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THE OUTLOOK FOR BRITISH COLUMBIA IN 1902.

THE development of a country proceeds in recurrent waves between which there are periods of relaxation, visible enough on the surface of things, although the tide may be making all the time. The waves of development follow upon either the discovery of wealth available without railway facilities, or the building of railways into rich parts of the country, unproductive without them. Thus the first great rush into this Province resulted from the early discoveries of placer gold. The second followed upon the completion of the Canadian Pacific railway, the third, upon the tapping of the Kootenay country by the Great Northern railway, and the Nelson and Fort Shepard railway, the fourth, upon the construction of the Crow's Nest Pass railway, and the Columbia and Western railway. The fifth has not yet arrived. The third and fourth, however, were so closely connected as almost to be merged into one. The stimulative effect of the one had not ceased before the other began to make its influence felt. Combined they caused no ordinary disturbance. Capital and population poured into the country from the United States, from Eastern Canada and from Great Britain. Unfortunately, as is always the case, a large percentage of

the capital so introduced was wasted. It is only just to our own Province to say that this was far more due to the entire lack of discrimination on the part of outsiders who sought sudden enrichment, than to either want of profitable openings in the Province itself, or to wilful deception on the part of our people. But as only philosophers blame themselves, a reaction set in against British Columbia as a field for enterprise and the credit of the country fell, as one undertaking after another showed external evidence of that failure predestined from its inception. In addition to this feature, no new country has been opened up. Here we have the true explanation of the complaints which have had frequent expression during the last two years. It may be pointed out, however, that these complaints, so far as they have been directed against what may be called the intensive development of the territory already opened, are without reasonable foundation. That, which may be compared to the steady making of the tide, has been going on in a most satisfactory manner, and is far from showing any evidences of decline.

The outlook for the coming year, as restricted to those districts, is not unfavourable from a mining point of view, but possesses elements of uncertainty from a market point of view. The market for silver, lead and copper, is unsatisfactory from the producer's standpoint. The price of silver is unlikely to revive, unless in response to some renewal of demand not yet foreseen. China's imports of silver have decreased during the last year over 40 per cent, and the conditions under which the decrease has taken place have not yet been modified and show no likelihood of change in the immediate future, although it is highly unsafe to predict anything in regard to an Oriental market. The price of silver is not likely to affect its production in British Columbia but only the profits of the producing mines, most of our silver-bearing ores being high grade enough to stand a decline in price. It is bound, however, to affect the investment of capital in the development of new silver mines, and, especially, when coupled with the complete demoralisation of the lead market, will retard the advancement of the country. Our silver-lead mines are at the present time under a maximum of expense, while they are receiving a minimum price for their product. It is quite possible that by reductions in freight, smelting and refining charges, they may, before the end of 1902, be placed in a better position than at present, even if no material change takes place in the prices of these metals. All those interested in the mining industry have been thoroughly awakened to the fact that so

long as it is a mere pendant to the United States, it can never be placed on a solid foundation, and must always be subject to avoidable costs and charges. We may, therefore, look during the coming year, for the establishment of the industry of silver-lead refining, and for other steps to give independence and stability to this most important source of wealth. The main silver-lead producing territory of the Province, the district of East Kootenay, possesses every facility for the cheap production and treatment of silver-lead ores, and a beginning has already been made in rendering these available by the construction of a smelter at Marysville. But whether the industry will be so reorganised during 1902 as to stimulate production to the amount of which that district is capable is somewhat doubtful. The chief progress which will be noticeable in East Kootenay will be the continued development of its coal resources. The productive capacity of the field is still far from being sufficiently developed to supply the market open for its coal and coke. And while the production has shown a great increase during 1901 over 1900, a still greater development may be expected during 1902.

With regard to the other silver-lead producing districts, notably the Slocan, there is no reason to expect a decline in production if only for the reason that less favourable conditions than have prevailed during 1901 could not well be imagined. The dry-ore belt on Slocan lake is yearly growing in importance and the outlook for steady progress and development there is very good; while if railway communication into the Lardeau becomes an accomplished fact, this district will immediately occupy an important position as productive of high grade ores.

Just how far the copper districts of the Province will be affected by the probably lower price of that metal prevailing, is extremely hard to say. The production of the Hall Mines, at Nelson, will not be affected because comparatively high grade in copper, that of the Trail district is not likely to be seriously affected for precisely the opposite reason, the copper there being a comparatively small proportion to the gold. The Coast mines where a very large increase in output may be expected are sufficiently high grade to stand a lower range of copper prices, but the effect on the largest copper mines in the Province is hard to predict. If copper falls so low that the mines become temporarily unprofitable, then they are likely to be closed down. If, on the contrary, a smaller margin of profit than that at present enjoyed, is still maintained, then production is likely to be pushed to its utmost limit. It may be said that at present, with every indication of lower prices the latter alternative appears to be preferable to the companies owning mines in the Boundary district. On the whole the outlook before copper mining is very favourable and points to a largely increased production during 1902.

In the absence of any very remarkable developments during the last year gold mining, that is lode mining, is likely to show simply its usual and steady percentage of growth. But there is every reason to expect that placer

and hydraulic mining will show a most gratifying development. On the whole, therefore, a year of steady and material progress in the development of mining districts and resources already opened up may be confidently predicted for the Province of British Columbia.

Such development as we have outlined, the steady progress of industries already inaugurated, and of districts already partially opened up, bears such an infinitesimal relation to the vast territories which await railway construction, and to the numerous enterprises and industries which await capital, that there is some reason for saying that the Province is standing still, or even declining, when no new territory is being conquered. Progress is entirely a relative word, and a state of things which would be satisfactory were the limits of the Province the districts of Kootenay and Yale, and a small portion of Vancouver Island is highly unsatisfactory when its territory is considered as a whole.

Although there is every indication of a revival of interest in the Cariboo district as a placer mining country during the coming season, due to the discoveries made on the head waters of the Horsefly river, and of a considerable inrush of prospectors into that district, still, the development of new territory throughout the Province awaits the construction of new lines of railway.

If one were to cast a forward glance the eventual complete opening up of British Columbia would be sure to depend on the completion of three trunk lines of railway running from east to west with intersecting feeders running from north to south. The development of the wide and certainly rich district of the Similkameen depends on a westerly extension of the Crow's Nest Pass and Columbia and Western railways. The development of the northern area of the Province depends upon the extension of the Canada Northern to tide water on the Pacific ocean. While that of the intervening territory depends upon a system of north and south feeders, one of which will be on the Island of Vancouver, connecting the three main easterly and westerly trunk lines. It is evident, however, that a purview of the effects of such development would carry us far beyond the possibilities of one year. The problem before the Province for the immediate future is entirely whether the wrangling about the best methods of securing these railways will cease within a year, and actual construction begin.

If it does, we may reasonably look for a renewed influx of capital and population into the Province to take possession of its great resources. If it does not, then, although there is no question that the progress of the productive parts of the Province will go on, there can be practically no conquest of new territory.

It would be a great pity if this were so. Because the times are decidedly propitious for the attraction of a large volume of capital towards British Columbia. The wildcat companies are very nearly all weeded out. Those which remain are likely to prove a better advertisement for the Province. West Africa, which has occupied the attention of English promoters, has proved a delusion and a snare, while the resumption of opera-

tions in the Rand will rather have the effect of releasing capital, than of causing fresh inroads upon it. American and Eastern Canadian capital is well enough disposed to British Columbia, provided indisputable evidence is given of another forward movement in the country. It only requires decision and energy on the part of those who should have the interests of the country at heart, to insure the beginnings during 1902, of a period of great and real prosperity and progress. But certainly, there never has been a time when wisdom and discretion, as well as energetic action, were more necessary, if the golden stream is not again to be diverted from this Province, through our failure to comprehend the means by which it may be directed here, made profitable and productive, and induced this way in increasing volume from year to year.

LEAD-PRODUCING INDUSTRY OF BRITISH COLUMBIA.

EAST and West Kootenay are at present suffering much from the effects of the depression in the lead-mining industry. Many explanations of the existing state of affairs, and suggested remedies have been advanced, some practical but many showing that great misapprehension upon some of the points affecting the situation is common. The present condition of lead mining could be much improved we think if those interested should arrive at a correct understanding of the situation, and would then combine to use their influence for the amelioration of conditions. Those interested are not only the owners of the mines and the men who would like to earn money working in them, the smelters and the large population in the Kootenays whose business is immediately affected, but also the transportation companies, the farmers and ranchers of British Columbia, Saskatchewan, Alberta and Assiniboia, the Eastern Canadian manufacturers, and the merchants of both Eastern Canada and of our coast cities whose business in the Kootenays has been so remunerative. Through them a large population in Eastern and Western Canada feels the difference between prosperity and hard times in the Kootenays. Apart from the effect upon the prosperity of Canadians, the Dominion government has no more liberal contributors per capita, by means of duties on imported goods, than the residents of the Kootenays, while the value of the ore upon which a tax of 2 per cent. is collectible is among the considerations which give the Provincial government an especial interest in the production.

There is no doubt that the relation of the cost of production to the average value of the product of our silver-lead mines is the difficulty, and not the lack of ore in the mines. Dealing first with the value of the product to see how it can be increased we find, so far as the price of silver and the world's market price of lead are concerned, that if lead mining is not possible at current prices, it cannot be relied on as a permanent business. The transportation companies can improve the value of

the lead to the miner by reducing the freight charge on ore to the smelter and on the bullion from the smelter to the refinery, and we should imagine that they would be disposed to do something in this direction if the others interested would do their share in cheapening production.

The mine owner is paid for 95 per cent. of the silver contents of the ore as determined by the most exact assaying methods. By the methods now used, much higher results are obtained than was usual a few years ago, and assayers with experience on both continents, inform us that this difference is much more marked if the comparison is between the assaying methods now used here and those in use in England where the results were so much lower as to give the smelter some margin of safety. The 5 per cent. deducted has to provide for the smelters' losses in slags and by volatilization, and for the percentage deducted by the refinery to which the base bullion is sold, and any small percentage not so absorbed is taken into account as part of the earning when treatment rates are considered.

Payment is made for 90 per cent. of the lead in accordance with the American custom to provide for losses and refining deductions. If this were not done, a compensating increase in the treatment charge would be necessary. The price paid is based on the London market price. As an example of the misapprehension regarding the situation to which we have referred, which by its existence tends to prevent reasonable united action, our attention was recently called to an article published by a contemporary, over the signature of a Mining Engineer, criticising smelting charges and reflecting upon the business ability of mine managers who submitted to them, and in which the deduction of \$1.00 per 100 lbs. from the price of pig lead in London was referred to as something of which the owner of the ore was deprived to his unjust loss and the profit of the smelter. As a matter of fact, the treatment rate charged on lead ores is higher than it would otherwise be because the deduction of \$1.00 per 100 lbs. is only a part of the cost of conveying the lead in the form of base bullion to a refinery, or refining charges and the freight to the world's market and selling costs there, and the remainder of this marketing cost, over and above \$1.00 per 100 lbs., has to be included in the freight and treatment charge which therefore increases as the percentage of lead in the ore increases within certain limits. It would certainly be simpler to deduct, say \$1.50 per 100 lbs. from the London price of lead, which would give a more correct value for the lead in base bullion at Nelson or Trail, and charge a lower freight and treatment rate. The same critic includes in the amount of which he calculates the miner is deprived to swell the dividends of the smelting companies, 90 per cent. of the 10 per cent. deduction, at the value of pig lead in London, not considering that before the lead can have that value the smelter must pay freight to New York, refining charge, freight and insurance to London, selling commission, etc. The deduction for freight and treatment being a

competitive rate with distant smelters, is not affected by the distance from the local smelters, but is uniform on lead ores irrespective of the point of shipment. The freight on the ore to the smelter is paid on the gross weight including sacks and moisture, while the miner only pays the combined freight and treatment charge on the net dry weight of the ore. With a not uncommon percentage of moisture of 10 per cent. and a freight rate of \$5.00, this amounts to 50 cents per ton.

Let us proceed to ascertain what the local smelters realise, and what is included in their charges. As an example take an ore or concentrate carrying 65 per cent. lead with, say, 10 per cent. moisture and a freight rate to a British Columbia smelter of \$3.50, which would be approximately descriptive of an important part of the lead ore produced in British Columbia.

Supposing that the mine ships gross weight of 2,000 lbs., of which moisture is 10 per cent. = 200 lbs., ore 2,000 lbs. The freight and treatment charge, according to 1901 rates, would be \$19.00, and a deduction from the London price of lead for 90 per cent. of the assay contents, 1,300 lbs. less 130 lbs. = 1,160 lbs. at \$1.00 per 100 lbs. = \$11.70, total \$30.70.

The smelter must pay freight on 2,000 lbs. ore and 200 lbs. moisture, total 2,200 lbs. at \$3.50 = \$3.85.

The freight, refining charge, selling cost, insurance and ocean freight, approximately on 1,170 lbs. lead at \$1.50 per 100 lbs. = \$17.55, total \$21.40, leaving as treatment earned \$9.30, and any little saving the smelter may make on metals over what he pays for, or less any loss of metals if his metallurgical results should prove unsatisfactory. While saying something of what is done to earn this \$9.30 it will, perhaps, make the matter clearer if a comparison is made with the work done to earn the treatment charge on the principal ores of the Boundary Creek district, as the rates charged there are often quoted (sometimes by those who should know better) when complaining of the rates on lead ores. We have on the one hand deposits of ore so immense, and so easily mined, that a very large and regular output can be definitely relied upon and the most economical smelting arrangements made with the knowledge that such a plant will have an ample supply of ore for years to come, as an instance of which the Granby Company has installed and is preparing to install the necessary blast furnaces and other plant to treat 2,000 tons of ore a day from its own mine, and to bring the product up to the last stage before the electrolytic separation of the precious metals. On the other hand you have a variable uncertain tonnage of lead ores, varying in quantity from less than fifty tons a day at present to perhaps 400 tons a day at times, to be purchased in irregular quantities from a great number of mines scattered over the district, making it imprudent to invest in the necessary plant to treat the maximum output, as in that case a great part of the plant may be idle much of the time, making it necessary also to provide storage (not in one mass but in a number of bins for the different classes of ore) for the surplus output to provide, if

possible, for the times when the output falls below the requirements of the smelter. In the one case there is an uniform grade of ore not dependent upon the admixture of any other so that it can be smelted as fast as it reaches the works, the loss of interest and risk of loss in prices minimized, and the works planned for the most economical operation; in the other a great variety of ores one dependent upon the other for economical smelting which, with the irregularity of supply, makes it necessary to carry large stocks of valuable ore and increases the necessary cost of handling, the loss of interest, and the risk of loss in prices. It might be thought that the smelter would equalise the losses on a falling market by gains on a rising market, but this is not the case, for while its receipts are likely to be in excess of its capacity when prices are high and its stock therefore increases, shipments from the mines diminish with low prices until the surplus is exhausted and the rising market finds it with empty bins and perhaps compelled to close down until it can accumulate a stock. The daily output at present, for instance, is not sufficient to keep one of the local smelters in operation. A German smelter will require, in agreeing to buy the output of ore from a mine, that a certain tonnage should be guaranteed, and will also limit the tonnage which it will accept. In British Columbia the lead ore contracts have been altogether in favour of the miner who has not usually guaranteed any definite tonnage, while the smelter has agreed to take the whole output of the mine. Next, the smelter buying the Boundary creek, or other copper ore, deducts from the New York price of refined copper about \$100 per ton with which to pay the freight to New York, and the refiners deductions and charges which, instead of being less than the cost, as in the case of the deduction of \$20.00 per ton of lead, gives him a margin of profit to help out his earnings for treatment.

Again, as regards cost of treatment, in the one case it is possible to make one sample and assay for a lot of several car loads, in the other almost always each car load forms a lot. Next, a furnace of such a size as would smelt 400 tons a day of Boundary Creek ore would be doing equally good work when smelting 100 tons per diem of a mixture of lead and dry ore accompanied by the necessary barren flux, which means that the cost per ton for interest on plant, management, clerical, assayers, foremen's salaries, etc., will be four times as much per ton in one case as in the other, without considering continuity as opposed to regularity of operation. Then, ore of the one class is ready for the blast furnace without any previous preparation, while almost all the lead ore now mined in British Columbia must be crushed fine, roasted in furnaces, then mixed with lime and made into briquettes, which operations cost about as much as the whole process of smelting the Boundary ore, increase the losses of values, and require additional expensive plant. Next, the Boundary ore requires no flux; for the other barren flux must be bought, which not only costs money itself, but costs money for labour, fuel, etc., to smelt it, and absorbs some of the

precious metals from the ore with which it is smelted. These respective advantages and disadvantages are not new discoveries, but are an old story to smelter managers and metallurgists.

In a paper by Mr. R. R. Hedley, now smelting manager of the Hall Mining & Smelting Company, which is published in the proceedings of the Canadian Mining Institute for 1898, he wrote:

"Speaking of possibilities, however, I consider that they are far greater in the Boundary Creek district. There the variety is greater and a perfect self-fluxing ore is obtainable. I do not pretend to say that there is an abundance of ore of such grade as to maintain a large plant, but I do say that there is every indication that such will prove to be the case. Once transportation is had, development will be pushed, and plants will follow. Ores will be treated both by direct smelting for matte and by previous concentration. There are very clean ores of mixed pyrites, chiefly pyrites and chalcopyrite, that will carry 8 to 12 per cent. copper and low silica; others of low pyrites, and gangue that will form an excellent slag. Should the coal, on development, prove to be of good coking quality and in sufficient quantity, a plant with large capacity will treat ore as cheaply as anywhere on the continent. Even bringing in coke, at a cost of \$12.00 per ton laid down, I have no hesitation in stating that a 500-ton plant (two furnaces) using steam power, will smelt at a cost not to exceed \$2.75 per ton of ore."

This estimate of the possibilities of the situation is being closely realised. Under these circumstances therefore it does not appear that the local lead smelters have been charging altogether unreasonable smelting rates, but we already have assurance that they will not be found least willing to make sacrifices to help out the situation.

Meanwhile the Provincial government has announced its intention of adjusting the incidence of the mineral tax, and if the railways and smelters will reduce their charges the net value of the product will be increased. This can be further increased if a line of action suggested to the Dominion government is carried out, and it doubtless will be if the pressure of public opinion is exerted by the people of Eastern and Western Canada interested in the prosperity of the Kootenays. The speeches of Sir Wilfred Laurier and Mr. Paterson, at the Canadian Manufacturers Association, seem to indicate that the administration has decided to continue the present tariff policy, and there is therefore no longer a reason why the advantages of that policy should not be extended to the lead-mining districts of British Columbia which have hitherto only suffered from its drawbacks.

The government has shown its disposition by offering a bounty to encourage the erection of a Canadian lead refinery, and it is now announced that the C. P. R. is adding a refinery to its plant at Trail so that in a few months we may hope that there will be Canadian pig lead on the market, and the necessity for a readjustment of the duties on lead in all stages of manufacture will thus become urgent. Such changes should then be made as would encourage the establishment of these manufacturers in Canada, and increase the consumption of our own pig lead which should have reasonable protection.

