is high grade, and contains less zinc than in the drift above, or at any other point in the mine. The lead is fully four feet in width, with good walls. The company is taking out an average of one car per week. Work is in progress on the Adams group, the Conductor, and other promising properties near Sandon. Encouraging reports continue to be made from Slocan Lake mines. On the Comstock, on Four-Mile Creek, a concentrator is to be erected. Two thousand feet of development work has been done on this property and a high-grade body of galena, running as high as from 100 to 300 ounces in silver, and from 60 to 80 per cent. in lead has been exposed. Claims on Fidelity Mountain, near Silverton, are also turning out well. The Enterprise, on Ten-Mile Creek, is working a force of fifty men, and 1,000 tons of high-grade ore has been carried down to the Lake for shipment. On Lemon Creek the Southern Chief is being opened up, and a shipment may be shortly expected. The Evening Star is also being worked, and the Bank of England has been leased for one year. A ten-stamp mill is being installed on the property of the British Canadian Gold Fields Exploration, Development & Investment Company, on Lemon Creek.

MINING IN NORTH-EAST KOOTENAY.

(From our special correspondent.)

The prospects of this district have never been better than they are at the present time. Already prospectors from West Kootenay are coming into the district, the successful results of last season's work having demonstrated that this section of British Columbia possesses as good mineral resources as any other. A new feature of the situation, too, is the large number of men from Washington, Idaho and Montana, who are coming into the district. This is due to the fact of the Klondike rush, and hundreds of prospectors are crossing the boundary into British Columbia from the neighbouring states. The Kootenay, Columbia, Fraser, Parsnip and Findlay rivers form an almost unbroken line of water communication from the United States to the far north, and this remarkable valley of 800 miles in length has been referred to by Sir William Dawson, Sir Sandford Fleming and Mr. Moberley as affording a wonderfully easy route into the eastern portions of the province. This route to the north has also the great advantage that prospectors will be passing through a practically

unopened country for most of the distance, but one which has already shown great promise of being rich in mineral. Game is plentiful and feed for pack animals abundant. Hay can, therefore, be cut and stored to provide fodder for horses during winter months. The government are assisting the opening of this great interior highway by re-building the Moberly trail from Donald to Canoe River. Thence it is open prairie country, and easy to travel. It is likely that there will be a great rush of prospectors through this country as soon as the snow goes and the country is accessible by the completion of the trail referred to.

There appear to be excellent placer prospects in this northern country, as a party leaving Golden recently for Cummins Creek (which flows out of the Rockies about sixty miles beyond Donald) report having found gold in all the prospect holes which they sunk, twelve in number, but owing to the quantity of water, the party, not having the means to contend with this difficulty, abandoned the work for the time being. The existence of gold, however, in paying quantities in this locality was sufficiently demonstrated. The limestone of the Rockies here changes to slate, and numerous quartz veins crossing the country are traceable, although there has been little prospecting.

Actual mining operations also promise to be brisk this season. The coming mine of the district is undoubtedly the Bennison, and it has been so highly developed that regular ore shipments will certainly follow as soon as communication is established with the outside. While the owners of this mine were prepared to contribute handsomely they do not see their way to assuming the entire cost of the road up the Beaver Valley, seeing that this road will be so much a work of general public benefit, opening up several mines as prospective shippers. The importance of having a good shipping mine in this part of the country cannot be over-estimated, and it would be a thousand pities if such a promising property as the Bennison should lie idle for want of some reasonable consideration on the part of the Provincial Government.

It is stated that the Vancouver Finance and Development Company propose to put a diamond drill on their copper properties at Jubilee Mountain. Mr. Henry Croft of Victoria, is also heavily interested here. The development work so far has revealed marvellously rich specimens of copper, but the results have not yet been satisfactory from a permanent mining point of view, and the only effective means of prospecting these deposits is undoubtedly by means of the diamond drill. Development work will also be steadily prosecuted in the Bluewater and Ottertail districts.

It is encouraging to see investors paying more attention to this district, a syndicate having purchased the Burns mine, on the Middle Fork of the Spillimachene. There is a five-stamp mill on this property, and the new owners propose to operate the mine during the present season, but it will be necessary to put in a cyanide plant to save the gold more effectually than was done when the mill was operated on a former occasion.

The large copper deposits on Horsethief Creek will be developed this season by Mr. Rutherford, of Vancouver, and the English Company represented by W. G. Mitchell-Innes. The galena deposits on Toby Creek are about to be opened up by the British Pacific Company of Victoria. It is also stated that a Scotch company has been formed to work the big galena deposits on the Bugaboo. The Bald Mountain Company propose to work their property this season, or dispose of it to a Development Company which has offered to take it under a working bond.

A new assaying institution has been established at Calgary under the management of Mr. W. C. Howard, who possesses high English and German qualifications.