Since writing the above we learn that action has been taken by the smelters and transportation companies, in the direction of assisting the lead-mining industry during the present depression in prices. The smelters in-

dicate their intention (assisted by railways) to reduce the combined freight and treatment rates on lead ores to \$11.00 for lead ore assaying 20 per cent. lead, with 20 cents per ton additional for each additional per cent. of lead to 40 per cent., with a change in the zinc limit from 10 per cent., as in the past, to 8 per cent., above which the usual penalty of 50 cents per one per cent. is charged. This amounts to a reduction of \$4.00 per ton of ore containing not more than 8 per cent. zinc, and of \$3.00 on all ores carrying 10 per cent. zinc or over. These rates, it is claimed, involve an undue sacrifice and are only emergency rates to apply while lead is below £12 in London, and with each advance of £1 in the price of lead, there is to be an advance of \$1.00 in the freight and treatment rates until the rates of last year are reached.

The smelters have chosen this time when prices are likely to advance, and the first advantage will probably be to the mine owner to ask him to share the speculation in prices. It is found that upon an average, about five months elapse between the purchase of lead ore and the sale of the product therefrom. The smelters have hitherto borne the risk of the fall in prices during this interval. Now they stipulate, when making the reduction in rates, that they will pay for 90 per cent. of the estimated value when received, and make final settlement in ninety days at the prices ruling then.

MINERAL PRODUCTION OF BRITISH COLUMBIA IN 1901.

MR. W. F. ROBERTSON, Provincial Mineralogist, has submitted to the Hon. D. M. Eberts, K. C., Acting Minister of Mines, the following approximate estimate of the mineral production of the Province for the year 1901. The Department of Mines has, of course, exceptional opportunities of correctly estimating the aggregate yield, even before all the returns from individual mines have been sent in, and the figures as given should therefore be reasonably near the mark. The returns from East Kootenay at first sight appear somewhat misleading, the estimated value of the product for 1901 being nearly the same as that of 1900, while the tonnage for the first-mentioned year is shown to have decreased by over sixty thousand tons. It is obvious, however, that while the coal and coke production from Fernie has been included in the estimate of values, tonnage from these collieries has been doubtless advisedly omitted from the column showing the number of tons of mineral produced. We extract the following from Mr. Robertson's explanatory letter:

"This estimate is based upon the actual returns of a number of the mines, and for those mines from which returns have not as yet been received the output is based upon their approximate known tonnage for the past year, together with the assays of the ores from the same mines for the previous year.

"You will note that these are not given as final statistics for the year, which can only be obtained after all

returns are in and checked very carefully. These will be included in the annual report of the department, which cannot be out for about two months yet.

"I hand you these figures now rather than wait for the final statistics, as I believe the prompt publication of even an approximate official estimate making so good a showing will be of benefit to the Province, and is generally desired by investors in our mines.

"I think you will find this estimate conservative and very approximate, quite sufficiently so to show the progress which has been made in the mining industry during the past year.

spring causing freshets and leaving a shortage of water during the latter part of the season.

"The tonnage of ore mined from the lode mines in the past year is about 871,832 tons, equal to an increase of 317,036 over the year 1900, a little more than 57 per cent.

"There has been an increase in the output of all the metals with the exception of lead, the low price obtainable in this Province for lead ores having discouraged this class of mining, except where accompanied with good silver values.

"The gross value of the copper output has increased

ESTIMATED MINERAL PRODUCTION BY METALS.

MINERAL.	Customary Measure.	1900.		1901 (Estimated).	
		Quantity.	Value.	Quantity.	Value.
Gold, placer	Ounces.	63,936	\$1,278,724	43,204	\$ 892,500
Gold, lode	"	167,153	3,453,381	227,666	4,704,200
Silver	"	3,958,175	2,309,200	4,685,718	2,624,602
Copper	Pounds.	9,997,080	1,615,289	30,736,798	4,951,608
Lead	"	63,358,621	2,601,887	50,529,260	1,970,641
Coal	Tons, 2,240 lbs.	1,439,595	4,318,785	1,529,210	4,587,630
Coke	"	85,149	425,745	134,700	673,800
Other materials	"		251,740		399,030
Totals			\$16,344,751		\$20,713,501

N. B.--1900 given as ascertained.

PRODUCTION OF MINERAL BY DISTRICTS AND DIVISIONS.

NAME.	Tons of Ore Mined.		DIVISIONS.		DISTRICTS.	
	1900.	† 1901.	1900.	† 1901.	1900.	† 1901.
CARIBOO DISTRICT					\$684,527	\$470,000
Cariboo and Quesnelle Mining Division			\$672,000	\$450,000		
Omineca Mining Division			12,527	20,000		
CASSIAR DISTRICT					467,479	320,000
KOOTENAY, EAST, DISTRICT	86,962	26,536			2,855,851	2,850,289
" WEST, "					6,020,783	7,302,189
Trail Creek Mining Division	217,636	279,084	2,739,399	3,855,556		
Nelson	94,378	103,486	787,082	1,110,226		
Ainsworth and Sloean Mining Division	30,833	30,207	2,413,373	2,240,615		
Other parts	622	1,229	81,028	155,792		
LILLOOET DISTRICT	5,317	3,670			88,493	56,990
VALE DISTRICT					1,422,495	4,751,458
Grand Forks and Kettle River Mining Div.	103,426	401,008	1,358,383	4,695,469		
Other Divisions	580	3,158	64,082	55,989		
COAST DISTRICTS	14,346	23,394			4,805,153	4,902,665
Totals	554,796	871,832			\$16,344,751	\$20,713,501

† Estimated

"In calculating the values of the products the usual course has been followed, and the average price for the year in the New York metal market has been used as a basis. For silver 95 per cent., and for lead 90 per cent., of such market price has been taken. Treatment and other charges have not been deducted.

"Roughly speaking, the increase made in 1901 over 1900 is 25 per cent. on gross value of output of the Province. This will be a very agreeable surprise to many, as the circulation of reports giving a contrary impression has caused a very despondent view to be taken of the progress of the mining industry during 1901, which does not seem to be warranted by the facts.

"There is an appreciable drop in the placer gold production, owing to the sudden melting of the snow last

206 per cent. over 1900, while lode gold has increased 36 per cent. and silver 14 per cent.

"The attached tabulated forms show the estimated production of the various metals and for the various districts."

B. C. IN LONDON.

(From Our Own Correspondent.)

BUSINESS in the London mining market in the latter part of the old year, and in the opening days of 1902, was chiefly noteworthy for the recovery in the South African market, where the tone has shown a distinct improvement owing to the belief that the war

will soon fizzle out. Large buying on behalf of continental and American operators was reported, and altho' there has been nothing in the nature of a boom, there has been a much firmer tone, and evidence of the underlying strength which has for some time past characterised this section. Westralians attract little attention from the public, and West Africans are still suffering from indigestion. In the British Columbia section the Le Roi group has again been very weak, the Le Roi No. 2 report furnishing the sensational event of the month, owing to the divergent views of the board and the auditors, Messrs. Ford, Rhodes & Ford, the latter of whom made a lengthy report, the gist of which seems to be that the dividend paid recently on Le Roi No. 2, was not justified by the finances of the company. In connection with the position of Messrs. Ford, Rhodes & Ford in relation to the London & Globe and B. A. C. groups it may be worth mentioning that at a recent meeting of a Rhodesian company, of which they had acted as auditors, they were not re-elected, altho' Mr. Ford earnestly defended the actions of his firm in regard to the London & Globe group, in replying to the criticism of one of the shareholders at the meeting in question. The late manager of the Le Roi has announced his intention of replying at length to his critics. Le Rois themselves have been heavy at about £4. L. and B. C. Goldfields on the other hand have been rather more in demand owing to their comparatively low price, and Ymirs also keep firm. This group is regarded by city men as the leading one in connection with B. C. matters. At the Whitewater meeting the chairman spoke in hopeful terms of the future, and said that much good should result for the inauguration of local refineries. Mr. Wethered gave an account of his recent visit to the property, and was also hopeful as to the future. The suggested reconstruction of the Velvet will not have come as a surprise to those who have followed the affairs of this company, and the group to which it belongs. By the scheme now put forward further capital will be obtained, and it is to be hoped that this proposition will, sooner or later, give a good account of itself; so far it has not made a very brilliant show, but then neither have any of the other concerns promoted by the new Goldfields group. There was some healthy criticism at the meeting of the Alaska Goldfields Co., but the month has not been very prolific of incident.

The Hon. J. H. Turner, the new Agent-General, has wisely decided to open an office in the heart of the city, a course which has earned the approbation of all classes of city men who, by the decision in question, are saved the necessity of sending a messenger to the other end of the metropolis every time they want a little information regarding the Province. The office of the agency is located at Salisbury House, London Wall, and Mr. Turner has been very busy settling down in his new quarters. Domiciled in suitable offices for the position of the Agent-General in London, and fortified, as he of course will be, by every possible reading matter that will tell the public on this side what they want to know about the Province, Mr. Turner should be able to render very material assistance to the city man, to the prospective emigrant and to the Province. It is satisfactory to know that he appreciates the necessity of judicious advertisement of the possibilities of the Province, and that he has already sketched out a scheme in this connection. It is to be hoped that in British Columbia equal importance will be attached to the question of advertising, for hitherto the Province has been sadly lacking in this respect. At the present juncture the new Agent-General, assisted by judicious advertising, should be able to do much to eradicate the bad impression of

B. C., created in this country by the mal-administration of promoters and directors of B. C. companies.

The Le Roi No. 2 company has just issued its annual report and balance sheet for the year ending September 30, 1901, as the latter may interest your readers I reproduce it here. It will be noted that the dividend of 5 per cent. was to all intents and purposes paid out of capital:

BALANCE SHEET, SEPTEMBER 30, 1901.

Dr.	
To Capital issued and called up, 120,000 shares of £5 each, £600,000, less calls in arrear, £30,000	£570,000
" Sundry creditors, London £149, and Rossland £1,987 ..	2,436
" Bills payable, Rossland, Northport Smelting and Refining company, £12,793, and Bank of Montreal, £15,121 ..	27,914
	£600,350
Cr.	
By Property account—Cost of property purchased, £55,000 less value of machinery, plant, equipment and buildings taken over from vendors, £10,306	\$539,794
" Preliminary expenses, less amount written off, £1,686 ..	1,686
" Mine exploration and development expenditure, less amount written off, £635	34,103
" Mine machinery and plant, less depreciation 10 per cent. ..	4,807
" Surface improvements and buildings, less depreciation 10 per cent.	4,397
" Mine surface equipment, less depreciation 20 per cent. ..	3,959
" Sundry debtors	5,269
" Ore in transit	1,063
" Cash at bankers and in hand	1,044
" Dividend (interim) paid, £30,000; 5 per cent. on dividend paid, due to directors under the terms of the articles of association, £1,500 — £31,500; deduct profit and loss—balance as per account, £27,275	4,224
	£600,350

PROFIT AND LOSS ACCOUNT.

From incorporation 1st June, 1900, to 30th Sept., 1901.

Dr.	
To Rossland expenditure—Ore production and insurance ..	£17,485
" Depreciation on machinery	2,647
" London expenditure	2,669
" Preliminary expenses, proportion written off	1,686
" Exchange	368
" Balance	27,275
	£52,131
Cr.	
By Ore account	£50,286
" Interest account	1,530
" Transfer fees	315
	£52,131

Owing to pressure on our space the lengthy report by the auditors is not given.

The directors of the company, in explanation of the auditors' report, say:—

(1) With regard to the interim dividend declared in June, the original arrangement with the Le Roi company was that the charge made for smelting the ore of the Le Roi No. 2 should give to the former a net profit of one dollar per ton. With this end in view it was agreed that the charge for freight and smelting should be \$5 a ton. Subsequently on the directors of the Le Roi submitting that by this arrangement they would make scarcely any profit, a cost of \$6 per ton was substituted. When the clean-up was made at the Northport smelter, preparatory to closing the books, a further amount of \$1.08 per ton (indirect charges) was added. This additional charge your directors could not anticipate, and in view of Mr. Frecheville's recent report in which upon 26,000 tons of ore purchased (which includes nearly 21,000 tons from your mines) he estimates the profit as \$62,021.69, or about \$2.38 per ton,

the total charge of \$7.08 per ton should not have been incurred.

(2) The auditors call attention to the fact that we have not reckoned as an asset the ore on the dump. The reason of this is that our general manager is unable to give any definite value for the same. The amount of \$62,000 borrowed against it from the Bank of Montreal has been paid off, and the dump is now an unencumbered asset.

(3) With regard to the small amount written off for development, it must be remembered that we have but as yet commenced attacking the ore bodies, and Mr. Macdonald assures us that the ore shipped last year was taken out largely in the development of these and making preparation for stoping.

(4) We do not admit that the Le Roi Mining Company has any pecuniary claim on this company.

RECENT PUBLICATIONS.

A History of the Precious Metals: From the Earliest Times to the Present; by Alex. Del Mar. Second edition, complete in one volume; pp. 500, 8vo. Cloth and gold \$3; The Cambridge Encyclopedia Co., New York, 1902.

THIS is an extremely valuable and comprehensive work; such indeed as was to be expected from an author of Mr. Del Mar's ripe scholarship, technical knowledge and command of language. The book is divided into thirty-six chapters, in which the history of precious metal mining in every country of both the ancient and modern world is graphically related, while some attention is also paid to the economic questions having regard to monetary systems and the production of wealth. Chapter xxxii is devoted to the history of gold mining in British Columbia, and here, perhaps, we are better qualified to assume the role of critic than in cases where other countries are under discussion. After briefly referring to the early Cariboo and other placer gold discoveries in the northern districts the author proceeds to say:

"In 1805-06 quartz mining began, when the produce rose to about one and a-half millions a year. Large capitals were now invested in the mines (quartz) and machinery began to take the place of hand labour. It is yet to be seen if these ventures will prove remunerative."

Of course it is quite easy to understand that there are difficulties in the way of bringing a book of this character strictly up-to-date, but it is now a well-known fact that a very large number of mining undertakings inaugurated in British Columbia since 1805, have proved exceedingly remunerative. Again, we find the following paragraph:

"According to the report of the United States Consul at Victoria, dated March 16, 1901, concerning the mineral production of British Columbia during the year 1900, the number of miners working underground in the Province was 2,426, and above ground 1,305, total, 3,731. If these were all gold miners, the entire produce of the mines was insufficient to pay them \$3 a day—the ordinary wages in mining camps on the north-western coast—to say nothing of the capital invested in prospecting, purchasing and developing the mines, machinery, supplies, licenses, taxes and other outlays. In a word, if the Consul's vague returns are correctly understood, every dollar produced from the mines of British Columbia must have cost at least two dollars."

Surely this is not altogether a sagacious remark. Even supposing that all the mines referred to were gold mines, which of course they are not, is it reasonable or fair to comment on the excessive cost of production in a country admittedly but recently exploited and in which necessarily but a few mines could be on a productive basis? Generally speaking mining is as economically conducted in British Columbia as in any other mining country, costs being sometimes even lower than those of South Africa where mine labour is miserably underpaid, and is therefore consequently unduly costly. It is somewhat unfortunate that Mr. Del Mar failed to secure official information from the Canadian authorities upon which to base his conclusions, instead of relying for this on returns which are incompletely expressed. Probably had he done so he would not have fallen into such other errors as, for instance, that "the government of the Dominion of Canada disallowed or repealed an Act forbidding all but British subjects from locating placer claims" or that "there is no tax on mineral product." These misstatements are unimportant but they might nevertheless have been avoided, and it is hoped that as the work will undoubtedly sell most readily on its merits, the necessary corrections will appear in subsequent editions.

The American Mines Manual: Comprising a careful, accurate and concise compilation of the active gold, silver, copper, lead and zinc mining and milling companies throughout the United States; compiled by George E. Vigouroux, LL.B. Price \$5.00, New York, Geo. E. Vigouroux & Co.

To machinery manufacturers and others this directory of American mining companies, containing possibly the most complete list yet published, should be of great use. Evidently a great deal of pains has been taken to insure accuracy, at the same time the value of the compilation could and doubtless will be vastly increased to the general public by the addition of information at present withheld. Thus brevity and conciseness has been arrived at and achieved at too great a sacrifice, and the publishers might well in future accept as their model that excellent Canadian work of the same character, *Bell's Mining Manual*. We are glad to see meanwhile that the compiler, in a preface, suggests such improvements, for he promises that "additional matter will be added, new facts stated, fuller particulars given, and the work itself will be completely revised."

Electric Gas Lighting: How to install Electric Gas Igniting Apparatus, including the Jump Spark and Multiple Systems, for use in houses, churches, theatres, halls, schools, stores, or any large buildings. By H. S. Norrie. First edition, New York; Spon & Chamberlain; London, E. & F. N. Spon, Limited, 1901.

Mr. H. S. Norrie (Norman H. Schneider) the author of "Induction Coils and Coil Making," has just published through Messrs. Spon & Chamberlain, another interesting and useful little text book under the above title. Most people will agree that electrical lighting is infinitely superior in every way to illumination by gas, but not infrequently gas is available when electricity is not. In such cases Mr. Norrie suggests a means whereby one of the disadvantages of the former may be overcome. Igniting gas with a match or taper is both dangerous and inconvenient, and recent invention has rendered it unnecessary. The author of this little book explains how gas may be ignited from a distance by simple electrical means, and in the six chapters the methods by which any person of moderate mechanical ability may successfully install and operate such an appliance are very clearly described.

THE MINING INDUSTRY IN CARIBOO DISTRICT, B. C.

By THOS. DRUMMOND, B. Sc., (McGill), M. E., M.C.S.C.E., & C.

(Continued from last month).

Cedar Creek Channel.—This channel is worked by several companies. At the lower end is the Pride of the Lake, formerly known as the Winkley claim. The company was reorganised last spring and they have now brought in a permanent supply of water from Poquette lake. The combined ditch and flume is about two miles in length and it carries 300 miner's inches of water. A short run this fall gave very satisfactory results. The new company hold 3,000 feet of this channel and have a dump of about 300 feet into the Quesnelle lake through a rock tunnel cut through the mine. The bank at present is shallow but increases in depth as it goes back. The gravel yields fairly coarse gold, with a number of pretty specimens of crystalline gold. The claim is now well opened up for next season's work. It has been worked for about three years in a small way



Dam at the Outlet of Bootjack Lake Reservoir.

with good results, and with a good permanent supply of water it should yield good returns.

Likely Gulch Co.—This property is situated on Likely gulch about one mile above the Pride of the Lake. It has been operated at a profit for several years and is reported to have produced \$1,600 during this spring's run. A permanent supply of water can be obtained from Summit lake by building a short ditch. The claim was sold this summer to Mr. Hobson, manager of the Consolidated Cariboo, who intends developing it next season.

Cedar Creek Co.—The mine, owned by Messrs. McLaren, McIntyre and Fitzgerald, is situated on Cedar creek, which yielded a large amount of gold in the earlier days of mining in the district. It paid well up to the crossing of the Cedar creek channel, which was not definitely located at that time. As far as can be seen this company has located it. During the season they ran 200 feet of tunnel and crosscut on the east side of Cedar creek, about 30 feet above the level of the present stream and are now running a 300-foot tunnel on the west side at about the same level. The creek and summit were also prospected with encouraging results. The top gravel averages about 10 cents per cubic yard and the bottom gravel carries from 10 cents to \$2.50 per cubic yard. The gold is fairly coarse with pieces up to \$3.

Several other companies are also at work on this channel, operating with a small supply of water, and while the water lasts the claims pay well.



Jetties and Gate at the Outlet of Polleys Lake Reservoir.

Spanish creek Moore Co.—The owners are Messrs. G. A. Veith, C. O'Neill, H. McGregor and B. Cumisky. They are and have for several years past been engaged in working the deep ground of Spanish creek, having been in pay for about two years, and with good firm gravel but very wet. So far, apparently, they have been working on a branch and could not bottom the channel. A new 250-foot incline has just been finished to tap the bottom and the claim is now in shape for systematic work. The claim latterly has been yielding 4-6 ounces of gold to the set with a 10-foot cap. The drain tunnel is about 1,000 feet long and 70 feet below the present stream. The gold is shotty with small nuggets, but it is not very coarse. The company hold three leases, and they expect to be on pay henceforward.

Several other companies are also at work drifting for the same channel and Mr. Moore has started work on his claim on Black Bear creek, the main tributary of Spanish creek. Mr. Mack is prospecting at Murderer's gulch for a high channel of Quesnelle river. He has



Cut, 10 feet deep and ¼ mile long, excavated to open Polleys Lake.

put down a shaft to a depth of 30 feet and is now drifting in.

Snoeshoe creek.—The hydraulic claims on this creek have a more or less limited supply of water and the run

is from 40 to 80 days. The uppermost mine is the Smith & Anderson hydraulic. It was operated with three men for 40 days piping the bank, which is 70 feet high. The claim usually pays from \$4,000 to \$5,000 per season. This year they paid expenses, but are running a new cut through low-grade material to improve the dump and do not expect to strike pay till next season.

Hayward Hydraulic Mine.—This mine is owned by Messrs. Veith & Borland. They piped 60 days and worked five men, cleaning up 200 ounces of gold from a piece of bed-rock 92 feet by 30 feet. The gold is coarse, one piece last season weighing about 16 ounces. The head of water is about 250 feet.

The Ah Que hydraulic mine usually pays about \$4,000. This season they lost the water before cleaning up and at the time of writing are engaged in this operation.

The Golden Gate drifting mine is owned by Messrs. Veith & Borland and others. They are 380 feet from the shaft, which is 60 feet deep. The mine is equipped with a good hoisting and pumping plant, operated by a water wheel. They have now started



Dam Gates and Camp on Six-mile Creek, below Polleys Lake Cut.

work for the winter with eight men working on two shifts and are on pay.

Keithley creek.—A number of Chinese companies are at work on this creek, working, as a rule, on the deep ground with large forces of men, and as far as can be learned are doing well.

Mr. J. E. Edwards is drifting in for the old channel of Snowshoe creek, where it empties into Keithley creek, and Messrs. Trowman & Pierce are also drifting.

At the Onward drifting mine, also owned by Messrs. Veith & Borland, operations have taken the form of exploiting for the high channel of Keithley creek, and Mr. Veith now informs me that the search has proved successful. The shaft is 100 feet deep to pay and a tunnel has been driven 570 feet long through rim into the channel. Another tunnel is now being started. There are several chance hydraulic mines on Keithley below the Onward. The properties are operated every year but the yield is unknown.

Goose creek.—Messrs. Helgeson & Poquette are drifting for the deep ground on this creek, and they are now on bed rock and get very pretty gold in coarse pieces up to \$5 and \$6 in value. I understand they will work the mine open in which case it will be 30 feet high.

They have a flume 8 feet by 2 feet to carry the water off the creek.

Messrs. Hunter & Kyart are at work lower down the stream on a high channel which they have already lo-



Hazeltine Camp, South Fork Canal.

cated and they are now opening up. The gold is coarse but of a different run from Mr. Helgeson's.

Cunningham Creek Flats.—Several shafts put down to a depth of twenty feet prove the existence of good ground on these flats for a hydraulic lift or dredge. The flats are 4-15 feet above the level of Swamp river. The properties are extensive and the creek itself furnishes unlimited power and a large volume of water.

Clearwater Lake.—A considerable amount of work has been done on Hemlock creek running into the north end of Upper Clearwater lake. The flume is 10 x 5 feet and 325 feet long, and the dam is 45 feet long and 10 feet high. Large boulders of glacial origin are very numerous all over that section and the creeks are filled with them. The results were not very satisfactory and it is doubtful whether the company will continue the work next season.

Main Quesnelle River.—The National Mining company hold four leases on the south side of Quesnelle river just below the mouth of Beaver river. During the season they built five miles of ditch and flume to carry



Flume on line of South Fork Canal.

1,000 inches of water, all of which is finished except a small portion of the flume. Three thousand feet of pipe and a monitor are on the ground but not installed. They built five miles of waggon road and brought in a

saw-mill. The water is taken from Beaver river just above the falls. They are supposed to have expended \$50,000 this season in equipment and development and the mine will be in operation next season.



Pooling Reservoir on Blackjack Gulch, below end of South Fork Canal.

Horsefly District.—The Horsefly Hydraulic Mining company originally operated their ground by hydraulic means, but the gravel being cemented the property has now practically developed into a drifting mine. During the last three years \$20,000 has been expended in advancing the main drift and running gangways and drifts to explore and open the mine, and there are now 100,000 tons of material blocked out, all of which can be mined at a profit. The main tunnel is in 1,800 feet and there is no sign of the opposite rim of the channel. During the last three years' operations, while practically doing dead work, some \$10,000 in gold has been recovered. The company have a 10-stamp mill which is to be much enlarged. The cemented gravel is crushed in this mill.

The Horsefly Gold Mining company has been reorganised under the name of Ward's Horsefly Gold Min-



Two 8-inch Streams at work on the Upper Bench, washing Gravel from bank 350 feet high.

ing company. The head of water on this company's property is 300 feet, which operates an elevating plant with a hoist of about 35 feet very successfully. The pipe line is about two miles long, the main pipe being

30 inches in diameter, dividing near the mine into two 22-inch pipes. The elevating plant here is the only successfully operated appliance of its kind in the country. Mr. Ward has done a great deal of dead work this year which has delayed his operations and rendered the returns less than he expected. When he suspended operations for the season, however, he was in good pay which will contribute largely in swelling next year's proceeds. Mr. Ward deserves great credit for his perseverance under many difficulties and is to be congratulated upon the success he has already achieved.

Miocene Gravel Mining Co.—This company operates at Harper's camp in the Horsefly country. The work comprises the exploitation of an ancient channel of enormous size and depth. Various deep shafts have been sunk—the last one a three-compartment shaft to a total depth of 550 feet. From the bottom of this shaft some 500 feet of tunnelling has been extended to tap the bottom of the channel. When they broke through into the gravel the water became too strong for the pumps, and after obtaining wonderfully good prospects the work was shut down till more powerful machinery could be obtained. This machinery will be brought in this winter and the mine will soon be again in operation. The company operating here under the

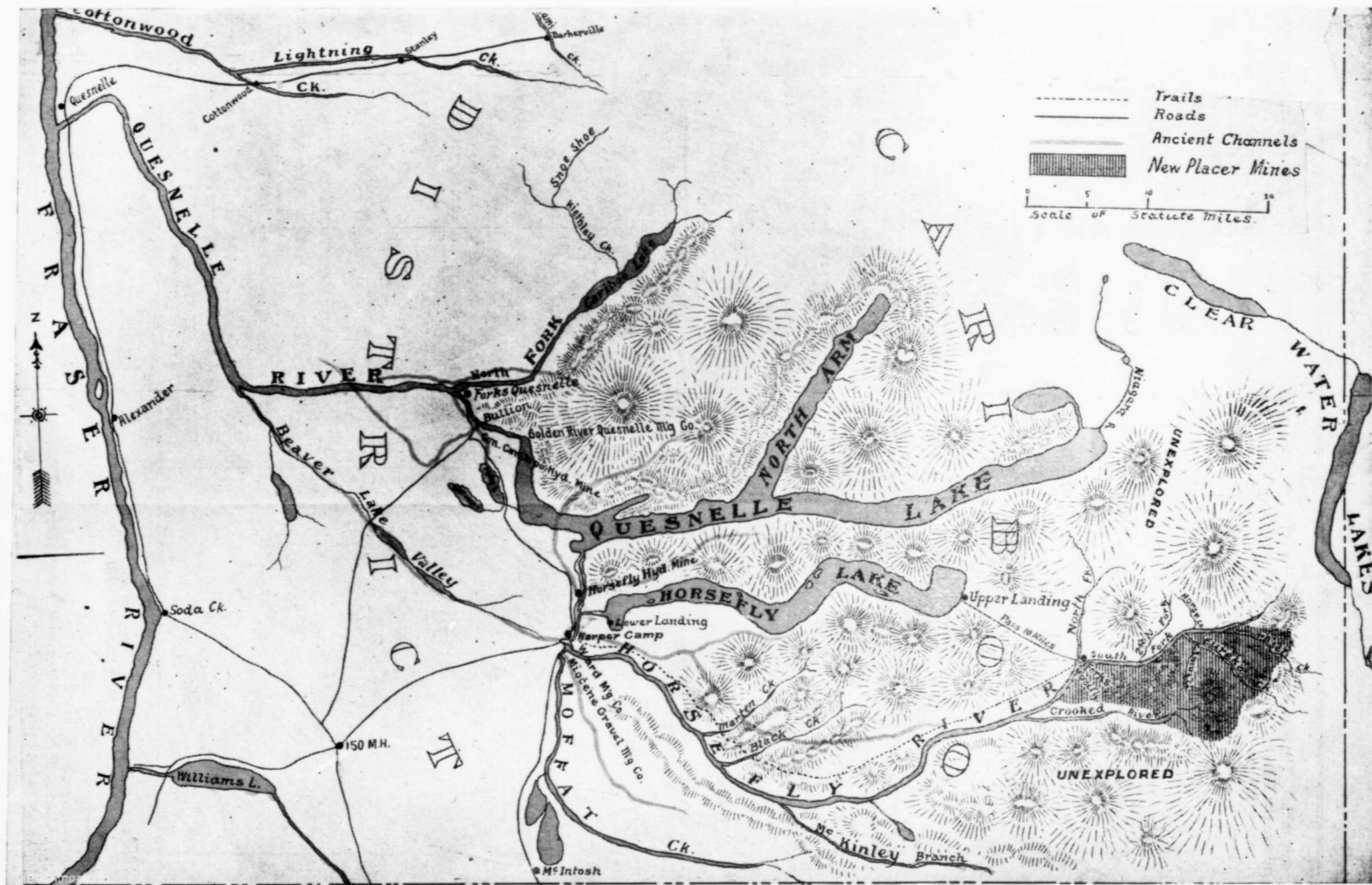


View of Morehead Lake Reservoir, looking East from the Dam.

efficient management of Mr. R. H. Campbell, deserve great credit for their perseverance under many difficulties, and they deserve the success which is apparently now assured. It might also be pointed out that the success of this mine means much to the district and country. It will prove a most extensive system of rich gold-bearing channels covering a large extent of country with room for working many other drifting mines as extensive as this.

THE NEW HORSEFLY GOLD DISCOVERIES.

Messrs. Drucker and Barrett are operating on South Fork of Horsefly, about 65 miles from Harper's camp and near the scene of the recent reported strikes on Horsefly river. They hold 3 1/3 miles on Horsefly river. Conditions are very favourable for operating here as there are big falls at the lower end of their ground. The ground is supposed to be about 40 feet deep and I understand the owners will work it open. Six men were employed during the summer. A shaft was sunk about 26 feet deep, but further sinking was prevented by water. From five to ten feet of the top gravel here yields \$8.00 to \$10.00 a day by sluicing tests. Beneath this there are about 20 feet of boulder clay with gravel, but the owners were unable to prospect this for values on account of water. A number of sluicing tests were also made. Probably \$300 worth of gold was recover-



ed from prospecting. The gold is fairly coarse and about the size of flax seed. Mr. Drucker is now in London, I am told, forming a company to take over the ground.



Rock Fill Cedar Crib Dam of Pooling Reservoir, at the delivery end of the Morehead Canal.

Regarding the reported strike on Eureka, Empire and Fraser creeks, I can say very little. A large number of claims have been located both on the above creeks and on the South Fork of Horsefly river, and I am told that the known ground is practically all located. I personally believe that there are gold diggings there, but I do not consider that the new diggings are by any means a second Klondike, and due caution should be observed in reporting upon them till the ground is carefully prospected. At present, so far as I can gather, there is nothing to warrant all the excitement that has arisen. Mr. Fraser has been engaged in sinking on Eureka creek and is down 16 feet in what is considered to be a high channel. He has been stopped by water and till he has obtained further appliances I fancy he will be unable to proceed. The sinking has been carried on in boulder clay and it is hoped to strike good gravel beneath. Drucker and Barrett are about eight miles below the mouth of Eureka creek and their prospects are encouraging. New maps of this district have been published giving distances, etc., and the papers



Discharge Gates in Dam of Morehead Pooling Reservoir.

have given detailed news about the creeks which it is unnecessary for me to report here. I may state that I personally have not visited the ground and my information is merely of a hearsay character.

BARKERVILLE DISTRICT.

Williams creek.—The Cariboo Gold Fields, Ltd., operates a short distance below the town of Barkerville in the deep ground of Williams creek. Several years ago the company installed an elevating plant of the hydraulic lift type, with a hoist of about 97 feet, and constructed a ditch system, delivering water at the mine with a head of about 800 feet. With this equipment quite a large pit, practically to bed rock, has been excavated. This portion of Williams creek was worked by drifting in the early days and was very rich. It was proposed to work the mine open and the accumulation of tailings on the top of the pay had also to be handled. It was found that the hoist was also inadequate to work this type of machine successfully, and under the management of Mr. Thompson an elevating plant of the endless chain and bucket type was installed last season and successfully tested. The appliance is supplied with 80 buckets having a capacity of about two cubic feet each, and the whole is operated by a Pelton water-wheel, using about 50 miner's inches of water under a head of 400 feet. The capacity of the machine is about 2,500 cubic yards per 24 hours. The gravel in the pit is washed in sluices to a central tank, the waste material being separated by a grizzly. The buckets work



Two 8-inch Streams at work Washing Gravel from Lower Bench in advance of old Chinese workings.

automatically in this tank and hoist the gravel to the surface where it is washed through a double flume. The company hold a large workable area, and the mine is generally believed to be a very good one. Everything is now in readiness for work next spring.

The Saint Juan hydraulic mine is above Richfield on Williams creek. They have a bank of about 70 feet and a good plant and I understand they have had a successful season's work.

The McPherson and Boyce hydraulic property at the mouth of Mink gulch is provided with a good hydraulic plant and is steadily operated.

In addition to the above a number of smaller companies or individual miners operate on this creek.

The Mount claim is situated near the reduction works. It is owned by Mr. Bremner, of London, and is to be worked under agreement. A hydraulic plant is to be installed this winter and the mine will be in readiness for work in the spring.

At Barker drift mine winter work is in progress. The owners are exploiting for rim of gold from Stout's gulch.

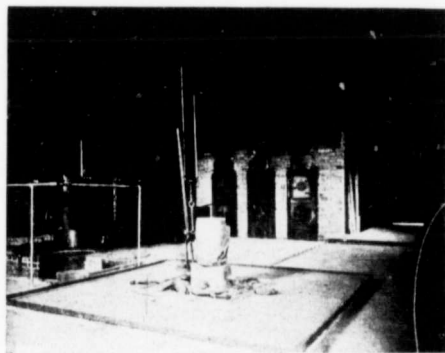
Stout's Gulch.—The Wintrip, Jenkins, Yeomanry and Protection hydraulic claims have all been operated this season with satisfactory results.

Lowhee creek.—The Cariboo Consolidated Hydraulic Mining company have made a long bed-rock cut of about 1,000 feet, and also a flume, and have been on rich ground though somewhat troubled with slide rock and bed rock was temporarily lost. The ground was rich but difficult to handle as it had to be shovelled. The water lasts till July or August. This company control a number of claims here and elsewhere, a good many of which are being operated.

Quite a number of smaller enterprises are engaged in mining on this creek.

Mosquito creek.—Alabama, Discovery and Williams hydraulic mines. The first two are in operation and the third will be working next season. They all have good plants and the season lasts from one to two months.

Laird's Willow River.—Operations at this mine are being conducted from a shaft on rim rock, about 200 feet deep, and in drifting out to strike the bottom of the channel which had previously been explored with a boring machine. The owners have broken out into the gravel but have been considerably troubled with water; the prospects, however, are said to be very good. The company have a good steam hoisting and pumping plant, one Corn'ish pump, 18-inch with a 11-foot stroke



Crucible containing 9,040 Troy ounces of melted gold.

which can pump out the works in 24 hours. They also have a compressed-air plant. There were many difficulties to contend against here but so far as can be seen these have been surmounted and it is supposed that the mine will be in full operation in a short time.

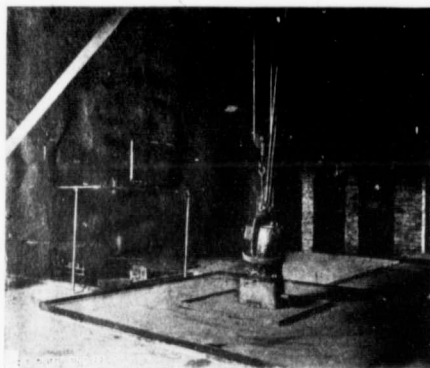
Slough creek.—The Cariboo Exploration company, operating on this creek have explored the channel with a boring plant. A shaft 367 feet deep has been sunk on the rim and about 1,000 feet of tunnelling run from it to strike the channel. A compressed-air plant has been installed and the property is also equipped with good hoisting and pumping machinery. As soon as everything is in readiness it is proposed to break through into gravel. The mine will then be in full operation and, I understand, working on pay.

Nelson and Slough creeks.—The China hydraulic mines operate on both creeks at a profit. The Lange hydraulic mine, Dragon Creek Co., has been operated profitably for several years and has made an unusually good showing this season. The returns, however, would have been still higher but for an unfortunate cave shortly before the close of the season. The bank here is about 50 feet. Water is conserved in a pooling reservoir and the mine can be worked at least for a few hours daily during the entire season.

Eight-mile creek.—The Thistle Co's property the

bank is about 25 feet high. A force of twelve men were employed during the summer. The mine is well equipped and has paid well this season.

Burns creek Hydraulic.—The Cariboo Exploration



Crucible partially broken off, the Gold Ingot weighing 9,040 Troy ounces.

syndicate are working into the hill near the mouth of Burns creek. Their ditch is four miles long and the water is taken from Jack of Clubs lake. The mine paid well this season and it is said to be a very promising property.

Shepherd creek Hydraulic.—The water supply at this property is limited. Yield for the season not ascertained but it is supposed operations were conducted at a profit.

Waverly hydraulic on Grouse creek, the bank is about 100 feet; water taken from Grouse creek. The mine has been in operation many years and is being worked in ground which has been drifted in with unworked ground ahead. It paid expenses this year.

There are several other companies operating on this creek, notably the Shirt Bend company, Mud Slide and several Chinese companies. The results are said to be satisfactory.

Shepherd creek.—The Chinese hydraulic has been operated for about 20 years, and made a remarkably good showing this year.



Ingot of Gold weighing 9,040 Troy ounces, valued at \$154,765; run of 68 days; Consolidated Cariboo Hydraulic Mine, 1900.