The North-East Kootenay Miners' Association has been very active since its formation in November last. The meetings are held monthly, and great interest has been taken in the proceedings, which have so far mainly been confined to the consideration of desirable amendments of the Mineral Act, and suggestions to the Government Agent as to the most necessary trail works.

The indefatigable Mining Recorder at Golden, Mr. F. C. Lang, is not satisfied with the already fine collection of the ores of the district that he has made for exhibition at the Government Office, but he has obtained authority to erect enlarged show cases, and he is increasing the collection in such a way that without going out of the town of Golden the visitor can obtain a first-class idea as to the different ores of the district, and its resources as a whole.

The ores of the north-east Kootenay are mainly of the yellow metals, which are most in demand at the present time. Gold and copper, and this probably accounts for the keener and more active demand for properties that has been experienced here of late.

FORT STEELE DISTRICT.

Persistent rumours are afloat to the effect that an English syndicate desires to secure the famous East Kootenay mine, the North Star. Whether there is any truth in these reports or not, it is certain that capital, both English and American, is being invested heavily in East Kootenay at the present time. Recently a group of eleven claims, on Magic Lake, and forming a part of what is known as the St. Eugene Group, were sold to a Chicago syndicate for a considerable consideration, and extensive operations will be commenced to develop the properties. Placer mining is also likely to become an important industry in this district. On Wild Horse Creek the Invicta Gold Mining Company, the Nip & Tuck company, the International Placer Mining Company, Brewery Creek Placer Company, Jennings & Polson Company, McMillan & Co., and three Chinese companies are actively engaged.

About 90 locations have been made on the North Fork of St. Mary's River. The ore carries gold, silver and copper, and the ore belt is well defined.

On Mark Creek, in the silver lead belt of the Selkirks, are the North Star group of 22 claims and 80 other locations on the south side, and on the north the Sullivan group and about 80 other locations, making 160 altogether. The ore is fine grained galena assaying from 40 to 60 oz. in silver and from 50 to 65 per cent. lead.

PUBLICATIONS.

CANADA'S METALS, by Prof. Roberts-Austin, London; Macmillan & Co., 1898, 8vo, Pp. 46, (Price, 2s. 6d.) The publication of a volume on this subject by so eminent an authority as Prof. Roberts-Austin, is in itself somewhat of a tribute to the prominence that is now being given to Canadian mining affairs. The book will undoubtedly assist in drawing attention to the great mineral possibilities of Canada in general, and British Columbia in particular.

CORRESPONDENCE.

The Editor does not hold himself responsible for the opinions which may be expressed in this column. No notice will be taken of communications unless accompanied by the full name and address of the writer.

THE LEGIBILITY OF LOCATION NOTICES.

TO THE EDITOR:—In the last issue of your valuable journal, I noticed a letter under the caption "A Good Suggestion," dealing with a matter which is of the utmost importance to prospectors. I refer to the question of the legibility of notices which the locator is obliged to inscribe upon his posts after staking mineral ground. I think we, in British Columbia, could well afford to follow the footsteps of the Australians in the particular, at least, of requiring prospectors to nail to their posts plates of tin with the location notices painted thereon. Perhaps, however, as by the present practice of writing the notices in pencil, the wording is legible enough for the first year, the same purpose would be attained if a second notice, painted on a tin plate, was put up (say) at the time the first assessment work is done on the claim. Such a regulation as this would certainly be appreciated by the *bona fide* prospector. But the great trouble, in my opinion, is that the mining laws are not sufficiently stringently administered; in fact, they are disregarded with impunity, the sinners relying on the "good faith" clause for protection. Here is a case in point: A and B locate a fine quartz lead on a promising piece of ground. They are apparently too lazy to cut the usual stakes, and so select a dead tree sixteen feet high for their No. 1 post, proceeding to "square it" five feet from the ground, and on the smooth surface inscribe the following, (which may be legal): The S— Mineral Claim, located by A and B, March 21, 1896, No. 1 Post. (I suppose it must be legal if done in "good faith.") Then the location line runs out for four hundred feet, but, getting tired, no doubt, quitting blazing, the locators have evidently strolled ahead for twenty minutes, and then set up the No. 2 post. It has the same information written on it as No. 1 post. No discovery post could be found in the direction of the location line. On looking up the records the claim was recorded and the following sworn to as being the legal posts: The S— Mineral Claim, located by A and B, March 21, 1896. The location line runs south 1,500 feet to No. 2 post, and

has 750 feet to right and left of location line. The assessment work for 1897 was also recorded, which gives it that "good faith" appearance which the Judge always looks for. It took my partner and myself a whole day to find out if such a claim as described had been located at all. The saving regulation regarding "good faith" is responsible for the slipshod manner in which in too many cases claims are located, and it would certainly seem advisable that it should be done away with, so that a prospector would know that if he failed to comply with legal requirements, he must expect to "pay the piper."