Cunningham creek.—The Low Wan hydraulic, Messrs. Ross, McGregor and Thompson owners, are operating up the bed of the creek and intend installing a hydraulic plant. Very encouraging prospects have been

obtained. There are several paying Chinese undertakings on this creek.

Wolf creek.—Mr. Hasell operating on this creek has very favourable prospects and has purchased a hydraulic plant which will be installed this winter.

Hard Scabble creek.—The Johnson & Fay Co. here are said to be getting satisfactory returns, but I have not ascertained the results for the season.

Stewart creek.—There are two drifting claims on this creek which are said to be operating at a profit but the details are unknown to me.

Lightning creek.—The Cariboo Consolidated Hydraulic Mining company own a mine in this vicinity just opposite the town of Stanley. The property has been successfully operated with a limited supply of water, but a larger and more permanent supply of water can be obtained when required.

Many other companies and individuals are prospecting through the Barkerville district, always with good chances of success, but space will not allow me to notice them in detail.

This has been a successful mining year throughout Cariboo district, especially among the smaller mines for the first part of the season was wet and furnished a good supply of water. The larger mines, however, which operate throughout the season have not been so successful, for in many instances the water failed early in the fall on account of continued warm dry weather.

Many large companies that have been operating in the country, especially along the Quesnelle river, have expended large sums of money in systematically prospecting their ground with successful results. They find that they have immense deposits of gravel and that these can be profitably worked by hydraulic power.



MELTING ROOM, CONSOLIDATED CARIBOO HYDRAULIC MINE. ELEVEN CAKES RETORTED GOLD VALUED AT \$81,622.00.

Several other claims are also being worked here but I am unable to give results.

Dunbar Flat.—Prospecting with a hydraulic plant for the old channel has been carried on here with results reported to be satisfactory.

Butcher Point.—Prospecting for a piece of unworked ground has been in progress with encouraging results.

On Peter's creek, a tributary of Lightning creek, the Empire company, a deep-drifting company, J. G. Mather, manager, has been engaged in running a tunnel to strike bed rock. The results so far have been encouraging. This creek was relatively little worked in the early days.

The Lightning Gold Gravels and Drainage company, have operated during the season near the wing dam and are engaged in drifting for the deep channel of Lightning creek. Work is conducted from a bed-rock shaft, the drift having broken through into the gravel. The inflow of water is a source of some embarrassment, but the mine is equipped with an excellent hoisting and pumping plant.

They have also an ample supply of water for the whole season for the operating of these deposits and an unequalled dump into the Quesnelle river. Such enterprises require a large initial outlay—and capital is now difficult to procure—but they also promise a large return and if they are laying dormant at present it is mainly on this account. Then again there are very many mines throughout the Cariboo district that have been annually worked by individuals or companies successfully for many years past and though the properties are, as the stocks are not listed on the markets, practically unknown to the public, still in the aggregate they yield a large amount of gold annually and prove that the country is still a producing one and worthy of examination. Dredging for gold also is another industry which will soon come to the front, especially on the Quesnelle river. I consider that the favourable conditions found here are unequalled elsewhere in the country, for the values are good, the dredging depth is not too great and the soft miocene clay bed rock makes an excellent bottom to dredge to and one from which all

the gold can be recovered. Deeper tertiary gravel probably exists underneath this miocene rock for it is a sedimentary deposit, and if this is found it will probably prove extensive diggings.

In conclusion I would state that we in Cariboo look forward to a prosperous era in gravel mining, especially in the case of the deeper mines which will operate the ancient channel systems of the country. These immense gravel deposits, often 600 and 800 feet in depth, will form a permanent and lasting industry in the country, even more so than quartz mines, and moreover these channel deposits when once fairly prospected can be depended upon to carry their values. We believe that the more rugged and rougher portions of the country will prove to be a good quartz country, and that valuable deposits will be discovered there in the near future.

HYDRAULIC MINING IN OMINECA DISTRICT DURING 1901.

OPERATIONS during the year were chiefly of an exploratory or development character, the results achieved generally, however, proving eminently encouraging. The district also suffered in common with other placer mining regions of British Columbia from a scarcity of water. Very heavy rains fell during the early spring, but after the end of July the season was an exceptionally dry one, the early melting of the snows on the higher altitudes increasing the difficulties of the situation.

On Manson and Germansen creeks and their tributaries operations were carried on by the 43rd Mining & Milling Co., of Ottawa, the Arctic Slope Hydraulic Co., of Victoria, and the St. Anthony Co., of Santa Barbara, California. The 43rd company's hydraulic elevator was removed early in July from Kildare gulch to Slate creek, a distance of about a mile, and prospecting at the latter spot was commenced. Good prospects were found on the surface, the values increasing as depth was attained. When work was suspended at the close of the season bed rock had not been reached, but the highly auriferous nature of the gravel in this locality has been sufficiently demonstrated to warrant the company's determination to install a large elevator plant on Slate creek next season. The 43rd company in addition to the operations on Slate, opened out a hydraulic claim on Manson creek, about a mile and a half below the town of Black Jack, during the season, but the ground was not sufficiently tested to admit of an adequate idea being arrived at concerning its value. The company has, however, now completed at a cost of probably nearly a quarter of a million dollars, the equipment of the properties, including a most extensive water-carrying system, and next year the undertaking should be upon a profit-earning basis.

The St. Anthony Co., operating on Germansen creek, directed attention entirely during the season to prospecting and exploratory operations, the work consisting of hill-side drifting. In the "seventies" very rich diggings were discovered on this creek.

Prospecting was also carried on by Mr. E. G. Tilton, on Manson and Lost creeks, a channel which evidently once formed the bed of Skeleton and Lost creeks having been encountered. The work this year was an endeavour to bottom a hole caused by an overflow of rim rock. Heavy gold was found at all depths, from near the surface to the bottom of the present 60-foot shaft. It is expected that the hole will be bottomed early next season and hydraulicing will also be started, the plant

being now on the spot. Ground sluicing was also prosecuted on Lost creek this last summer by individual miners, and among the larger nuggets recovered, one was valued at \$49. On another property, from which \$105,800 was taken out twenty years ago, before pay gravel was exhausted, an effort is to be made during winter to locate the rich channel by drifting.

Mr. Bertram W. Powell kindly sends us the following information of operations on the Vital and Tom creek section of the district:—

This portion of British Columbia is comparatively little known. The great drawback to its being thoroughly developed is the lack of transportation facilities, the present mode of getting supplies into the country being most expensive and tedious, absolutely debarring the individual prospector from exploring what, I have every reason to believe, is one of the richest portions of British Columbia.

Vital creek was one of the first streams upon which gold was discovered in the Omineca. The discovery was made by a Frenchman, after whom the creek was named, who was one of a party of prospectors sent out by the government. This was in the autumn of 1869. The usual excitement followed, and the spring of '70 saw a number of miners at work. The camp proved to be a very prosperous one, and a very large amount of gold was taken out in a remarkably short time. Mr. Eyra Evans, one of the "old timers," informed me that his claim paid steadily at the rate of fifty dollars a day to the man. At that period no ground was considered worth looking at that would not yield at the very least twenty dollars a day per man, and as the gravel gradually became deeper as the workings advanced up the creek, which rendered it more expensive to work, it is not surprising that the discovery of shallow diggings of great richness on Germansen creek, in the fall of '70, caused a general exodus of all the men on Vital to that place.

The finding of Manson creek was the occasion of another stampede from Germansen. A considerable amount of gold was recovered from Manson and adjacent streams, but further exploration was rendered by the report of very rich finds in Cassiar district, and an exodus in that direction followed. Two or three miners remained, however, on Vital and for the next fifteen years are reported to have recovered from their operations gold to the value of from ten to fifteen thousand dollars a year. Tom's creek having been discovered in 1889, was again the cause of Vital being deserted. In 1894 a party of Chinamen settled on Vital and worked there for four years. They mined in the most primitive way, only removing a piece of ground 800 feet long, but out of which they secured some forty thousand dollars. Since that time about one and one-half miles of the creek have been acquired by an English syndicate who have been engaged in prospecting and carefully ascertaining the extent of auriferous gravel contained in their holding.

The past season's work has produced the most satisfactory results, about one hundred and twenty yards of bed-rock gravel having been run through the sluices, and which showed a very handsome value per yard. Preparations were made for the installation of a hydraulic plant next year. The property is an almost ideal one for hydraulicing, as there is plenty of water obtainable at a small cost which can be brought onto the creek at an altitude of three hundred feet. The stream runs on such a steep grade that the question of dump becomes a very easy matter to arrange. The gold from the creek assayed in London \$17.95 per ounce. Large quantities of arquerite and native copper are also found.



MINING IN Omineca.
 1. Miner's Cabin on Lost creek. 2. Workings on Lost and Manson creeks. 3. Blasting boulder clay on Blackjack creek. 4. Undershot Wheel on Germanen creek. 5. Monitor at work on Manson creek. 6. Tramway for transporting foulders. 7. A pit on Blackjack. 8. Hydraulic elevator and workings, Kildare Gulch. 9. Arctic Slope Co's flume. 10. Blasting and picking clay. 11. Rafting lumber on Manson.

B.C. PHOTO ENGRAVING CO. VICTORIA

TOM'S CREEK.

The Mayflower claim on this creek is the only one which is now being extensively worked—Jas. J. May is the head of the company of five miners owning and mining the property. He is a reminder of "the days of old, the days of gold, the days of '49," in California, and since that time has been mining steadily in British Columbia. He has laboured under a great many difficulties on Tom creek, the claim being a hard one to work. It is situated on a very ancient channel, which turns into a hill. In order to drain this May & Co. have had to run a deep bed-rock cut from the present creek. It has cost them a great deal of time and money, but having unbounded faith in the claim they have stuck to it in spite of all obstacles. From what I saw of the property the indications are that next season will see them rewarded for their sacrifices. They were able to bottom the old channel last summer and commenced to "open up" the ground from their "cut" and altho' their line of sluices was set twenty feet above their shovelling pit, a feature which necessitated first throwing the dirt onto a platform and from there into the boxes, they informed me that the ground was averaging \$350.00 to ten feet.

Now that they have been able to get the ground opened their work next year will be greatly simplified. If gravel will pay by working in this slow and expensive method. What would it not yield if a modern plant were installed? Last fall a party of us went on a prospecting trip across to the Osalinca river, which lies about one hundred miles north of Vital creek. This part of the district is unexplored. We found a magnificent game country which would be a perfect paradise for the miner should diggings of value be discovered. We found countless creeks pouring their waters into the Osalinca. Two of these we tried pans on and got excellent prospects of very coarse gold. We were unable to stay longer owing to the food running short, but were greatly impressed with the evidences of mineral deposits appearing on every side. When the question of transportation becomes so arranged that the individual prospector can afford to roam about without starvation staring him in the face, I am positive this portion of the country will prove as satisfactory as any of British Columbia's mining camps, both in quartz and placer mining.

But until a railroad is built into the north, the rich mineral belt striking northwest from the Omineca—the extensive coal measures of the Telqua, not to mention the magnificent farming lands of the Buckley and Nearchar valleys—must lie dormant.

 THE YEAR'S MINING IN KAMLOOPS AND YALE.

BY JOHN REDMAN,
(Queen's Prizeman Geology).

THIS district being at present one of prospects rather than of mines, has naturally been seriously affected by the prevailing financial depression. The list of hopeful prospects previously worked and closed down during the last eighteen months is unfortunately a lengthy one. There are, however, two enterprises in the immediate vicinity of Kamloops, which have been vigorously and ably exploited during the year. These are: The Iron Mask mine and the North Thompson gold dredging undertaking. To the first

named must be accorded foremost place as a successful venture. For several years past a promising but much-abused prospect, the property was purchased by the B. C. Exploration Syndicate for \$40,000, some eighteen months ago. Systematic development work was at once initiated under the direction of the company's engineer, Mr. J. Argall. Extensive buildings have been erected, and the mine has been also equipped with a large gasoline hoisting engine and a powerful steam pump. The shaft has now been sunk to the depth of 350 feet, and development work is being conducted at the various levels. The vein is 40 feet wide with bands of 3 to 4 feet of high-grade ore on both walls. The first shipment of 60 tons was made to the Granby smelter some four months ago and occasional shipments have also since been made. The ore thus raised was taken out in the progress of development work from the high-grade bands. As to values the smelter returns gave 15 of copper with small gold and silver contents aggregating about \$4.00 a ton. The ore is also self-fluxing and therefore in considerable demand by smelting works. The mine is situated about two and one-half miles to the south of the Thompson river and C. P. R. track, and a site has been purchased from which shipments will be made and also for the purposes of a probable future location of reduction works. The company intend to install an aerial tram in the near future from the mine to this site, when regular production will be inaugurated upon an important scale.

Almost all other Coal Hill undertakings are at a standstill. The Python and Pothook are closed down, also the Kimberley mine. This latter has been the subject of much misrepresentation. Purchased last year by an eastern company, some 200 feet of work was carried on, according to reports on the ore body. Conflicting accounts reaching the company, which appeared to be acting in perfect good faith, the manager was relieved and Mr. W. H. Fowler, one of the original owners, was appointed in his place just before the annual meeting. Mr. Fowler had merely time to thoroughly sample the new workings and report to the meeting. This sampling proved, however, that instead of having developed a large body of shipping grade ore, as expected, the development work had but passed through slightly mineralised country rock. The shareholders meanwhile refused to believe that they had been deceived, or to accept Mr. Fowler's conclusions and his services also were dispensed with. Subsequent investigation, however, satisfied the directors that Mr. Fowler's report was trustworthy, although work on new lines, later, disclosed a low-grade ore body, no ore of shipping grade being discovered. The property has been closed down and has not been operated for nine months past. I give these facts of the case here as paragraphs have lately appeared in the press of a misleading character, probably with a view to a resuscitation of the mine and the extracting of money from the pockets of the confiding eastern public.

A further effort to work the Copper King mine with the aid of local capital appeared for a time to promise success, but this attempt also failed. In addition to the usual assessment work on a large number of prospects, a contract has been let for a limited amount of development work on the Chieftain group, recently acquired by a company in process of formation. Not much is known of the promoters of this enterprise, but some good ore has been encountered.

The gold dredger on the North Thompson river at Jamieson creek, was completed during the summer and operations were conducted until the close of November, when work was suspended for the winter months.

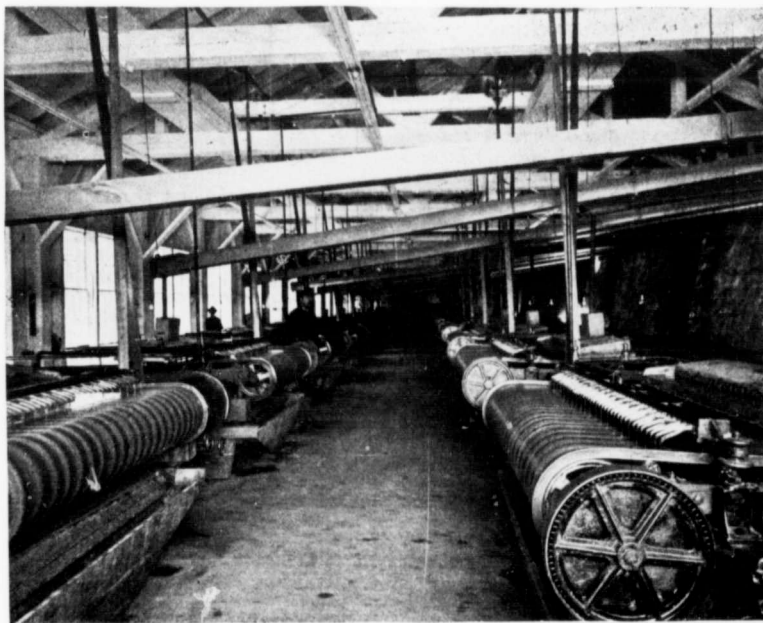
The work here was prosecuted under the direction of

Mr. F. J. L. Tytler, C. E., and was chiefly confined to testing the ground. As the tests are incomplete no authoritative statements can yet be made as to the possibilities of gold dredging on the river. Experiments were carried on at two spots only, at the first results were disappointing; at the second encouraging. On the whole it is believed that the dredge will yield good returns if the fine gold associated with the black sand can be economically recovered. It is proposed to try a treatment of the black sand with cyanide next spring. Whatever the outcome is, failure at least will not be due to ignorant or incapable management for the undertaking has been most skillfully directed from the start. Here again many utterly untrue and unreliable reports have been assiduously circulated and the public would do well to disbelieve all accounts of wonderful returns obtained during so many hours dredging, unless

properties have been financed from England there has been very little investment in this direction by Canadians. The Carthage, Fog Horn, Shiloh, Union Jack and Bayonne properties have all undergone considerable development during the year under American auspices, while of the producing mines the Canadian King and Second Relief are managed from Spokane, the Ymir and Arlington are British undertakings, and the Yellowstone and Fern are Canadian.

The production of this mine during 1901 will total some 65,000 tons of ore, treated by the 80-stamp mill at a net profit of about \$275,000. The new cyanide plant, the installation of which is now nearing completion, will effect a saving of about \$1 a ton, and consequently next year's profits will be increased to this extent. In the development at the mine

Y MIR
MINE.



VANNER ROOM, YMIR MINE.

these are guaranteed by the only responsible authority, the manager of the enterprise.

At Sicamous a promising property has been operated during the entire summer but there have been no important developments. Other claims in the same district are also being worked.

In the Nicola, Stump Lake and Aspen Grove districts many promising ore bodies carrying good values are awaiting exploitation, which will inevitably follow the construction of the Coast-Kootenay railway.

Y MIR DISTRICT IN 1901.

BY PERCY J. GLAZER.

A SIGNIFICANT feature of the progress made in Ymir district during the past year, is the large amount of outside capital which has been invested, and the number of properties which have been incorporated. The greater part of this new capital has been derived from American sources, and while a few

the chief feature of interest has been the cutting through of a rich body of ore on the No. 4 level. This chute is reported to extend across twenty-six feet, the whole width of the ledge, and to average \$40.00 a ton. None of it has as yet been included in the output, nor will it become a factor in production until connection has been made between the shaft and the adit tunnel on the 1,000-foot level. The shaft is now down 800 feet, and the tunnel in 1,800 feet with 300 feet farther to go, so that the connection may be expected in about two weeks time. At the lowest depth in the shaft the vein is officially reported to be even stronger and more compact than in the upper levels and the values to be well maintained.

During the year the Kenneth Co., formerly operating this property, went into liquidation and a company called the Tamarac Mines, Ltd., was formed the bonds being issued to the Kenneth shareholders with a liability of ten cents, of which four cents have been called up. An aerial tramway has been construct-

TAMARAC
MINES.

ed a distance of 3,000 feet, connecting the mine with the railroad, and some 150 tons of ore have been shipped to the reduction works at Silica, chiefly for experimental purposes. The ore was found to average \$11 and to be susceptible to profitable treatment by the cyanide process.

During the year the following mines have produced ore: Ymir, Yellowstone, Wilcox, Arlington, Fern, Tamarac and Spotted Horse. The total production aggregating, approximately, 80,000 tons. Most of the ore produced has been treated in local mills, the following being the average monthly production:

	Stamps.	Tons.
Ymir	80	6,000
Yellowstone	10	750
Fern	10	750
Arlington		1,000
		8,500

The Tamarac, Wilcox and Spotted Horse have shipped ore direct to the smelters, while the 10-stamp mill at the Second Relief mine only came into operation during the last month of the year.