Rossland, B.C.

SCOTTY.

A COAST SMELTER.

TO THE EDITOR:—As a matter of mining interest I take pleasure in informing you that the Van Anda Copper and Gold Company will immediately erect the first smelter on the coast of British Columbia. The plant occupies four cars, weighs ninety tons, has a capacity of more than fifty tons per day, and is *en route* by Great Northern to Seattle, and by boat from there to Van Anda City, Texada Island, B.C., which is in the midst of the Company's ten properties. These properties are now sufficiently developed to supply fifty tons per day of \$30 ore, which will give the Company a net profit per ton of at least \$20. Repeated shipments of the ore during the past two years to various smelters have proved this value in the ores. After September 1st the Company will make daily shipments of matte carrying about fifty per cent. copper, three ounces gold, and fifty ounces silver per ton.

H. W. TREAT,

Secy. & Treas., Van Anda Mining Co.

THE TINHORN WATER SUPPLY.

TO THE EDITOR:—The letter contained in your last issue, from Messrs. Dier, Davidson and Russell accuses me of misrepresentation. In answer I may say that at the time the letter complained of was written by me, the Tinhorn mill had stopped work for lack of water. All that trouble is over now, and has been for some time, as the company has piped water from a creek one and one-half miles south of Tinhorn Creek. I may say that the letter of mine which Messrs. Dier, Davidson and Russell complained of was written last December.

Fairview, B.C.

RICARDO.

ANSWERS TO CORRESPONDENTS.

H. (Vancouver).—There has been some delay in replying to your question but the Company is not a prominent one and information was difficult to procure. Two eighty feet tunnels have been driven and thirty feet of open cutting. The company has funds in the treasury, and from all accounts means business.

A. McG. (Camp McKinney). It is a matter of regret that you marked your communication "private." We should have been delighted to publish so entertaining an effusion. It is a mistake on general principles to fulminate, and trying to the nervous system. The reference to the Minnehaha was made on the best authority, but if a mistake occurred you surely might ask for a correction in a less offensive manner. We have called the attention of A. W. More & Co. to the fact that the stock has not been quoted in their list, and the matter will be remedied.

G. L. (Inverness, Scotland).—We fear that we are unable to take advantage of your offer.

S. M. (Redhill, Eng.).—No foundation for the rumour.

B. T. (Toronto).—The river will be open for navigation by any rate the second week in May.

A. (Brandon).—The stock may recover, but do not hold too long. It is not regarded as a very desirable investment.

Mining Engineer (Auckland, New Zealand).—Do not care to assume the responsibility of advising you in the matter. There are, however, openings in the country for good men desiring to establish a practice for themselves in the new districts.

THE STOCK MARKET.

Stocks have been active during the month of April, and brokers have found it difficult to fill orders at prices offered.

In Trail Creek stocks, War Eagle has been in great demand, and the price has advanced from \$1 to \$1.60, and is likely to go higher. Deer Park has also been a favorite and the stock is hard to get at fourteen cents. Very large blocks of Mugwump have changed hands as some one appears to be endeavouring to secure control. Monte Christo and Good Hope have been ready sellers at any price under the regular quotation, and the Silver Bell stock appears to be commencing to move. A number of sales have been made of Josie, Iron Mask and Virginia.

In the Slovan and Nelson districts the favorite seller has been Athabasca, owing to the reported sale of this property to an English Company, and the stock has advanced from twenty-six to thirty-five cents.

In sympathy with the Athabasca deal B.C. Gold Field's shares have been very active in the neighbourhood of six to seven cents as the B.C. Gold Fields own a large interest in the Athabasca. A number of Dardanelles have changed hands from ten to eleven cents.

In the Fairview Camp several blocks of Tin Horn have been sold outside at fifteen cents, and Winchester is quoted at twenty-one cents.

Cariboo of Camp McKinney has been enquired for at fifty-two to fifty-five cents with few offering at these prices, but some asking fifty-nine to sixty cents.

In Coast stocks Van Anda shares are coming into favor owing to the fact that the Van Anda Company intend erecting a smelter at once with a capacity for over fifty tons per day. Van Anda shares are at five to six cents. Channe shares are also changing hands at twelve cents.

In Lillooet district Golden Cache shares are quoted from eighty to eighty-five. It is understood this Company is spending large sums of money in new machinery and additional stamps.

SHIPPING MINES.

ROSSLAND.

Following are the ore shipments from the mines adjacent to Rossland from January 1 to April 16, 1898:

	Tons.
Le Roi	17,991
War Eagle	1,925
Centre Star	370
Poorman	308
Iron Mask	1,033
Cliff	140
Velvet	350
Total	22,117

Shipments from the Slovan mines to the 16th of the month were fairly heavy, but the output will not quite come up to that of March. The principal shipments were from the Payne, Idaho, Ruth, Last Chance, Rambler and Montezuma, while the Queen Bess and Black Diamond (Ainsworth) are now steadily shipping. The Slovan Star will again ship continuously next month. The following table shows the total shipments of ore:

	Tons.	Value.
Total for January	9,500	\$1,197,489
Total for February	8,678	949,138
Total for March	10,489	594,436
Total to April 16th	1,991	245,043

APRIL DIVIDENDS.

WHITEWATER Mines, \$10,000, April 1st. London & B.C. Gold Fields, Lt., one shilling per share, equal to ten per cent. of the paid up capital; April 1st. The Company own the Ymir mine, in the district of the same name.

Le Roi, Rossland, \$50,000, April 10th. This is the twenty-fourth dividend paid by the Company to date, the aggregate sum being \$825,000.

MACHINERY NOTES.

THE volume of business transacted by the local iron works of Vancouver and Victoria, has increased enormously of late, as a result, chiefly, of the rush to the Klondike gold fields. In the B.C. Iron Works of Vancouver

the number of employees has been raised to three hundred, and a sum exceeding two thousand dollars is daily paid out in wages alone. Seven flat-bottom stern wheel steamboats, designed for the Yukon River trade, are now being built by this Company, in addition to which the S.S. "Cutch," which was formerly on the route between Nanaimo and Vancouver, is being completely refitted and supplied with new engines. Among other contracts may be mentioned one from an English company, for an improved suction pump dredger, to be operated on the Fraser River, and also an extensive dyking plant, ordered by the Provincial Government for use in reclaiming land in the Sumas Valley. The Company have been busily engaged during the past winter in preparing patterns for mining machinery.

The largest air compressor ever built in Canada, has been ordered by the War Eagle Mining Company, of Rossland, from the James Cooper Manufacturing Co. Lt., of Montreal. The machine will have a capacity of fifty drills, and will be driven by electricity. The fly-wheel is twenty-two feet in diameter, and weighs in the vicinity of twenty-five tons. The mine management have also purchased from the same firm a 300-ton electric hoist, which will lift an average load of eight tons from a depth of 3,000 feet, at a speed of 1,000 feet per minute. This hoist is the largest in the world, operated by electricity.

The British Columbia Gold Fields Co., of Toronto, have recently placed an extensive order with the Jenckes Machine Co. for a ten-stamp battery, complete, with two vanners, two ore feeders, grizzly, Blake-Marsden Crusher, and all the various apparatus making up a complete modern milling plant. The plant is to be delivered at Nelson. Also, the Smuggler Gold Mining and Milling Company have closed a contract with the same firm, for a twenty-stamp mill, to handle the output of their promising gold mine at Fairview, and an aerial tramway from the mine to the mill. The mill is expected to be in operation in three months.

A new device for generating and utilizing acetylene gas is being introduced in the Province by Messrs. Newling & Co. of Nelson and Victoria. This machine is constructed on extremely simple and durable lines, and has, moreover, the advantage of being cheap. The light is very brilliant, and the machines recently furnished to the Nelson post-office, several business houses in the same town, and to the No. 1 Mine at Ainsworth, are giving perfect satisfaction.

It is proposed to build a concentrator this summer, to treat the low grade ores of the Whitewater Mine, of which there are an enormous quantity.

A ten-horse-power hoist has been installed in the winze at the 600-foot level of the Le Roi.

In the Ymir Camp there is at present a large demand for mining machinery. The Dundee Mining Company here has recently let a contract for supplying material for a three-line gravity tramway, and tenders are being asked for the construction of a concentrator. At the local office of the London & B.C. Goldfields, Lt., plans are now being prepared for the purchase and installation of a 40-stamp mill upon the Ymir Mine, owned by the Company. Enough ore is said to be in sight in the mine to keep the mill in operation for several months.

Arrangements are being made to erect a 10-stamp mill on the Athabasca a promising mine near Nelson, recently acquired by an English company.

The Colorado Iron Works Co., of Denver, Colorado, received an order from John A. Moore, for one water jacket smelting furnace, to be erected in the San Juan district.

At a Board meeting of the Golden Cache Mines, Limited, the tender of the Royal Electric Company of Montreal was accepted for furnishing the electric plant for the mine. The contract for supplying the water wheel (23-in. Sampson, La Felle wheel) and a compressor plant, was awarded to the William Hamilton Manufacturing Company, of Peterboro, Ontario. The compressor plant is to be put in at once. These will involve an expenditure of over \$35,000. The compressor plant will, it is hoped, be working towards the middle or end of July. Another additional improvement in hand at the present time, is the erection of a private telephone from Lillooet to the mines.

TRADE CATALOGUES.

MESSRS. FRASER & CHALMERS, of Chicago and London, have issued a seventh edition of Catalogue No. 6, descriptive of the Comet Rock Crusher, and a fourth edition of Catalogue 24, dealing with the Riedler Pumps, Compressors and Blowing Engines. Both catalogues contain much interesting information.