The Dundee mine has been inactive during the year. Following an examination by Mr. Bernard Macdonald, recently manager of the Le Roi mine, however, instructions have been given for the unwatering of the mine, indicating that negotiations are in progress for the resumption of operations.

For the first six months of the year this property, the stock of which is chiefly held in Victoria, remained idle.

FERN MINE.

Subsequently, however, a lease of the mine and mill was given to Mr. P. J. Nichols, a practical miner of large experience, who has put the property in good condition, and is treating the ore at considerable profit. Work was formerly abandoned in consequence of the ore body faulting and it is only during the past few weeks that Mr. Nichols has succeeded in refining the ore, which is said to be richer than at any previous period.

A remarkable showing of rich ore has been obtained on the Fourth of July portion of the Wilcox mine. In the winze on this claim two feet of clear steel galena ore have been uncovered, averaging \$92.00 a ton. A quantity has already been shipped to Northport and more is now being sacked for shipment.

The Fog Horn property has been developed from a mere prospect to a promising mine during the year. Two long tunnels have been run 500 and 200 feet, respectively, the former being a crosscut and the latter following a vein of rich ore, from which shipments will be made during the present winter.

The crosscut tunnel encountered the vein at a distance of 250 feet, and the drifting is now being done along the vein to get below the good ore exposed on the surface at the shaft.

The 10-stamp mill on the Yellowstone mine has been in operation throughout the year, although as the property is owned by a close corporation details of the development and output are not available. The British group of claims, traversed by a vein of very rich free-milling ore was only discovered two months ago, in the neighbourhood of the Yellowstone mine. It has, however, already been bonded to the London & B. C. Goldfields, Ltd., for \$35,000, which company is now developing the property. The 50-ton concentrator at the Arlington mine was completed in August last, since which date rich concentrates have been regularly shipped. The 10-stamp mill on the Second Relief was completed during December. Mean-

while the active development operations in progress during the year are being continued.

The Chicago National Development Co., of Chicago, have bonded the Carthage claim which is adjacent to the Ymir mine and is supposed to be a continuation of the latter vein. Two tunnels have been run 250 and 150 feet respectively, the former disclosing two feet of excellent ore very similar to that of the Ymir. The Active Gold Mining Co., promoted by Cincinnati capitalists has just been formed to operate the Union Jack property, situated on Porcupine creek about six miles from the town of Ymir; recently the resumption of development operations are promising and a large vein of free-milling ore was encountered with a full complement of miners.

The Bayonne, a promising claim, was recently bonded for \$20,000 by Mr. A. L. Davenport, of Spokane. The first payment of \$2,000 was made in December.

RECENT DEVELOPMENT IN THE FERGUSON DISTRICT.

By A. H. HOLDICH, R.S.M., ETC.

IN this district the past 12 months has seen an enormous amount of development on the numberless claims, and many of them will undoubtedly prove extremely valuable in the near future. Still, the number of them that can be designated by the name of mines is very limited, even the Triune which has produced such rich ore can hardly be considered more than a very well developed prospect, though by this time next year it is quite likely that it may fairly be called a mine. The only other sufficiently developed properties are the Silver Cup and the Nettie L. both of which have been frequently referred to in these pages, and which are both in a position to ship regularly. The Silver Cup has not had its full complement of miners all through the year, and there have been some changes in the management, but just now it has a force of some 30 men and is preparing to increase the staff, having contracted to produce 1,000 tons of ore this winter. The Nettie L. also had a very small force during the summer, but is increasing the number now. The long lower tunnel is completed, and ore was struck in the far end; the upraise to connect the lower and upper workings is now being made and is expected to be completed by the end of January, till which time there will be no great quantity of ore shipped.

The Ophir-Lade group had a lot of work done upon it during the past season, and has proved to be wonderfully rich in gold; which appears to exist partly free and partly as a telluride. This, with most other of the smaller properties, is closed down for the winter, though active operations will be resumed next season. Small as these beginnings are, there has been more ore shipped in small lots from the various claims than ever before, and the returns have always been satisfactory and occasionally highly so. Among the small shippers we may notice the Ophir-Lade, Ruffled Grouse, Horse-shoe, and the Linson View, as being exceedingly satisfactory to their owners; while many more will follow the example next year, when it is hoped the long promised railroad will reach the northwest end of Trout lake and greatly reduce transportation charges.

In addition we are guaranteed a small smelting plant at once, (now being installed) and that, if successful, will be an immense benefit to small shippers. But if, on the other hand, it should turn out unsuitable for our

ores, it is to be feared that more harm than good may be the result by discouraging intending investors. However, it will be time enough to growl after it has failed, which we hope it won't, and great things are said of it in places where it has been tried. Altogether the outlook for Ferguson (which town has doubled in size during the past year) and for the district surrounding it is extremely favourable, not only from a mining view but on account of other industries to be established.

THE NELSON DISTRICT.

BY RONALD C. CAMPBELL-JOHNSTON, M.I.M.M.

WHEN reviewing the progress made in mining during the year there are several sides of the question to be considered. How has capital, invested in the district, been rewarded by dividends? What development has been accomplished with a chance of dividends accruing in the near future? How much has our knowledge of the characteristics of the mineral-bearing veins advanced, so that we can follow veins past faults and broken formation without needless expenditure? Where to look for fresh mineral with every chance of success? Finally, have we got the adequate treatment to save the values contained in our ores?

In answering these questions by exhibiting our mistakes, if any, and by relating our experiences gained, we can then give capitalists an unbiased view of the district, and tell them what great profits are awaiting them if they will take a hand in developing it.

Let us begin with the mines on Toad mountain where the Silver King has now demonstrated how to search for the gold and silver-bearing copper ores there. The splendid outcrops of ore originally on the surface were in a quartz gangue as veins frozen to the country rock without selvage. As in all mining the copper ore lies in chutes, those on the surface in time at depth narrowed down, and left the problem of discovering the indicator that would lead to the next chute. In a new district it takes time and much money (therefore the necessity of ample working capital) to learn the peculiarities of the vein formations. Crosscutting here led to the discovery of another kind of ore occurrence, namely, an altered zone of mineralised rock. The manager, seeing at Rossland close at hand that this was the occurrence of the ore, naturally jumped to the conclusion that Toad mountain was similar. Later it proved, however, they had been on the wrong scent, since crosscutting for veins has shown that quartz is the matrix of the ore bodies, and also down to the 1,000-foot level in that mine that the values of the ore are as rich as ever, and have every appearance of pertinacity in depth, since the deep-level companies, such as the Dandy and others, show these values many thousand feet deeper. We have learnt therefore about Toad mountain, and capital need now no longer hesitate to develop the many surrounding groups.

Next must be considered Morning mountain with its gold-bearing ores. Running east and west to Sandy creek is a wide zone of green igneous rocks, with granite again coming in on the north. Along this contact lies the Robin Hood, California, Exchequer, Athabasca, Venus and others. As higher-level mines in the green rocks are the Juno, Birdseye, Thorn and others. As lower-level mines in the granite are the Royston, etc. The Athabasca has borne the brunt of development and expense in learning the features of the veins.

All have proved that the veins in the green rocks carry high-grade chutes of ore, though on occasions

faulting. The indicator where to pick up the vein is known, however, and so no anxiety is now felt about faults. When the veins dipped into the granite at the contact they held their values, but at the Athabasca as they go deeper down in the granite, a poorer zone of values came in with every indication, however, from other mines of becoming rich again with more development. As there are northerly and southerly veins intersecting the easterly and westerly veins, it is no dream of the far future to predict tunnels from near the Kootenay going along the southern veins to cut at great depths the eastern veins which dip north, and make Morning mountain a most prosperous camp in the near future.

Sandy creek has had considerable surface stripping accomplished, exposing large quartz veins dipping west towards the creek, and bearing out the Australian rule "own a vein with the hill and not against the hill."

Eagle creek has been actively developed in the Poorman mine, though why the Poorman was favoured in preference to the Granite is still a conundrum, since both mines have equal merits, and equal demerits from expense in sinking. The veins carry rich chutes of ore but in places narrow to a foot wide. Machine drills were put into the stopes, so that often twice as much country rock as ore was treated. One would not on the face of it consider this an economical proceeding, especially as the Athabasca emphatically proved the opposite. The Eureka on this creek is showing up fine chutes of ore. The Royal Canadian underwent a hard experience. In development country rock, dyke and ore were heaped together awaiting assay returns. The new management carted this miscellaneous stuff to the mill as a trial test of the mine, instead of sampling the mine, and only milling the chutes of ore. The opinion formed of the mine under these circumstances could hardly have been a correct one. The Majestic and Paradise are looking well under development.

On Forty-nine creek large bodies of low-grade ore, with chutes of high values in them, have been opened up, pointing to large plants presently. Here also Monahan is opening up a prospect, typical of others, at intervals along the south bank of the Kootenay river, that is, wide veins of heavily mineralised vein matter carrying auriferous iron pyrites and native copper in seams in the veins.

Bird and Rover creeks have received some attention, showing wide veins with rich chutes of ore, but much more has to be learned yet. From Rover till we come to Champion creek not much is known, though on the latter mines are being opened up and a mill has been erected, with good reports of the values.

Coming east now, back to Nelson, along the north bank of the Kootenay river, here are as good surface copper showings as Rossland and Boundary ever had in their infancy. The old saying, "farthest pastures are always greenest," holds good here. This was too near to Nelson, the original starting point for prospectors. No one who examines this part can doubt that it will soon open out as large a copper camp as any in the Kootenays or Yale.

We must now follow south along the railway. At Hall creek the Fern is opening up good ore, and milling it without a good reduction officer, with the usual results. There is a good mineral belt here stretching west, with little development accomplished.

On the east of the railway prospectors are opening up Whaleback mountain. On Barrett creek the Porto Rico lies idle with the same fault cutting off all three levels, but which veins can be easily picked up again by one with local experience. The Spotted Horse has opened

up a showing, and shipped very rich gold ore to the smelter.

At Erie, on the North Fork of the Salmon river, mining is brisk at the Arlington and Keystone. The Second Relief has large stopes of good grade ore blocked out, and have erected a plant to treat it. There is a radius of good mineral country here waiting development. At Salmo the Yellowstone mine needs more work to open up chutes of rich ores. From surface showings on adjoining claims, and in the vicinity on Birtsch's new strike, under bond to the L. and B. C. Goldfields, there should be lots of encouragement to persevere.

Ymir camp is a busy one with many mines working, and the dividend paying Ymir mine is making large profits from their big plant by treating rich and poor ore alike as it comes. There is every encouragement here for capital to come in and open up the many veins exposed in this district. The Dundee, Tamarac and others are reported to be progressing in their development and arrangements for shipping. The Nelson district is so large that mention cannot be made of all the steady development going on at many properties, but sufficient has been said to show that mineral of paying values and in great quantities

exist here, are more than holding their own against other mining camps of the world. Experience from success daily shows the necessity of employing qualified mining engineers as managers, instead of mining experts. From all these recitals it is evident that the district is progressing, though not as fast as we could wish, this being an off year everywhere for mining capital.

The treatment of the ores, outside of smelting, though when the complete plants are finished we can tell definitely, is not an accomplished fact in saving (90) ninety per cent. of the values.

Capital, comparing this district with others elsewhere, cannot but see that the values are here and in quantity.

RECENT OPERATIONS IN THE ATLIN DISTRICT.

By MARYN WILLIAMS.

OPERATIONS in this district during 1898 and 1899 were entirely confined to placer mining. The prospects of 1898 were the cause of an influx of population during the season of 1899, amounting to probably 6,000 men. Successful operations were conducted on the following creeks, viz.:

Pine and Spruce creeks, including Willow, Otter, Boulder, Birch and McKee. The approximate value of the gold won by hand during 1899, amounted to \$800,000. Notwithstanding, however, this encouraging return, opinion was divided as to the value of the district as a placer mining field, and in consequence several hundred men left the district. The result of the first influx however, caused to be prospected a great many creeks in a limited area and the opportunities for profitable hydraulic were indicated. During the latter part of the season of 1899 large tracts of land adjoining the principal creeks were staked and hydraulic leases applied for in the spring of 1900. Five companies were employed in active construction and equipment of hydraulic plants.

These companies were: the Pendugurg syndicate, on Wright creek; the Societe Minere, on Boulder creek; the Atlin Lake Co., Ltd., on Birch creek; the Willow Mining Co., on Willow creek, and the Sunrise Co., on Pine creek.

PENDUGURG SYNDICATE, WRIGHT CREEK.

This property, distant about 18 miles from Atlin comprises some 13 hydraulic leases. Operations have been conducted about a mile below the area successfully worked by the placer miners. During the period under review, general construction and equipment consisted of the building of a water-supply flume one mile in length, with pressure box and pipe line attached. Also



Photo by Muirhead Bros.

A PIONEER ATLIN MINER.

the preliminary boxes of a bed-rock flume. Operations commenced about the middle of July. During August owing to lack of water, great difficulty was experienced in passing debris through the flume, and the failure to find pay caused an early stoppage of work. Operations during 1901 were conducted several hundred feet below the previous season's workings. Bed rock was finally reached after trenching several hundred feet, with the same results. One is forced, on viewing the above operations, to the following conclusion: that the property has no natural facilities for the successful working by hydraulics, i. e., the property has neither water grade nor dump.

The facilities of the upper part of the creek in the vicinity of Discovery are infinitely superior, and had the same effort and capital been devoted to this area the results would have been widely different.

THE SOCIETE MINERE, BOULDER CREEK.

This property consists of several hydraulic leases and a few 100-foot placer claims. Distant from Atlin 16

weeks to complete. The end of next season should see this company in a good position. In conclusion, in the writer's opinion, this creek has better facilities for hydraulic mining than any other tributary to the Pine Creek valley. Above the company's works the miners have operated the two past seasons with the result that this season the undertaking ranks first in point of gold production in the district. The benches have only lately been prospected and are known to contain good pay. This, if widely distributed, will increase the life of the creek by many years.

ATLIN LAKE CO., LTD., BIRCH CREEK.

This company obtained its foothold in 1899 by the purchase of Discovery claim and 14 claims above. The sum of \$1,500 was expended in building a waggon road four miles in length, in the erection of a camp and the construction of a small bed-rock flume. Bed rock was struck at a depth of 14 feet and uncovered for a length of 40 feet. The results obtained here and the average results known to have been previously obtain-



PLACER MINING, McKEE CREEK, ATLIN, B. C.

miles and connected by waggon road. Construction and equipment were carried on simultaneously here and at Wright creek. The construction of the water-supply flume was considerably shorter on account of the greater fall of the creek. Operations commenced on or about July 10th and continued until the beginning of October. During 1901 operations were commenced early in June. Owing to extreme high water the works were flooded. This caused a temporary suspension of operations, it was then decided to start lower down the creek and in its present bed. This was undoubtedly a wiser course as it enabled the bed-rock flume to gain a greater depth with less loss of ground. Bed rock was eventually struck late in the season at a depth of 45 feet from the surface, disclosing good pay. Owing to the lateness of the season no further development was possible. In summing up the position it may be said that beyond opening up a large pit from the head of the bed-rock flume, the final conclusion of dead work is in view. This, during the ensuing season, will take probably six

ed by the miners working on the creek induced the company to acquire more land. During the spring of 1900 machinery was shipped to Atlin over the ice and successfully landed on Birch creek. Construction and equipment operations began on May 4th and were completed by June 1st. Ten days' hydraulicing revealed the fact that there was deeper ground than had been estimated. The pay ground was temporarily abandoned as it was necessary for the sake of future operations to establish the flume on the deepest channel of the creek. Mining was suspended from July 12th to Aug. 12th, to admit of the construction of a conserving dam. Trenching after this was steadily pushed forward until October 6th and bed rock was uncovered at a depth of 30 feet. During 1901, in consequence of the backwardness of the season, the start was not made as early as anticipated and on account of the great depth of ground in front of the bed-rock flume the progress of opening out a large pit was necessarily slow, the accomplishment of this work consuming the whole of the spring

flood or freshet. The establishment of the bed-rock flume in the rock and the opening out of the pit from rim to rim finally completed the dead work. During the latter part of the season the bed rock in the face rose rapidly and by the end of the season the greatest depth attained was 15 feet and the average 14 feet. Returns from the present face yielded 85 cent per yard. The property is now in a position to produce during the coming season. The only drawback is the want of water after July. There is sufficient water, however, under the present conditions to work out several claims annually at handsome profits, but should operations on a larger scale be contemplated, it would be necessary to insure a greater and more constant water supply.

WILLOW MINING CO., WILLOW CREEK.

Willow creek is situated a short distance above Discovery. It is in reality a dry gulch paralleling Pine creek. The property consists of several 100-foot claims

township on the north side of Pine creek. With this object in view a wing dam was constructed at the falls for protecting a bed-rock flume. A ditch was also constructed beginning at a point three miles below Surprise lake, and thence a short distance above Discovery city. At this point the company decided to abandon the idea of hydraulicing Ground gulch and decided to conduct their operations on Pine creek in the vicinity of Discovery. For this purpose a system of pipe lines was laid with the object of working out benches on the principle of lays or tribute. The construction of a smaller ditch on the south side of Pine and the hydraulicing of a bench claim on the north side of Pine concluded the company's operations for last year. During 1901 operations were confined to the working out of individual bench claims with the eventual purchase of further property and the selling of water to the individual. The water supply and equipment were sufficient to carry out operations on a large scale,



SCOWS LEAVING ATLIN FOR DAWSON.

purchased by the company. The water supply was obtained from the Miners' company operative ditch, constructed during 1899, with a small additional supply obtained from a lake in the vicinity. A bed-rock flume has been constructed, with its outlet into Pine creek. The probable extent of bed rock cleaned during this season would not exceed three full claims. Operations during 1901 were carried on under extreme difficulties owing to the want of proper dumping facilities, and also on account of constant disputes with claim owners above No. 2 below. The property cannot be strictly termed hydraulic ground although pressure to a limited extent is employed. The methods of working are more in the nature of ground sluicing. This company, up to date, has produced more gold than any other in the district. The want of dumpage ground is, however, a serious drawback to the successful operation of the undertaking and means an increase in production costs.

The Sunrise company originally proposed to hydraulic Ground gulch, a dry gulch situated below Discovery

but the lack of grade and dumpage and also constant disputes with other operators seriously interfered with the steady continuance of work, and operations were suspended before the end of the season.

It is recognised that there is only one method by which Pine creek can be operated successfully, and that is by the construction of a bed-rock flume starting at the falls. The main expense of such work would be the tunnelling or cutting down of these falls for the purpose of obtaining a five per cent. grade, the present grade being inadequate. The present operations of the Sunrise company can be looked upon as valuable from the point of view that they are accurately prospecting and demonstrating the value of the benches on Pine creek.

SPRUCE-BLUE CANYON, 1900 TO 1901.

A small mining partnership through their operations have successfully demonstrated values here. Dead work and construction represent an expenditure of some \$10,000. A nugget valued at \$600 was discovered dur-

ing the season. This property is not regarded by its owners as hydraulic but workable by ground sluicing.