"The Wilfley Ore Concentrator," published by the Wilfley Concentrator Co., of 32 Old Jewry, London, E.C.; American agents: The Mines & Smelter Supply Company, Denver, Colorado. This catalogue contains a well-prepared article upon ore concentrating. For the Wilfley concentrator, it is claimed that it will handle three or four times more material than any belt concentrator made, that it will save more concentrates; that it requires little or no attention, and that it will save much expense in power and room.

The Royal Electric Company

MONTREAL, QUEBEC.

— MAKERS OF —

Electrical Mining Machinery

MOTORS

Adapted for Operating Stamps, Compressors, Hoists, Trams, Drills, Pumps.

Lighting Plants for Mines and Buildings.

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FOR ALL CLASSES OF MINING WORK.

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Rossland.

36 Government St., Victoria.

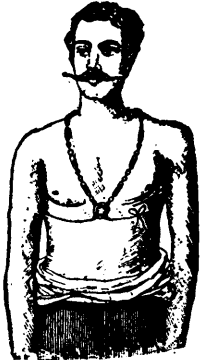
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For Rheumatism, Open Rheumatic Sores, Neuralgia AND ALL NERVOUS DISORDERS

Such as Megrin, Restlessness, Neuralgia, Muscular Tremors, Nervous Headache, Uneasiness, Irritability, Congestion and Insomnia as well as Asthma, Chlorosis, Anaemia, poor Circulation of the Blood, (cold hands and feet), Kidney trouble, Hardness of hearing, Catarrh, Stomach and Heart trouble, Convulsions, La Grippe and all results thereof

WINTER'S GALVANIC-ELECTRIC HEALTH CHAINS OF STETTIN, GERMANY,

are without an equal as a simple and positive cure. They are prescribed and recommended by the most eminent physicians of Europe, and used in some of the best hospitals of the world. Do not confound these thoroughly reliable electric appliances with any of the numerous belts, batteries, etc., that are offered for sale. No fraud or swindle, the names of physicians attesting their merits prove the efficacy of these chains. Full particulars free upon application.



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DON'T JUMP INTO AN IRON MINE MUCH LESS A GOLD OR SILVER ONE

Without at least knowing SOMETHING about minerals. It may require months and perhaps years to obtain by costly experience the rudimentary knowledge so essential to success. Living in a country rich in minerals of all kinds, you should know whether you intend to mine or not. **How to Prospect. How to test Ore-bearing Rock. How to Assay.**

A Pleasant Course of Study.

Classes in English and in French are being formed weekly, in which pupils will be taught to distinguish the various minerals, how to find them, how to make quick camp assay tests, how to pan and how to outfit for the field. For a personally attended course of six lessons \$5.00.

For those unable to attend personally, a correspondence course has been arranged, which can be made as useful and profitable as a personally conducted course. Terms, \$10 for the course, including a testing outfit and a set of mineral specimens.

Its aim is, as far as possible, to give a demonstration of the mineral wealth of Canada, from the Atlantic to the Pacific, from Nova Scotia to the Yukon.

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Exhibit Company,**
(Limited).

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MONTREAL.

A College Course not Necessary.

The Company requests prospectors and claim-owners to send samples of their minerals, with full details and price of location.

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BUCKETS, STEEL WHEELBARROWS,
MONITORS, CONVEYORS, ETC.

CORRESPONDENCE SOLICITED

715 Heatley Avenue,

VANCOUVER, B.C.

Mining Stocks.

Prepared by A. W. More & Co., Mining Brokers, Victoria, B.C., Apr. 28, '98

Company.	Capital.	Par Value.	Price.
TRAIL CREEK.			
Alberta.....	\$1,000,000	\$1	5
Big Three.....	3,500,000	1	9
Bruce.....	1,000,000	1	10
Butte.....	1,000,000	1	02
Caledonia Con.....	1,000,000	1	5 1/2
California.....	2,500,000	1	15
Camp Bird.....	1,000,000	1	05
Celtic Queen.....	750,000	1	03
Centre Star.....	500,000	1	3 50
Commander.....	500,000	1	13
Deer Park.....	1,000,000	1	14
Enterprise.....	1,000,000	1	20
Evening Star.....	1,000,000	1	06
Georgia.....	1,000,000	1	10
Gertrude.....	500,000	1	11
Golden Drip.....	500,000	1	15
Great Western.....	1,000,000	1	10
Hattie Brown.....	1,000,000	1	03
High Ore.....	500,000	1	05
Imperial.....	1,000,000	1	10
Iron Horse.....	1,000,000	1	20
Iron Mask.....	500,000	1	44
I.X.L.....	1,000,000	5	10
Josie.....	700,000	1	29
Jumpo.....	500,000	1	60
Le Roi.....	2,500,000	1	7 50
Lilly May.....	1,000,000	1	20
Mabel.....	1,000,000	1	15
Mayflower.....	1,000,000	1	10
Monita.....	750,000	1	19
Monte Cristo.....	1,000,000	1	21
Morning Star.....	1,000,000	1	08
Nest Egg-Firefly.....	1,000,000	1	10
Northern Belle.....	1,000,000	1	10
Novelty.....	1,000,000	1	05
Palo Alto.....	1,000,000	1	05
Phoenix.....	500,000	1	12
Poorman.....	500,000	1	12
Red Mountain View.....	1,000,000	1	11
Rossland, Red Mountain.....	1,000,000	1	22
St. Elmo.....	1,000,000	1	06
St. Paul.....	1,000,000	1	12 1/2
Silverine.....	500,000	1	06
Virginia.....	500,000	1	22
War Eagle Consolidated.....	2,000,000	1	1 60
West Le Roi.....	500,000	1	28
White Bear.....	2,000,000	1	19
AINSWORTH, NELSON AND SLOCAN.			
American Boy.....	1,000,000	1	15
Arlington.....	1,000,000	1	10
Argo.....	100,000	0 10	10
Athabasca.....	1,000,000	1	35
Black Hills.....	100,000	0 10	10
Buffalo of Slocan.....	150,000	0 25	
Canadian M. M. and S. Co.....	2,000,000	1	07 1/2
Camberland.....	500,000	10	
Dundee.....	1,000,000	1	50
Dardanelles.....	1,000,000	1	12
Dellie.....	70,000	1	05
Eldon.....	1,000,000	1	07 1/2
Ellen.....	1,000,000	1	10
Elkhorn.....	1,000,000	1	10
Exchequer.....	1,000,000	1	10
Fern Gold.....	200,000	0 25	75
Goodenough.....	800,000	1	25
Gibson.....	650,000	1	17 1/2
Grey Eagle.....	750,000	1	
Hall Mines.....	300,000	£1	
Idler.....	1,000,000	1	12 1/2
Kasio-Montezuma.....	1,250,000	1	20
London.....	150,000	1 25	25
Minnesota.....	1,000,000	1	25
Nelson-Poorman.....	250,000	0 25	16 1/2
Northern Light.....	250,000	1	19
Noble Five Con.....	1,200,000	1	12 1/2
Ottawa and Ivanhoe.....	1,000,000	1	
Payne.....	2,500,000	2 50	
Phoenix Consolidated.....	1,000,000	1	07
Rambler Con.....	1,000,000	1	26
Reco.....	1,000,000	1	1 50
Slocan-Reciprocity.....	1,000,000	1	06
Slocan Star.....	250,000	50	2 10
Santa Marie.....	\$1,000,000	\$1	05
Silver Band.....	250,000	0 25	12 1/2
Slocan Queen.....	1,000,000	1	10
Star.....	1,000,000	1	07
St. Keverne.....	1,000,000	1	05
Sunshine.....	500,000	10	
Two Friends.....	240,000	30	17
Washington.....	1,000,000	1	25
Wonderful.....	1,000,000	1	05
LARDEAU.			
Consolidated Sable Creek Mining Co.....	1,500,000	1	10
TEXADA ISLAND.			
Texada Proprietary.....	250,000	25	25
Van Anda.....	5,000,000	1	5 1/2
Victoria-Texada.....	150,000	0 25	10
Texada Kirk Lake.....	800,000	1	1 00
Vaven.....	1,000,000	1	10
Gold Bar.....	100,000	0 10	10

VANCOUVER ISLAND.			
Alberni Mountain Rose.....	250,000	1	05 1/2
Consolidated Alberni.....	500,000	1	19
Mineral Creek.....	500,000	1	05 1/2
Mineral Hill.....	750,000	1	05
Quadra.....	500,000	1	10
CARIBOO.			
Cariboo Gold Fields Ltd.....	£100,000		
Cariboo Hydraulic Consolidated.....	\$5,000,000	1	85
Horsefly Hydraulic.....	200,000		
Horsefly Gold Mining Co.....	1,000,000	10	2 00
Cariboo M. & D. Co.....	300,000	1	25
Golden River Quesnelle.....	£350,000	£1	
Victoria Hydraulic.....	300,000	1	85
LILLOOET DISTRICT.			
Golden Cache.....	500,000	1	80
Alpha Bell.....	500,000	1	50
Cayoosh Creek Mines.....	500,000	1	50
Lillooet Gold Reefs.....	200,000	25	25
Excelstor.....	500,000	1	50
FAIRVIEW CAMP.			
Tin Horn.....	200,000	0 25	22
Winchester.....	250,000	0 25	22
BOUNDARY.			
Old Ironsides.....	1,000,000	1	15
Golden Crown.....	1,500,000	1	25
CAMP MCKINNEY.			
Cariboo.....	800,000	1	.60
Minnehaha.....			17

† Dividends paid to date are as follows: Trail Creek District—Le Roi, \$325,000; War Eagle (old company), \$217,000. Camp McKinney—Cariboo, \$189,000. Nelson District—Hall Mines, £26,750; Fern, \$10,000. Slocan District—Payne, about \$800,000; Slocan Star, \$400,000; Reco, \$287,000; Idaho, \$240,000; Whitewater, \$154,000; Rambler-Cariboo, \$40,000; Last Chance, \$40,000; Two Friends, \$6,000.
Dividends paid since last month's list was made up, Le Roi, \$50,000.