COLUMBIA HYDRAULIC, 1901.

The property is situated above Discovery. The company have constructed a large water-supply flume, ditch and pressure box with pipe line in position. It was expected that the bed-rock flume would be established a month before the end of the season, owing to a sudden dip in rock this was not possible. The facilities for the working of the property are the best on the creek. The prospected values are high. A large investment was made below Discovery during the latter part of the season. Many claims were purchased and bonded including the water right; construction work will be commenced this season.

ATLIN LAKE MINING COMPANY, M'KEE CREEK.

This creek has been one of the best producers in the district. During the latter part of 1900 the Atlin Lake Mining company purchased several claims, including Discovery. Machinery and lumber were hauled and delivered on the creek during the following spring. Construction was similar to that on the other tributaries of Pine creek. Hydraulic commencing in earnest during the early part of July and on account of the extreme shallowness of the ground the monitor was utilised in driving the gravel directly into the bed-rock flume. Several claims were exhausted with, however, disappointing results. The reason for this is obvious. Shallow ground not exceeding five feet, and averaging three feet, would have been worked out by the individual miner during the proceeding seasons if the ground had warranted work, but the portions operated by the company had been thoroughly prospected during the proceeding season of '99 and 1900.

McKee creek is undoubtedly one of the most valuable assets of the Atlin district, but the best values so far obtained have been won many hundreds of feet above the present operations. The local opinion as regards the results obtained by the Atlin Mining company is that the returns so far obtained cannot be regarded as a criterion of the value of the ground in the vicinity. Below the Atlin Mining company's property a certain amount of construction has taken place on another property. As, however, the water throughout the season is inadequate for the purposes of the first-named undertaking, it is difficult to foresee how the second enterprise can be profitably undertaken.

The adaptability of McKee creek for hydraulic mining is excellent. In regard to water grade and dump the facilities are similar to those on Boulder creek.

QUARTZ MINING.

Quartz mining prospects, having regard to free-milling ores only, are promising. But so far exploitation has been limited to the work done by the Nimrod syndicate. The operations of this company in the district have caused great dissatisfaction and are not considered final or conclusive. Well-defined bodies of copper ore have been located but it is obvious that no refractory ore can be mined at a profit under present conditions.

Taken as a whole the total area of the gold-bearing creeks is not large, and unless further discoveries are made there is hardly room for more operations in the district. The presence of gold in paying quantities has been abundantly proved. The facilities for hydraulic mining in nearly all cases are excellent, the inadequate water supply alone excepted. The only creek which is abundantly supplied during the whole season is Pine but in all the tributaries, including McKee, the flow of water is very scanty towards the end of the season.

There is, however, an abundance of water during more than half the season whilst the freshets are in motion, but after this period the water steadily lowers. Although this is a serious matter for the future it is not by any means insurmountable, and will not alter materially the present systems on the tributaries unless operations on a larger scale are undertaken.

COMPANY MEETINGS AND REPORTS.

WHITEWATER MINES.

THE annual general meeting of the Whitewater Mines, Limited, was held in London, on December 9th, Mr. H. W. Forster, M.P., (chairman of the company), presiding.

The Secretary (Mr. E. R. Tasman) having read the notice convening the meeting and also the auditors' report.

The Chairman said: I will first deal with the accounts, and the principal item I am sure you will recognise is the item of profit for the year. This profit appears at £3,939 8s. 8d., of which the dividend declared on December 11 last absorbed £3,125, leaving a balance of £814 8s. 8d. to be carried forward. It is only right that I should explain to you that this profit was arrived at after treating the accounts in the most drastic manner; for not only does this profit represent the revenue for only ten months, but it is arrived at after deducting from the year's work £2,623 5s. 10d. brought forward from the development account of the previous year, charging the whole of the costs of development for 1900 (less £1,000 carried forward), amounting to £3,987, and depreciation amounting to £701 1s. 10d. In other words the operating profit for the year 1900 has been debited in the accounts before you with a total amount of £7,221 6s. 11d., after which deduction a profit of £3,939 8s. 8d. still remains. From this explanation you will see that the work done during 1900 was considerably more profitable than the accounts now before you would seem to show. The amount expended upon development—that is to say, in driving tunnels for opening up further ore reserves and other work of a similar character—amounted during the year to £4,897, the advantage of which is explained by their being, at the end of 1900, 40,500 tons of ore opened up, which Mr. Fowler (our engineer) estimates at a gross value of over £50,000. Against this large value in ore reserves only £1,000 has been carried forward, and here again I am sure you must agree with me that the accounts have been treated in the most conservative possible manner. The general expenditure in British Columbia may appear to be somewhat high; but upon investigation you will find that this is really not the case, as under the item of management, office and engineering expenses are included the salaries of the mining superintendent and his clerk. The other items under this head need no further comment from me, they being for the most part payments over which we have no control. The amount of general expenditure in London cannot be considered high, and were it not that your directors are in a position to deal with such matters themselves this item would have to be swelled to the extent of the cost of employing engineers to advise them at this end.

I may explain to you that the Whitewater vein is one which varies considerably in value, consisting as it does of bodies of high-grade ore embedded in other ore of a lower grade, and consequently the future of the mine depends upon the proportion in which the high-grade bodies of ore stand to the poorer quality around it. From Mr. Fowler's report you will notice the remarkable fact, that although the average gross value of the ore mined and treated last year was only \$6.68 per ton, a profit of nearly 67 cents per ton was derived from it. This will show you how economically the mine is being worked, and the immense possibilities which would arise from any increase in the value of the ore, as the expense of attending the mining and treatment of the low-grade ore is practically the same as it would be for the higher-grade material. Mr. Fowler's figures explain that the cost of mining and treating the ore has been reduced to a minimum, and I can assure you that your directors have been careful to institute economies in every possible quarter, and with this in view I may say that our patrons, the London and British Columbia Goldfields, Limited, are assisting us in every way. At the end of last year your directors had hope that the mine had entered on a dividend-paying basis, with every prospect of its continuance. It was therefore with considerable consternation that we were met with the decision of the American smelter people to cease taking lead ores from British Columbia except upon exorbitant terms. We thought, however, that this condition of things would be of short duration, and consequently, continued full operations at the mine and mill until March last, when the mill was shut down and work confined to development only. In April all hands were discharged except the small force necessary for keeping the workings in good order, and it was not until July last that we succeeded in making terms with a local smelter for the treatment of our ore, which terms Mr. Fowler describes as more favourable than those we had been having from the American smelter. Operations were continued with one shaft until August, since when full operations have been resumed. I think also

that we may look forward to considerable improvement in the smelting position, in the first place owing to the liberal action of the Dominion Government in granting a subsidy upon lead locally refined, and secondly, from the competitions of local smelters with those of the United States which is likely to follow. In fact, we understand that a local refinery will before long be established at Nelson, which place is no great distance from our mine. Our difficulty has been that there was practically no demand for the ore such as Whitewater Mine produced in Canada itself. Almost all the ore from our part of British Columbia has had to go to the United States, and we have had to take what terms the American smelter could give us. We hope, however, that the outcome of the establishment of a local smelter and refinery I have referred to will be to promote competition and to offer a ready market for our productions.

Before I conclude I feel I must refer to the heavy slump in the price of lead and the somewhat smaller drop in the price of silver which have occurred since last I met you. Had this not been the case, I feel sure it would have been within my power to have spoken to-day in a far brighter manner than, under the circumstances, I am able to do. You must not, however, attach too much importance to this slump in prices, because I am hopeful—and many are agreed with me—that bottom prices have been reached, and that they may take an upward turn. As we are to-day earning profits at the mine, notwithstanding the low price of our products, it will require but a very small rise in the price of lead to produce a marked improvement in our position. It is also quite on the cards that in working the reef between the tunnels we shall encounter larger blocks of the higher-grade ore than has recently been met with, which again would tend to increase our profit. With this in view, I do not think we need despair. Adverse circumstances have given us some ugly knocks; but they have not ruined our mine. The mine is there thoroughly equipped with efficient, up-to-date plant, and we only want a slight stroke of luck so to improve matters as to altogether alter the aspect of affairs. Our capital is not large, the administration is efficient and economical, and therefore, although our past has been somewhat clouded, we have a much brighter future before us. I might say that the result of operations during September, which was the first month's work after the resumption, produced no profit, which was mainly due to the expenses for that month having to be debited with certain heavy insurance charges and taxes. The work during October gave a profit of \$2,000, which, although small, is, I think, a sign of general improvement. I wish I could have given you a more encouraging account of the mine; but I can honestly say that I believe there is no reason why we should despair as to the future. I now beg to move: "That the report of the directors and the statement of accounts to December 31, 1900, now submitted to the meeting, be, and the same are hereby adopted."

Mr. Oliver Wethered, who has recently returned from a visit of inspection to the company's property in British Columbia, in seconding the resolution, gave an account of his recent visit to the mines. He said that the causes that had contributed to the present unsatisfactory position were, first, that the lead ore had not been so good in value of late as it was at first; secondly, the disorganisation caused by the strike; and thirdly, the difficulty with the smelter—the most serious of all. But, as the chairman had said, this last difficulty was being got over, and with the least advance in the price of the metals, he looked forward to an improvement in profits.

The resolution was put and carried unanimously.

Mr. H. W. Forster, M. P., and Mr. Oliver Wethered (the retiring directors) were re-elected, and Messrs. Monkhouse, Stoneham & Co., having been re-appointed auditors, a vote of thanks to the chairman closed the proceedings.

CENTRE STAR MINING CO.

The accounts for the year ended 30th September last, as submitted to the shareholders on the 26th ultimo, are as follows:—

ASSETS.		
Centre Star Mine	\$3,300,540 00	
Cash in Bank of Toronto, Toronto	10,603 90	
Stores on hand as per inventory	38,329 99	
Machinery, buildings and equipment	249,517 57	
Furniture of offices	1,360 90	
Invested in War Eagle hotel	12,500 00	
Accounts receivable	1,531 25	
		\$3,614,383 61
LIABILITIES.		
Capital stock	\$3,500,000 00	
Bank of Toronto, Rossland	40,728 50	
Accounts payable	13,526 33	
Profit and loss	60,128 78	
		\$3,614,383 61
PROFIT AND LOSS ACCOUNT.		
Dr.		
To Balance brought forward	\$182,122 10	
" Direct costs of mining and develop- ment	\$258,349 23	

To Fixed and general expenses, Aug and Sept. (Mine closed)	\$5,432 71	
" Diamond drill prospecting	2,184 28	
" Extralateral litigation	7,685 30	
" Other legal expenses	2,290 49	
" Mine accidents	925 59	
" Consulting engineer's fees	1,850 00	
" Managing director's salary (3 yrs.)	7,500 00	
" Travelling expenses	239 19	
" Interest and exchange	588 70	
" Auditors' fees	154 00	
" Toronto office expenses	1,128 93	
" Trail smelter examination	2,670 79	
" Sundry expenses	753 60	
" Amount written off for depreciation in plant, etc.	22,019 54	
		\$313,772 26
" Dividends, Nos. 2 to 6	\$175,000 00	
" Balance carried forward	60,128 78	
		235,128 78
		\$731,023 14
Cr.		
By Net Proceeds from ore sales	\$694,643 71	
Less Provincial ore tax	13,889 92	
		\$680,753 79
" Transfer fees	269 35	
" Premium on capital stock sold in 1899	50,000 00	
		\$731,023 14

LE ROI MINING AND SMELTING COMPANY.

The following is extracted from the report of Mr. R. J. Frecheville just issued on the Le Roi mine:—

Acting under the instructions given me at the extraordinary meeting held at the end of last August, I have examined your mines and smelting works, and the manner in which your affairs have been conducted. On the 2nd November last I found it necessary in your interests to remove Mr. Bernard Macdonald from the position of general manager, and to undertake the duties of this position myself, pending the arrival of Mr. J. H. Mackenzie, whom I have appointed to manage your business. Mr. Mackenzie arrived here on the 26th November, and since then I have been posting him in the details of the undertaking. The many complicated matters that required looking into and adjusting, together with the details of management, somewhat retarded my examination, so that I was unable to make a definite statement concerning your property until the 25th November last, when I sent you the cable which has already been published. Since the date of this cable Messrs. Price, Waterhouse & Co. have made further adjustments, resulting in the profit for the year ended 30th June, 1901, being reduced to \$568,722.06. The data on which the above cable was based are given in the following report:—

FINANCIAL POSITION.

Messrs. Price, Waterhouse & Co., who have exhaustively examined the books at both mine and smelter, have to-day handed me the following statements in advance of their official report:

ROSSLAND, B.C., Dec. 4th.

R. S. FRECHEVILLE, Esq.,

Managing Director, Le Roi Mining Co., Ltd.

Dear Sir,—In accordance with your instructions, we have examined the books of the Le Roi Mining Company, Limited, at Rossland, B.C., for the period from the 15th February, 1899, to the 30th June, 1901, and after making certain adjustments of the book figures, we find the profits to have been as follows:—

February 15, 1899, to June 30, 1900	\$527,563
July 1, 1900, to June 30, 1901	568,722
	\$1,096,285

We find these profits to be represented on the Rossland books on June 30, 1901, by a surplus of assets over liabilities made up as follows:

Plant, buildings and equipment:—		
Mine machinery and plant	\$188,378	
Surface improvements at mine	89,026	
Mine equipment	45,559	
	\$322,965	
Smelter plant	130,986	
Flora lime quarry	7,544	
	\$461,495	
Mine exploration and development	153,049	
James Breen's interest in Northport smelter	300,000	
La Fleur Comstock, etc., property	50,000	
Stock of ore at mine and smelter, and smelter product on hand and in transit	\$731,933	
Less—		
Loans by Bank of Montreal secured on same	616,290	
		115,643
Stores on hand at Northport smelter		57,367

Debtors—	
Le Roi No. 2, Limited, cash advances	\$76,881
Rossland Great Western Mines, Limited, cash advances	41,769
Sundries	67,170
	<u>\$185,820</u>
Less—	
Sundry creditors for wages, taxes, etc.	133,464
Cash in bank	52,356
London office—cash remittance	14,944
	<u>39,760</u>
	\$1,244,604
Less—	
Ore in dump on February 15, 1899, transferred from the London books to the Rossland books	148,319
	<u>\$1,096,285</u>
We propose to explain our adjustments and to refer more particularly to the above figures in our detailed report. (Signed) PRICE, WATERHOUSE & CO.	
The following is an estimated statement of current assets and liabilities on November 30, 1901 :—	
Matte in transit, 27,000 lots at \$14,000	\$378,000
High-grade matte, 132,689 tons at \$14,000 per 30 tons	61,020
Low-grade matte, 669,545 tons at \$300 per ton	200,863
Calcedined briquets, 85,000 tons at \$300 per ton	25,500
Sows, 14,422 tons at \$446.86 per ton	6,445
Bottoms and furnace receivers, say	10,000
Flue dust, 1 100 tons at \$28.96 per ton	31,845
Ore stock at smelter, 23,766,355 tons at \$7.00 per ton	166,365
Ore in dump at mine, 31,252 tons at \$3.45 per ton	118,169
	<u>\$999,107</u>
Less loans by Bank of Montreal secured on same	974,750
	<u>\$24,357</u>
Stores on hand—	
At mine, say	\$50,000
At smelter, say	35,000
General stores at smelter	\$47,969
Less amount owing on same	34,109
	<u>13,869</u>
	98,860
Debtors—	
Le Roi No. 2, Limited	\$62,047
Rossland Great Western Mines, Limited	17,450
Sundries	16,724
	<u>\$ 96,221</u>
Less creditors for wages, etc.	103,793
	<u>\$7,572</u>
Cash—	
At bank, overdraft	\$79,105
On hand, Northport office	3,452
	<u>75,653</u>
	83,225
Surplus	<u>\$39,992</u>

ORE RESERVES.

Middle Vein—Quantity and Value of Ore Reserves—In the following estimates to cubic feet of ore in place are reckoned as equal to one ton. As no proper assay records have ever been kept, and as I found all the information given me to be most misleading, I found it necessary in order to arrive at the quantity and value of the ore reserves, to prepare a complete set of assay plans. Owing to the wide vein and the hard character of the ground, it was not possible to take more than about fifteen samples per day. As nearly 700 samples were taken altogether, the arduous and lengthy nature of this work of sampling the mine will be apparent. Between the 300-foot level and surface the ore-bearing ground is all worked out, with the exception of three small blocks to the east of the old shaft, containing 21,540 tons, of an average assay value of \$10.75. Between the 300-ft. and 450-ft. levels there is no pay ore left; where any ground is standing the values are practically nil. Between the 450-ft. and 500-ft. levels there are 57,740 tons, of an average assay value of \$9.90. Between the 500-ft. and 600-ft. levels there are 27,440 tons, of an average assay value \$12.92; where this ore stands the ground is so badly caved that it is questionable whether this ore can be mined. Between the 600-ft. and 700-ft. levels there are 113,980 tons, of an average value of \$10.32. Between the 800-ft. and 900-ft. levels there are 96,000 tons, of an average value of \$11.32. South vein—Between the 500-ft level and surface there are

28,000 tons, of an average value of \$9.31. Between the 500-ft. and 700-ft. levels there are 44,800 tons, of an average value of \$6.42.

The above figures show that there are in sight on both veins 604,840 tons of mine ore of an average assay value of \$10.26. The mine ore, after passing through the crusher on the headgear of the combination shaft, falls into receiving bins, and from these is fed automatically on to three steel endless conveying belts, each 100 ft. long, travelling at the rate of 45 ft. per minute before the sorters, who pick out the waste. A daily record is kept of the number of tons of waste trammed to dump. From these records it appears that 20 per cent. of waste is picked out from the ore hoisted. I had all the waste dumps carefully sampled, several bulk samples of about 40 tons each being taken and passed through the sampling mill. These samples showed the waste dumps at the combination shaft proceeding from the sorting tables now in use to assay on the average \$5.32 per ton; we have then :—

604,840 tons of mine ore at \$10.35 per ton, containing a gross value of	\$6,269,713
Less 120,968 tons of waste at \$5.32, containing a gross value of	643,550
	<u>483,872 tons shipped ore, containing</u>
	<u>\$5,626,163</u>

that is \$11.75 per ton. The metallic contents per ton of this grade of ore are :—Gold, 0.35 oz.; silver, 0.6 oz., and copper 1.33 per cent.

At the 900-ft. level, opposite the old shaft, a crosscut has been driven to the north for a distance of 870 ft., passing through the Josie claim into the No. 1 claim. This crosscut which cost \$23.75 per ft., was driven for no other purpose than developing the Le Roi No. 2; nevertheless, the whole cost, amounting to \$24,662.50, has been paid by you.

WORKING COSTS.