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86 Government Street,

VICTORIA, B.C.

TRANSPORTATION COMPANIES.

Canadian Pacific Navigation Co., Ltd.

TIME TABLE NO. 33.

(Taking effect March 1st, 1898.)

VANCOUVER ROUTE.

VICTORIA TO VANCOUVER daily except Monday at 1 o'clock.
VANCOUVER TO VICTORIA daily except Monday at 13 o'clock or on arrival C.P. Railway No. 1 Train.

NEW WESTMINSTER ROUTE.

LEAVE VICTORIA—For New Westminster, Ladner's Landing and Lulu Island Sunday at 23 o'clock; Wednesday and Friday at 7 o'clock. Sunday's steamer to New Westminster connects with C.P.R. Train No. 2 going east, Monday.

FOR PLUMPER PASS—Wednesdays and Fridays at 7 o'clock.
FOR MORESBY AND PENDER ISLANDS—Fridays at 7 o'clock.
LEAVE NEW WESTMINSTER—For Victoria Monday at 13:15 o'clock. Thursday and Saturday at 7 o'clock.

FOR PLUMPER PASS—Saturday at 7 o'clock.
FOR PENDER AND MORESBY ISLANDS—Thursday at 7 o'clock.

FRASER RIVER ROUTE.

Steamer leaves NEW WESTMINSTER for CHILLIWACK and way landings every Tuesday, Thursday and Saturday at 8 o'clock during river navigation.

NORTHERN ROUTE.

Steamships of this Company leave Victoria for Fort Simpson via Vancouver and intermediate ports on the First and Fifteenth of each month, and for Queen Charlotte Islands on the first of each month.

KLONDIKE ROUTE.

Steamers of this Company leave weekly for Wrangel, Juneau, Skagway and Dyea.

BARCLAY SOUND ROUTE.

Steamer "Willapa" leaves Victoria for Alberni and Sound ports the 10th and 20th of each month, and for Quatsino and Cape Scott on 30th.
The Company reserve the right of changing this Time Table at any time without notification.

G. A. CARLETON,

General Agent.

JOHN IRVING,

Manager.

Kaslo & Slocan Railway.

TIME CARD.

Subject to change without notice. Trains run on Pacific standard time

Going west.		Going east.
Leave 8.00 a.m.	Kaslo	Arrive 3.50 p.m.
" 8.36 "	South Fork	" 3.15 "
" 9.36 "	Sproutle's	" 2.15 "
" 9.51 "	Whitewater	" 2.00 "
" 10.03 "	Bear Lake	" 1.48 "
" 10.18 "	McGuigan	" 1.33 "
" 10.38 "	Cody Junction	" 1.12 "
Arrive 10.50 "	Sandon	Leave 1.00 "

CODY LINE.

Leave 11.00 a.m.	Sandon	Arrive 11.45 a.m.
Arrive 11.20 a.m.	Cody	Leave 11.25 a.m.

ROBT. IRVING,
G. F. & F. A.

GEO. F. COPELAND,
Superintendent.

Spokane Falls & Northern, Nelson and Fort Sheppard, Red Mountain Railways.

The only all-rail route without change of cars between Spokane, Rossland and Nelson; also between Nelson and Rossland.
DAILY EXCEPT SUNDAY.

Leave		Arrive
7:30 a.m.	Spokane	7:00 p.m.
10:30 a.m.	Rossland	3:25 p.m.
9:00 a.m.	Nelson	5:20 p.m.

Close connections at Nelson with steamer for Kaslo and all Kootenay Lake points. Passengers for Kettle River and Boundary Creek connect at Marcus with stage daily.

BRITISH COLUMBIA SMELTING & REFINING CO.

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GOLD, SILVER AND COPPER ORES.

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Mining, Milling, Hoisting, Pumping, Hydraulic and Air Compressing Machinery. Power Generation and Transmission.
Twelve years' experience in the United States of America.

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AGENTS and CONVEYANCERS,
ARCHITECTS AND CIVIL ENGINEERS

Properties examined and reports made.

First-class Banking and other references.



The Columbia & Kootenay Steam Navigation Co., Ltd.