Messrs. Price, Waterhouse & Co. make the total costs on this side for the year ended June 30, 1901, to be \$10.72 per ton of ore, segregated as follows :—

Stoping, hoisting, trimming, sorting and loading ore	\$0,487
Exploration	423
Depreciation—	
Mine equipment	080
Surface improvements	050
Mine machinery	106
	<u>\$4,14</u>
Freight on ore to smelter	510
Smelter expenses	4,465
Interest and discount (on ore in yard)	137
Depreciation	232
	<u>4,834</u>
Matte expenses—	
Sacking and crushing	\$ 944
Freight on matte to refiners	536
Eastern representative	028
Bank charges	092
Refiners' toll and deductions	534
	<u>1,234</u>
	<u>\$10,724</u>

The average gross value of the 202,582 tons of ore shipped to your smelting works at Northport during the same year was \$13.16 per ton. The above working costs make the net profit on this \$2.44 per ton, or \$494,300 on the whole tonnage. The actual profit based on matte sold cannot be given, as together with your ores were smelted about 26,000 tons of purchased ores and concentrates. The management has been most loose and extravagant. Great reductions can be made in the costs of both mining and smelting, especially the latter. Much useless extraneous expenditure can be cut off, the result being, in my opinion, that in the future the total cost will not exceed \$9.00 per ton. With the grade of ore you now have in reserve this will leave a profit of \$2.75 per ton.

UNNECESSARY MACHINERY.

At the combination shaft there is a fine Corliss engine, mounted but not in use, and an electric generator unmounted. I was told by the late manager that they had been purchased to hold as a club over the head of the West Kootenay Power and Light Company so as to prevent this company from increasing its rate for power and light. The cost of this machinery landed here was \$5,300.94. It will never be required. The mine is drained of water by means of pumps driven by compressed air. These pumps work about eight hours a day only, the water being very light; nevertheless there arrived here about a month ago two magnificent electric pumps with the motors for driving them; their cost landed here is \$7,278.52. This machinery was certainly not wanted, and what makes the matter worse is, that the dimensions of the pumps and fly-wheels do not admit of their being let down the shaft. If ever used they will have to be cut up into sections. Two skips were purchased for the old shaft; they cost \$1,619, and will never be used on your mine. Two cages were purchased for the combination shaft at a cost of \$1,581, but their dimensions are unsuitable for the track. Evidently the appetite for purchasing machinery grows with feeding.

THE SMELTER.

The Northport Smelting Works are owned by the Northport Smelting and Refining Company, Ltd., an American organisation, with a

nominal capital of \$1,000,000, divided into shares of \$1 each. The shares are all owned by your company. The metallurgical work has been very bad. By using a strong blast and a very high percentage of coke the ore has been smelted, but at how much extra cost and at how great a loss in flue dust will never be known. Amongst the purchased ores smelted were 923.8 tons of concentrates from the Baker City Sampling Works, assaying 5.27 ozs. of gold per ton. These were often charged into the furnaces raw without briquetting, the result being that a large percentage of this valuable material has been carried by the strong blast through the condensing chambers, up the stack and scattered over the surrounding country. It appears, as Mr. Bela' Kadish, the late manager of the smelter, is the owner of the Baker Sampling Works and was thus in the position of buyer and seller at the same time that the more concentrates were used the better it was for business. The new manager Mr. Oscar Szontagh, has already made many great improvements. He purchases no more concentrates, as he is able without using them to make matte of the grade in gold required by your contract with the American Smelting and Refining company. He has completely done away with the granulation and calcination of the low-grade matte; this will very largely reduce the smelting cost, and to a great extent obviate the mechanical loss in handling and the loss in flue dust. The double-decked calcining furnace recently erected by Mr. Kadish at a cost, including building to cover it, of \$27,355, will never be used on your ores. The consumption of coke has also been reduced, and with all this there has been no reduction in the quantity of ore put through the furnaces, as, with four running, over 800 tons a day are now being smelted. The coke used costs \$10.00 a ton delivered at the works. When the Great Northern Railway company have completed their branch line now being built to the Crow's Nest coal fields, it is probable that you will be able to get coke at about \$8.00 per ton. As about 200 tons a day are used this means a notable saving.

(NOTE.—Mr. Miller, the Vice-President of the Great Northern line, informs me that this branch will be ready for traffic by next April.)

THE STRIKE.

I have carefully gone into the matter, interviewing all sorts and conditions of men, and am of opinion that the strike was mainly brought about by the injudicious and arbitrary action of Mr. Bela' Kadish, the late manager of your smelting works at Northport, where the strike first commenced. The strike at Rossland is a sympathetic one ordered by the Western Federation of Miners, which has its headquarters at Denver, Colorado, the Rossland Miners' Union being a branch of that organisation. The demand for an increase of 50 cents a day in the "muckers'" wages is simply a pretext. More "muckers" than are wanted can be got for \$2.50 a day, which now is and always has been the rate of pay for this class of labour at Rossland. The miners who receive \$3.50 a day have no grievances that I am aware of. As a matter of fact the strike was, according to the by-laws of the union itself, illegally called. The battle having once begun has to be fought out if you wish to have control over the working of your property. Any concession, no matter how slight, to the demands of the union would be hailed as a victory, and would be followed by still further demands. The rank and file of the Rossland Miners' Union would now gladly call off the strike, but they are powerless to do so, being under the control of professional agitators, who in their turn are ruled by the orders of the Western Federation of Miners, at Denver. As it is your mine and smelting works are being filled up with non-union men; the smelting works have already got their full complement, and it will not be long before your mine will be in the same position. Naturally, at the first, many of the men were green hands, and work was carried on at a great disadvantage, but this condition of affairs is improving daily, incompetent men are being weeded out and replaced by skilled miners. For the month of October, when work in the mine was restarted, the output was 9,837 tons, whilst for November it was 14,088 tons. I predict that, under the new management, your mine will soon be working up to its full capacity, and be at the same time vigorously developed.

After the exhaustion of the existing ore reserves the future of the mine will mainly depend on the results to be obtained by development work on the middle vein. In this connection it is encouraging to note that the pay chute now being opened on the 9th level west of the combination shaft, has an average assay value of \$15.75. No time will be lost in opening out the 1,050-ft. level and sinking the shaft for the next level, which will be at 1,200 feet. My investigation shows that there has been very great extravagance and looseness of management, resulting in unwarranted expenditure and high working costs; also that under proper control your property would have paid dividends from the start. I leave here for London on the 7th inst., in the full conviction that I have placed your affairs in the hands of a thoroughly capable and conscientious manager, whose sole object it will be to conduct the operations at both mine and smelter for the best interests of the shareholders.

THE LAUNCHING OF THE STEAMER "REVELSTOKE."

(From a Correspondent.)

THERE is not a great deal in the mining way to report in the Big Bend district this month. The Duquesne Mining Co. are working the Blue Jay placer lease on Smith creek. At the last reports they were drifting from the bottom of the shaft, which is down

thirty feet with good prospects. One side of the shaft is in pay gravel. This is the initial venture of a substantial Pittsburgh Co., which will probably launch out into more extensive operations next season.

The Prince Mining Co., is drilling away in the Standard basin with most encouraging results. At the last report a big streak of copper ore was encountered in the easterly drift from the winze in No. 2 tunnel on the Standard. The face of the drift was all in ore. In the westerly there are two parallel veins, one four feet and one a foot wide, the latter carrying high silver values, 100 ounces to the ton, as well as 17 per cent. copper and a little gold. There is considerable ore on the dump.

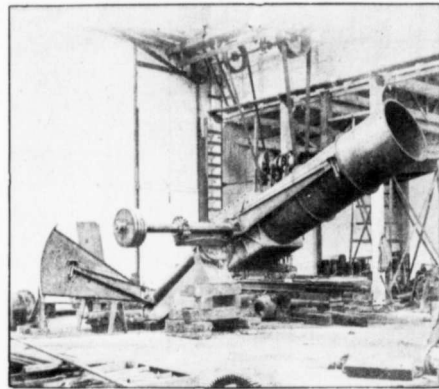
The nine beds located last summer at the head of End and Potlatch creeks, by Golden parties, have attracted the attention of Revelstoke investors, who have formed a local syndicate and acquired an option on the claims. Work on these deposits will be actively prosecuted next season.

The launch of the "Revelstoke" on January 8th, was an event of great importance to this place. She is owned by a local company and is a fine river boat, costing some \$17,000. Her designer was Commodore Troup, of the C. P. Navigation company, and her boiler and engines were specially designed and built for the work on the swift water of the upper river. She will run from Revelstoke to Laporte, between 40 and 50 miles up the river and will bring the gold, silver-lead and copper properties on Laforme, Carnes and Downie creek, Keystone Mt. and Standard mines, within a few miles of easy communication with their base of supplies here. Besides this all the rich placer ground about Death rapids, on Smith creek, French creek and other tributaries of the Columbia will be brought within from 15 to 25 miles of cheap transportation, while the district beyond Goldstream with the valuable timber limits and mine deposits which are known to exist in it, will for the first time come within touch and a large area of great promise to the prospector will be brought within his reach.

Revelstokers are now bending their energies towards getting a good appropriation from the Dominion Department of Public Works for improvement of the navigation of the upper river, including a tramway to be constructed at Death rapids, in order to admit of the transportation of freight from Laporte, at the foot of the rapids, to Twelve-mile at the head, to connect with another steamer plying on the river above to Canoe river. The accomplishment of this project would place 100 miles of rich country within easy reach of the main line of the C. P. R. at Revelstoke.

ADDITIONS TO THE LICK OBSERVATORY.

MESSRS. Harron, Rickard & McCone, who have taken over the business of Parke & Lacy Co., the long established machinery firm of San Francisco, have completed a contract with the Lick Observatory for the mounting of a large reflecting telescope as represented in the accompanying illustration. The great 36-inch refracting telescope of the Lick Observatory has been in use three nights a week since the year 1896 in connection with a photographic spectroscope, presented to the Lick Observatory by Mr. D. O. Mills, for determining the motion of the stars to and from the observer. It is one of the fun-



damental laws of the universe that every celestial object is in motion. One star is moving in this direction, another in that, and so on indefinitely, some with a velocity almost zero, others with velocities as great as sixty miles a second away from the solar system. If a star is moving at right angles to the line of sight, its motion can, in the course of a few years be detected by the usual telescopic methods; but the component of motion toward or from the solar system must be measured by means of the spectroscope.

The velocity of the stars are measured at the Lick Observatory, not from a great interest in the motion of each star, but that the results

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may be combined for many stars, and therefrom the motion of our own solar systems through space may be determined. For this purpose it is highly desirable that observations be secured of as many stars as possible, and that they may be observed over the entire sky. From the Lick Observatory one can observe stars situated between the North Pole and a circle thirty degrees south of the equator; but the stars from thirty degrees south on to the South Pole cannot be observed from there.

It is therefore highly desirable that a powerful telescope be located in the Southern hemisphere, in order to extend the work to the South Pole.

In November, 1900, Dr. Campbell called the attention of Mr. D. O. Mills to the desirability of providing such an observatory in the Southern hemisphere, and he, with great generosity, gave a sum of money to construct the telescope, spectroscope, a dome to cover them, to defray the expense of installing the Observatory in the Southern hemisphere, and to pay the salaries of the astronomers engaged in the work.

As the investigations are to be made entirely by photography, it is more advantageous to make use of a reflecting telescope than of a refractor. Acting upon the advice of Messrs. Warner & Swasey, the most successful telescope builders in America, Dr. Campbell entrusted the task of constructing the mounting for the 37-inch reflecting telescope to the Parke & Lacy Company, of San Francisco. The general features of the mounting, together with many of the more important technical details, were designed by Director Campbell, but the designers of the Parke & Lacy Company unified these plans and adapted them to the requirements of modern construction, besides supplying many devices of great value.

The John A. Brashear Company, of Allegheny, Pa., who are the principal manufacturers of optical apparatus, are constructing the mirrors to be used in the telescope mounting. The principal mirror to be placed in the lower end of the great tube, will be of glass, 36 $\frac{3}{4}$ inches in diameter, with a hole 5 inches in diameter in its centre. The thickness of the mirror will be 4 $\frac{1}{2}$ inches, its upper surface will be ground to a parabolic form of great perfection, and covered with a thin deposit of silver. When this silver is polished, it will reflect the light from a star very perfectly, bringing it to a focus 17 $\frac{1}{2}$ feet from the surface of the mirror. If an eye-piece were placed at this point, the image of the star could be observed. Such, however, will not be the construction of this telescope. In the axis of the tube at a distance of four feet below the focal point, where the diameter of the beam of light is still 9 $\frac{1}{2}$ in., a convex silver-on-glass mirror will be placed. This will turn the ray backward through the hole in the centre of the great mirror; and these rays will come to a focus 18 inches below the reflecting surface of the great mirror. This point is 13 inches below the lower end of the great tube.

A thoroughly modern photographic spectroscope is under construction, and nearly completed, at the Lick Observatory. This spectroscope will be supported by a truss system of T and Channel steel, and attached to the lower end of the great tube in such a way that the light from the star will enter the spectroscope. The light passes through the telescopes and prisms making up the spectroscope, and falls upon a photographic plate suitably placed. The photographs obtained will enable observers to determine the motions of the individual stars observed, and more important still, the results far the stars observed will be combined with the results for the Northern hemisphere obtained at Mt. Hamilton, in such a way that they will be able to determine from the data the motion of our solar system through space. The telescope will be moved by clockwork to follow the star.

As soon as the mirrors have been completed, the apparatus will be assembled on Mt. Hamilton for testing. It will then be carefully packed and shipped to Chili, where an observing station will be selected with great care, probably in the vicinity of Santiago, or on the summit of the range of mountains lying between Santiago and Valparaiso.

Dr. W. W. Campbell, the director of the Lick Observatory, will go to Chili to select the station, to install the apparatus, and to make sure that everything is in order. The work thereafter will be in charge of Prof. Wm. H. Wright, who with one or more assistants will be engaged for two or three years in observing a list of stars distributed as uniformly as possible over the region lying within sixty degrees of the South Pole.

CATALOGUES, CIRCULARS AND TRADE NOTICES.

AN IMPORTANT CONSOLIDATION.

WE have reviewed the following circular letter informing us of the consolidation of the firms of Lexow and Yawger, carbon and bortz importers, of New York:—

"We beg to inform you that this day we have consolidated our two firms, Theodor Lexow and I. C. Yawger, forming a stock company to be known as The Yawger-Lexow Company, for the importation of and dealing in carbon and bortz and all diamonds for mechanical purposes, to be located at 12 to 16 John street, New York.

"The excellent reputation always enjoyed by our first predecessor, the firm of Victor Bishop & Co., established 1837, which was succeeded by our Mr. I. C. Yawger, as well as our own endeavours individually, to protect the interest of our customers, we hope will secure for us a continuance of your patronage under our new venture.

"In fact, this consolidation is mainly undertaken in the interest of our patrons, as we contend that long experience, the best possible connections abroad, the buying of goods from first hands in Brazil, and ample means, enabling us to make all our purchases for strictly cash only, will secure all advantages possible for our customers. Our Mr. Lexow, as well as our Mr. Yawger, will continue to give their personal attention to the business, while Mr. Henry Demmert, connected with our Mr. Lexow since he started in business, and who is one of our directors, will continue to represent us on the road, where he is so favourably known, being assisted by Mr. A. H. Vorster, also one of our directors. All moneys due the respective firms of Theodor Lexow and I. C. Yawger should be liquidated with them personally."

WM. HAMILTON M'FG CO'S VANCOUVER BRANCH.

The Wm. Hamilton M'fg Co., Ltd., give notice of the appointment of Mr. C. N. Cornell to the management of the British Columbia branch. Mr. Robt. Hamilton, who formerly held this position, having resigned in order to assume other duties in connection with the company's business at Peterborough.

NEW OWNERS OF A LARGE HOUSE.

A business change of considerable interest is that by which the old established mining supply house of the Parke & Lacy Co., San Francisco, Cal., goes into the hands of Harron, Rickard & McCone. This was brought about by the recent death of Mr. B. T. Lacy, the late president of the Parke & Lacy Co., and the disinclination of the heirs to continue. Of those who will carry on the business hereafter, Mr. J. O. Harron and Mr. Thos. Rickard have long been associated with the old company and for the last few years they have been entrusted with its active management. They are, therefore, thoroughly conversant with the work they undertake and are well and favourably known. Nothing less can be said of Mr. A. J. McCone, who, although not heretofore a resident of San Francisco, is known by many interested in mining as the successful proprietor of the Fulton Foundry, Virginia City, Nev., and vice-president of the Fulton Engine Works, Los Angeles, Cal. He brings with him a host of friends to the new concern and a great fund of information for the benefit of its clients. The advertisement of the new firm will be found on the back cover of this number.

The officers of the new company are as follows: J. O. Harron, president; Thomas Rickard, first vice-president; A. J. McCone, second vice-president; Thomas Steel, secretary; Louis C. Graupner and Jas. H. Mundy, directors. The business will be continued at the old headquarters, 21-23 Fremont street, San Francisco, Cal., and branches will be conducted as before at 306 Byrne Building, Los Angeles, Cal., and at Bakersfield, Cal.

CONCENTRATING MACHINERY AND ORE BREAKERS.

The Allis-Chalmers Co., Chicago, Ill., have just issued a series of new catalogues, of which book No. 1, descriptive of the well-known Gates Rock and Ore Breakers, and catalogue No. 9, dealing comprehensively with the subject of concentrating machinery are before us. The former describes over a dozen different styles of crushers and breakers, special attention being directed to a new modified form of the Gates Rock and Ore Breaker, designated as style "D," which possesses several advantages over former construction arrangements. It is interesting to note that nearly 5,000 Gates gyratory crushers have been sold to the public and are in operation in all parts of the world. The scope of the present booklet is confined solely to supplying information in regard to this special class of crushers, but the company also issue a supplementary book (No. 4) with illustrations and plans of complete crushing plants and auxiliary appliances. Catalogue No. 9 has almost the appearance of a text book and contains information of the greatest interest and value. The illustrations are numerous and there are also some fine diagrams, among which is one of an improved concentrating mill such as was recently installed at the Arlington mine, Erie, British Columbia.

SPECIALTIES FOR DREDGERS.

Hadfield's Steel Foundry Co., Limited, represented in Canada by Mr. Francis T. Peacock, M. E., of Montreal, issue an illustrated catalogue comprising a very complete list of dredger appliances and specialties, including steel pins and bushes, bucket blades, links, lips, tumblers, shafts and gearing. The material out of which these appliances are manufactured is the celebrated Hadfield's Patent Manganese Steel, which is of peculiar hardness and exceptional toughness, a combination most essential for dredger work. While ordinary steel shows considerable wear after three months' work, tests prove that after ten months constant use, Manganese steel parts are only just perceptibly affected.

MINING RETURNS AND STATISTICS.

THE COAST—MT. SICKER DISTRICT.

DURING 1901, the Lenora mine, Mt. Sicker district, shipped to smelters 17,733 tons of ore, and added 25,000 tons to the dump accumulation.

ROSSLAND.

It is estimated that ore shipments from Rossland mines for the year 1901 amounted to 279,133 tons of a gross value of \$3,700,000, figuring at about \$13 per ton. The shipping mines were as follows:

	Tons.
Le Roi	150,876
Centre Star	53,600
Le Roi No. 2	39,160
War Eagle	19,900
Rossland G. W.	10,581
Iron Mask	3,733
Homestake	20
I. X. L.	230
Spitzee	200
Velvet	563
Monte Cristo	20
Evening Star	74
Giant	74
Portland	24
Total	279,133

BOUNDARY DISTRICT.

The Phoenix Pioneer publishes the following statement of ore production from the Boundary district during 1901. Estimating the average gross value of the product at \$6 per ton, the year's output would represent a valuation of \$2,280,000.