TIME TABLE NO. 10.

In effect June 8th, 1896.

ARROWHEAD-TRAIL ROUTE, STEAMER "NAKUSP."

Mouth bound; read down.		North bound; read up
Son. Wed. Fri.	7 p.m. De ARROWHEAD	Ar 11.30 a.m. Wed. Fri. Sun
" " "	{ 11 p.m. Ar NAKUSP	{ De 7.30 a.m. " " "
" " "	{ 12 m. De	{ Ar 6 a.m. " " "
Tues. Thurs. Sat.	{ 9 a.m. Ar ROBSON	{ De 8.30 p.m. Tues. Thurs. Sat
" " "	{ 12 noon De	{ Ar 8 p.m. " " "
" " "	{ 2 p.m. Ar TRAIL	{ De 4.30 p.m. " " "

Connections at Arrowhead with C.P.R. to and from Revelstoke and all points east and west; at Nakusp with Slocan R. to and from Slocan points; at Robson with C. & K. R. to and from Nelson and Kootenay Lake points; at Trail with C. & W. R. to and from Rossland; at Trail with Str. "Trail" to and from Waneta, Northport and Spokane.

TRAIL-NORTHPORT ROUTE, STEAMER "TRAIL."

Daily except Sun.	{ 8 a.m. De TRAIL	Ar 4.30 p.m. { Daily except Sun
" " "	{ 9 a.m. Ar WANETA	De 3 p.m. " " "
" " "	{ 10 a.m. Ar NORTHPORT	De 1 p.m. " " "

Connections at Northport with S.F. & N.R. to and from Spokane and way points; at Trail with C. & W. R. to and from Rossland, and with Str. "Nakusp" to and from Robson, Nakusp and Revelstoke.

KOOTENAY LAKE ROUTE, STEAMER "KOKANEE."

Daily except Sun.	{ 4.00 p.m. De NELSON	Ar 9.30 a.m. { Daily except Sun
" " "	{ 9 a.m. Ar KASLO	De 5.30 a.m. " " "

Saturday, June 6th and every second Saturday following, steamer leaves Kaslo at 10 p.m. for Bonner's Ferry; returning leaves Bonner's Ferry Sun. at noon. Connections at Nelson with C. & K. R. to and from Robson, Trail, Rossland; Nakusp, Revelstoke and C.P.R. points; at Nelson with N. & F.S.R. to and from Spokane and way points; at Kaslo with K. & S. R. to and from Slocan points. at Bonner's Ferry with G.N.R.

The right is reserved to change this schedule at any time without notice. For tickets, rates, etc., apply at Company's office, Nelson.

T. ALLAN,
SECRETARY.

J. W. TROUP,
MANAGER, Nelson B.C.

INTERNATIONAL NAVIGATION & TRADING COMPANY LTD.

Steamers "International" and "Alberta" on Kootenay Lake and River.

TIME CARD IN EFFECT 1st OCTOBER, 1897.

Subject to Change without Notice.

Five-Mile Point Connection with all Passenger Trains of N. & F.S. R'y. to and from Northport, Rossland and Spokane.
Tickets sold and Baggage Checked to all U.S. Points.

Leave Kaslo for Nelson and Way Points, daily except Sunday, 5.45 a.m.
Arrive Northport, 12:15 p.m.; Rossland, 3:40 p.m.; Spokane, 6 p.m.
Leave Nelson for Kaslo and Way Points, daily except Sunday, 4.45 p.m.
Leaving Spokane, 8 a.m.; Rossland, 10:30 a.m.; Northport, 1:50 p.m.

NEW SERVICE ON KOOTENAY LAKE.

Leave Nelson for Kaslo, etc., Tues., Wed., Thurs., Fri., Sat.	8:30 a.m.
Arrive Kaslo	12:30 p.m.
Leave Kaslo for Nelson, etc., Mon., Tues., Wed., Thurs., Fri.	4:00 p.m.
Arrive Nelson	8:00 p.m.

BONNER'S FERRY AND KOOTENAY RIVER SERVICE.

Leave Kaslo, Sat.	4 p.m.	Leave Bonner's Ferry, Sun.	1 p.m.
Arrive Boundary, Sun.	12 p.m.	Arrive Boundary, Sun.	5 p.m.
Arv Bonner's Ferry, Sun.	10:30 a.m.	" Kaslo, Sun.	10 p.m.

Close connection at Bonner's Ferry with trains East bound, leaving Spokane 7:40 a.m., and West bound, arriving Spokane 7 p.m.
*The Alberta awaits the arrival of the International before leaving for Bonner's Ferry.

GEORGE ALEXANDER,

General Manager.

Kaslo, B.C., 12th July, 1897.

Change in Time Card

After end of October, the S.S. Alberta passenger service, leaving Nelson 8 a.m. and Kaslo 4 p.m. will be discontinued.