	Tons.
Granby Mines, Phoenix	233,424
Mother Lode, Deadwood	89,034
B. C. Mine, Summit	47,405
Winnipeg, Wellington	1,040
Snowshoe, Phoenix	1,731
Athelstan, Wellington	550
Jewel, Long Lake	350
No. 7, Central	850
Sunset, Deadwood	802
R. Bell, Summit	560
King Solomon, West Copper	875
Carmi, West Fork	890
Ruby, Boundary Creek	80
Miscellaneous small shipments	2,409
Total for 1901	380,000

SLOCAN.

For the year 1901 shipments from the Slocan district, according to the New Denver Ledger, were as follows:

	Tons.
Payne	1,970
Last Chance	1,423
Slocan Star	4,664
Ruth	279
Bosun	620
Hewett	1,924
American Boy	1,462
Ivanhoe	1,317
Sunset (Jackson Basin)	724
Sovereign	117
Wonderful	146
Arlington	5,477
Two Friends	40
Enterprise	700
Hartney	140
Black Prince	155
Goodenough	284
Miller Creek	20
Reco	431
Sunset (Can. Gold Fields)	53
Silver King	14
Noble Five	59
Washington	30
Red Fox	123
Antoine	16
Queen Bess	1,199
Monitor	480
Corinth	81
Bondholder	33
Rambler	3,035
Surprise	200
Kaslo group	10
Chapleau	15
Speculator	10
Ajax	10
Soho	136
Emily Edith	46
Phoenix	23
Alpha	40
V. & M.	20

Marion	22
Ruby	1
Esmeralda	6
Hampton	7
Capella	44
Fourth of July	12
Tamarac	5
Mary Durham	8
Buffalo	5
Sweet Grass	2
Exchange	5
Mollie Hughes	22

Tons 27,874
The total is several thousand tons less than that of 1900, although to these figures must be added the ore shipped from the Whitewater mine by way of Kaslo. This ought to bring the total for the year up to 30,000 tons.

From the camp tributary to Ainsworth town the total of ore mined was 5,100 tons, almost all of which was from the Highland, and of this most was concentrating ore. From the Lardeau trail, shipments aggregating 50 tons were made.

LARDEAU DISTRICT.

The following are given out as the official returns from the Lardeau district up to the 1st December, 1901, but since then some shipments have been made, probably 100 tons from the Silver Cup:

	Tons.
Silver Cup	1,200
Nettie L.	880
Triune	325 1/4
Beatrice	221
Great Western	28
Broadview	26
Ethel	17
Cromwell	11 1/2
Ophir Lode	6
Metropolitan	6
St. Elmo	6
Ruffled Grouse	6
Linson	1/2
Total	3,727 1/4

Value with the 100 tons estimated from the Silver Cup, \$375,016.81.

NELSON.

During 1901 the Ymir, in Ymir camp, had 80 stamps in operation. There was mined 70,000 tons. An average of one hundred men have been employed under ground, one hundred on the surface and in the mill, and for the last six months one hundred more in constructing a cyanide plant, which will be in operation by the end of January. It will cost \$50,000. Other shipments from near Ymir, 50 tons. In the vicinity of Erie and Salmo, the Arlington shipped 1,000 tons; Keystone 100 tons. The Second Relief put in a concentrator and is ready to ship. The Yellowstone stamp mill crushed 9,000 tons and the Fern 375. The estimated number of miners employed in Ymir district is 450. In Nelson district the Hall Mines produced 21,366 tons; Athabasca 4,500; Granite creek mines (milled) 6,809; Mollie Gibson 750 tons.

EAST KOOTENAY.

An estimate of production from this district last year, places the output of silver-lead ores and concentrates at 21,305 tons having a gross value of \$852,000, to this must be added placer gold and production from other sources which would probably make the total value of the mineral yield about a million dollars. The following mines contributed to the aggregate production: The St. Eugene, North Star, Sullivan and Society Girl mines.

YUKON GOLD IN UNITED STATES.

A RETURN has been made showing the business transacted by the United States assay office at Seattle since its establishment in July, 1898, which is well worth studying. In 1898 the deposits at this institution amounted to 356,612.77 troy ounces of gold, valued at \$5,678,213.52; in 1899, the aggregate deposits for the year increased to 871,610.30 ounces, valued at \$12,971,879.20; in 1900 the business transacted through this office showed a further gain, 1,345,032.65 ounces of gold, to the enormous value of \$22,038,795.79, having been purchased from miners. To October 31, 1901, when the office closed, the total value of the deposits though still sufficiently considerable, representing the respectable sum of \$14,184,356, there is a decrease for the first time consequent, of course, on the establishment of the Dominion assay office at Vancouver, although much of the gold assayed by the Canadian office is afterwards sold to the mint at San Francisco, and passes through the hands of the Seattle institution. Of the great quantity of gold melted at Seattle during the last three years, the equivalent valuation is no less a sum than \$54,873,235.51, very nearly 80 per cent. originated from the British Yukon and British Columbia. The totals in full are made up as follows:—
From Nome, Alaska, U. S. A., gold to the value of \$7,094,031.27

was received; from other Alaskan mining districts \$1,526,089 87, and from the State of Washington, \$800,991.28; or from all American sources a total of \$8,921,112.42; while the Yukon alone contributed to the total return \$43,707,584.69 and British Columbia \$2,244,538.40. Even with the present by no means perfect arrangement effected by the Dominion authorities for the purchase and handling of the gold product from the Yukon, much of the desired object has been accomplished, as the above figures demonstrate, for the decrease in the business of the Seattle mint is not, of course, due in any falling off in the Yukon gold yield, which, as is well known, is greater in the aggregate this year than last.

ROYALTY RECEIPTS.

The royalty receipts from gold dust produced in the Yukon territory, for the season of 1901, has just been computed in total and found to be \$381,162. Each mine is allowed an exemption of \$5,000 from taxation on the output of each year, and 5 per cent. of the excess taken from each mine is held by the government as royalty. In 1900, ten per cent. was taken for royalty. The government collected royalty in 1900 to the amount of \$891,475, a little less than three times the collections this year.

The payments of royalty in 1901 were on gold produced to the amount of \$7,623,257. Last year notwithstanding, the inducement was greater to avoid paying the tax, royalty was paid on more than \$8,000,000.

The receipts of royalty this year by creeks or districts in the territory were as follows:

Forty-mile	\$ 599 00
Eureka	391 00
Dominion	37,751 51
Sulphur	11,581 91
Gold Run	37,084 87
Hunker	36,526 86
Grand Forks, including Bonanza, Eldorado and numerous hillside and bench claims and gulches of the vicinity ..	249,211 81
Total	\$381,162 85

COAL EXPORTATIONS.
VANCOUVER ISLAND.

THE total coal output of the Vancouver Island collieries for 1901, aggregated 1,331,350 tons, as against 1,383,375 tons in 1900.

The reduction—52,025 tons—was due to a reduction of the foreign coal shipments, caused, chiefly by the inroads of coal-oil fuel upon the California market. The New Vancouver Coal company shipped 584,542 tons, a slight gain on 1900, when the output was 579,351 tons. Extension shipped 415,580 tons, as against 267,553 tons in 1900. The Union Colliery shipped 270,006 tons, as against 323,523 tons in 1900, and the Alexandria mine 61,222 tons, as against 112,153 tons in 1900. The Wellington Colliery, which produced 100,772 tons in 1900, closed in that year, and therefore yielded nothing in 1901. On the whole the decrease of the Vancouver Island coal yield in 1901 is therefore slight, having regard to the competition of coal oil in California, and the terrible mine accidents at Extension.

There were, it should be added, shipped in 1901 from Comox, 4,760 tons of coke used for foreign consumption, Vancouver Island's foreign coal shipments of 1901 were in all 821,945 tons, as against 906,215 tons in 1900. Of the shipments of 1901, the New Vancouver Coal Co.

was responsible for 448,157 tons, the remainder being shipped from Union and Ladysmith respectively. The figures show, as will be seen, that the whole of the small decrease of output for 1901 was more than due to a decline of foreign shipments, there being a gain of over 32,000 tons in the amount of coal got and used within the Province.

THE METAL MARKET.

THE average prices of metals in New York during the year 1901 were as follows:—

Month.	Silver	Copper	Tin	Lead	Spelter					
	1901	1900	1901	1900	1901	1900				
January	62.82	59.30	16.25	15.68	26.51	27.07	4.35	4.68	4.13	4.65
February	61.06	59.76	16.38	15.28	26.68	30.38	4.35	4.675	4.01	4.64
March	60.63	59.81	16.42	16.29	26.03	32.00	4.35	4.675	3.91	4.60
April	59.29	59.59	16.43	16.76	25.93	30.00	3.35	4.675	3.98	4.71
May	59.64	59.96	16.41	16.34	27.12	29.37	4.35	4.181	4.04	4.53
June	59.57	60.42	16.38	15.75	26.60	30.50	4.35	3.901	3.99	4.29
July	58.46	61.25	16.31	15.97	27.85	33.10	4.35	4.030	3.95	4.28
August	58.37	61.14	16.25	16.35	26.78	31.28	4.35	4.280	3.99	4.17
September	58.26	62.63	16.25	16.44	25.31	29.42	4.35	4.350	4.08	4.11
October	57.89	62.83	16.25	16.37	26.62	28.54	4.35	4.350	4.23	4.15
November	57.94	62.04	16.224	16.49	26.67	28.25	4.35	4.350	4.29	4.29
December	55.10	64.14	13.845	26.31	24.36	28.94	4.153	4.350	4.31	4.25
Year	58.95	61.33	16.117	16.19	26.54	29.90	4.334	4.37	4.08	4.39

The prices given in the table for copper are the averages for electrolytic copper. The average price for Lake copper for the year 1900 was 16.528; for the month of January, 1901, it was 16.772; for February, 16.900; for March, 16.940; for April, 16.940; for May, 16.940; for June, 16.900; for July, 16.610; for August, 16.500; for September, 16.440; for October, 16.600; for November, 16.330; for December, 14.300; for the year 1901, 16.530.

During the month of January trade conditions have been very seriously disturbed by the rapid and heavy decline of copper which is now quoted in New York as low as 10c. Lead has been in fair demand but at unchanged prices, the latest London quotation being £10, 8, 9. New York quotations being 3.85 and 3.95. Silver has been fairly steady, no important movements having been reported. Quotations in New York have been from 56 1/4 to 56 1-8.

THE LOCAL STOCK MARKET.

DURING the past few weeks conditions have entirely changed for the better, and prices having particular regard to better class stocks, have generally advanced. An excellent harvest in Manitoba, and the prosperous state of trade in Eastern Canada are no doubt partly responsible for the improvement as noted, through the great progress evidenced in the direction of mining development in British Columbia during the past year, the recent rich strikes made in such mines as the Cariboo-McKinney and Centre Star, in which Eastern capital is largely interested, and the resumption of operations at the Gooderham owned mines, all have assisted in bringing about the renewal of confidence. In the last three weeks Cariboo-McKinney has risen from 15 to 26, Centre Star from 30 to 45, Iron Mask from 14 to 20, War Eagle from 10 to 13, Payne from 15 to 35, Rambler-Cariboo from 66 to 82, and American Boy from 5 to 8. North Star has been stationary but firm at 26, while Winnipeg has been in demand at from 4 1/2 to 5. The upward tendency is meanwhile likely to continue as prices last year were unduly depressed. Some activity is likely to be displayed in Republic securities shortly, the railway to that camp being now nearing completion, and will enable the ores from this locality to be shipped to the Granby works.



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THE FAIRBANKS CO.,
749 Craig St., MONTREAL.

Coal Mines Regulation Act Amendment Act, 1901.

PROVINCIAL SECRETARY'S OFFICE,

9th January, 1902.

His Honour the Lieutenant-Governor in Council has been pleased to issue the following Regulations for carrying out the provisions of the "Coal Mines Regulation Act," and to order that the same shall come into force on the 15th day of January, 1902.

By command,

J. D. PRENTICE,
Acting Provincial Secretary.

Regulations Under the Coal Mines Regulation Act Amendment Act, 1901.

CONSTITUTION OF BOARD.

1. Each member of the Board of Examiners shall be entitled to vote at every examination.
2. Each Board shall, within ten days of its formation, meet and elect from its members a Chairman, who shall preside at all examinations and meetings of the Board.
3. The person appointed by the Lieutenant-Governor in Council to serve on each Board shall act as Secretary thereto, and keep minutes of all proceedings, record of all candidates for and results of examinations, issue certificates of competency, and forward the prescribed returns to the Department of Mines. He shall also attend to all correspondence of the Board and answer all enquiries made to him regarding the affairs thereof.
4. The owners or managers of each mine shall, on or before the first day of December in each year, forward to the Department of Mines, upon the prescribed form, notice of the two persons nominated by him to act on such Board. He may also nominate two other persons as alternates to act in the absence of the members nominated by him. In the event of such nomination not being made the Minister of Mines may appoint two members to act on behalf of the owners of the mine.
5. At each election for coal miner members of a Board there shall be two alternates appointed who shall be the two candidates receiving the next highest number of votes to those elected. Such alternates shall act upon such Board in the absence of the elected members.
6. In the event of any one or more of such elected or alternate coal miners ceasing to be employed in the mine for which he or they shall, *ipso facto*, cease to be members or alternates as the case may be.
7. As soon as possible after a Board has been constituted there shall be published in the *British Columbia Gazette*, and in a newspaper circulating in the vicinity of the mine, a notice giving the names of the persons constituting such Board and the alternates. The name of the post office address of the Secretary shall also be contained in such notice, together with an intimation that all persons requiring information as to the conduct of examinations shall apply to the Secretary of the nearest Board.
8. The members of the Boards first constituted shall enter upon its duties on the first of March, 1902; thereafter each Board shall enter upon its duties on the first day of January. All Boards shall continue in office until the first day of January next ensuing, or until successors are appointed or elected.
9. A Board of Examiners may be formed, by permission of the Minister of Mines, at any mine where its constitution may be rendered necessary after the regular date of formation in any year, but if such Board be constituted after the 1st of September such Board shall hold office until the 31st December next ensuing, and for one year thereafter.
10. If, for any cause, a full Board cannot be constituted at any mine from the regularly elected and appointed members and alternates the vacancies may be filled by the Minister of Mines.

ELECTIONS.

11. The first election of coal miners as members of the Boards of Examiners shall take place on the 15th day of February, 1902; thereafter such elections shall take place on the second Saturday in December in each year.
12. One week before the date set for such election the owner or manager of every mine at which a Board of Examiners has been constituted shall forward a list, certified by him to be a correct one, of the coal miners actually working in the mine. Only the persons named on such list shall be entitled to vote at the ensuing election.
13. All candidates at such election shall be nominated in writing by at least two coal miners working in the mine, and such nomination, together with the candidates' acceptance thereof, in the prescribed form, shall be delivered to the Secretary at least seven days before the election. No coal miner whose name does not appear on the list furnished by the owner or manager shall be eligible for election to the Board. At least four days before the election the Secretary shall post notices of such election, together with the names of the candidates thereat, in at least three conspicuous places about the mine.
14. All elections shall be by ballot and the Secretary to the Board of Examiners shall act as returning officer.
15. When any coal miner shall apply for a ballot the Secretary shall

satisfy himself that the name of such person is on the list furnished to him. At any election after the first the Secretary may require any applicant for a ballot to produce his Certificate of Competency, and if such certificate be not produced no ballot shall be furnished to the applicant.

16. The election shall be held between the hours of two and six o'clock in the afternoon, at such place as shall be designated by the Secretary, and shall be conducted in the following manner:—

(a.) The Secretary, after satisfying himself that the applicant is entitled to vote, shall furnish him with a ballot on which shall be written or printed, in alphabetical order, the names of the candidates. The Secretary shall place his initials on the back of each ballot before handing it to the voter, and the voter, after marking same, shall fold it in such a manner that such initials shall be visible, and show the same to the Secretary before placing it in the ballot box:

(b.) The ballot box shall be sealed during the continuance of the election:

(c.) Each voter shall be entitled to vote for two candidates and no more, and shall vote by marking a cross opposite the names of the candidates for whom he votes. Any ballot marked for more than two candidates shall be void:

(d.) At the conclusion of the election the Secretary shall open the ballot box and proceed to count the votes. The two candidates receiving highest number of votes shall be declared elected, and the two receiving the next highest number of votes shall be declared alternates. In the case of any tie the Secretary shall have a casting vote:

(e.) Any candidate, or one person acting on his behalf, may be present at the counting of votes:

(f.) The Secretary shall forward the marked ballots to the Department of Mines, together with his certificate of the result of the election within three days after the same. Such ballots shall be destroyed at the end of thirty days if no dispute arises as to such election. If a dispute arises they shall be destroyed forthwith after its settlement:

(g.) In the event of any dispute arising as to the result or conduct of any election the matter shall be referred to the Minister of Mines, whose decision shall be final. He may order a new election or otherwise deal with the case as he may deem fit.

EXAMINATIONS.

17. Notice of the date and place of each examination shall be posted for at least seven days before the holding of the same, at three or more conspicuous places about the mine. All candidates for examination shall give at least two days' notice to the Secretary and pay to him the examination fee of one dollar.

18. The examination shall commence on the day named and continue until all the applicants have been examined.

19. The result of each examination shall be certified under the hand of at least three examiners, in a book to be kept by the Secretary for that purpose, and a report thereof, in the prescribed form, shall be forwarded to the Department of Mines within ten days after the conclusion of each examination.

20. All certificates or testimonials presented by persons coming before the Board must be clear and satisfactory, and in case of doubt the Board may require additional confirmation or proof of the same.

21. Candidates shall produce their previous certificates of employment when presenting themselves for examination.

22. The Board, in the case of candidates for certificates as shot lighters, fire bosses or overmen, will see that they have certificates of competency as coal miners, or show at the time of their examination that they can pass such examination of competency, and will be careful to see that they are qualified as to their practical knowledge of gas and the duties of shot lighters and gas examiners.

23. All fees paid in respect of examinations and certificates of competency under this Act shall be forwarded by the Secretary to the Treasury at the end of each month and shall form part of the Consolidated Revenue of the Province of British Columbia.

24. Examinations for certificates of competency as coal miners shall be *viva voce*, but those for shot lighters, fire bosses and overmen may be *viva voce* or written, or partly written or partly oral in the discretion of the Board of Examiners.

CERTIFICATES OF COMPETENCY.

25. All members of any Board of Examiners and alternates appointed or elected to hold office during the year 1902, shall be entitled, without examination, to receive certificates of competency of the class in which at the time of such appointment or election they shall be employed.

26. All holders of certificates of competency or service as coal mine managers shall be entitled, without examination, to certificates of competency as overmen, on application to the Secretary to the nearest Board of Examiners and production of their certificates.

27. A certificate of competency as shot lighter, fire boss or overman shall carry with it all the rights and privileges granted to a coal miner by a certificate of competency as such, and the holder thereof shall be eligible of nomination and election as a coal miner member of any Board of Examiners or alternate, and to vote at any such election.

28. In the case of any person who claims to have lost his certificate of competency, he shall apply to the Secretary to the Board from which he received the same for a substituted certificate. The said Secretary, upon proof satisfactory to him of such loss, may issue such substituted certificate, endorsing upon the face thereof the words, "Issued as a substituted certificate for No. , satisfactory proof of the loss of same having been