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BRITISH COLUMBIA MINING RECORD

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THE MONTH.

A well-informed correspondent writing from the Slocan observes: "As to the interest in zinc mining, which is gaining every day, it is remarkable how well this new industry has been received. In conjunction with the lead mining, the possibilities for zinc are sure to become a permanent factor in the future."

Last month the Indian Chief, situate at Sidney Inlet, on the west coast of Vancouver Island, made its first shipment, having sent about 100 tons of copper gold ore to the Tyee Copper Company's smelter at Ladysmith. While the quantity shipped is not important, it is gratifying to note even this beginning of production by another Vancouver Island property.

The Atlin *Claim* reports that an endeavour is to be made to ship from Atlin before navigation closes for the season some 200 tons of magnesite (magnesium carbonate) in order to ascertain values in bulk and whether or not the mineral can be profitably shipped. It is understood that there is a large deposit of this mineral near Atlin, so that if it be found that it will pay to ship it the value of the production of that camp will be increased from this source.

The report of Dr. R. W. Ells, of the Geological Survey of Canada, on the coal measures at Quilchena, in the Nicola district, which we publish this month, will be read with interest. The opening up of the coal areas of Nicola Valley and neighbouring localities would do much to attract more attention to the district, which is not only adapted to agricultural and pastoral pursuits but has as well mineral resources, both metalliferous and non-metalliferous, that give promise of proving valuable and important.

The numerous applications received of late by the publishers of the MINING RECORD for specimen copies of this periodical is some indication that interest in our mining industry is on the increase. Thus during the past few weeks letters containing requests of this nature have reached us not only from the great European and American financial centres, but from such widely separated places and countries as, for example, Archangel, Russia; Rio Dequancio, Brazil; Republic of Colombia; Hong Kong, Denmark, Mexico, Queensland, Gold Coast, New Zealand, and British North Borneo.

In the September issue of the MINING RECORD we published a description of the British Columbia Copper Company's smelting works at Greenwood, Boundary district. The *Observer*, of London, England, made a digest of our article, accurately describing the improvements lately made, new plant installed, etc., but incorrectly gave credit for them to the company's general manager, Mr. F. Keffer. We have no doubt this error was unintentional, but as the superintendent of the smelter, Mr. J. E. McAllister, as stated in our article, designed and installed the Bessemerizing plant, and as his modern and economical metallurgical practice has been the chief factor in making these smelting works a commercial success, we hope our English contemporary will do him justice by making the necessary correction in its columns.

The following from the Denver *Mining Reporter* should have a local application in British Columbia as well as in the United States. "On the question of publicity it might be well to point out that the most practical plan for spreading abroad knowledge

of the mineral wealth of mining districts is to support clean, honest and well-edited local newspapers. Supporting a local paper does not simply mean paying a subscription, but also by giving it the news. In less than a month items which originally emanated from the local paper will have appeared in scores of other papers, reaching the eyes of many thousands of readers elsewhere. Let such information be reliable, and good must eventually be derived by the locality to which reference is made."

The high price now obtainable for zinc ores has certainly assisted in stimulating the movement—of which the Payne Company at the instance of its energetic resident manager, Mr. A. G. Garde, was practically the pioneer—of turning the zinc-bearing ores of the Slocan district to commercial account; and the development of these resources is now proceeding in so satisfactory a manner that it can only be a matter of a short time ere zinc mining in the province will assume very important proportions. The other day one mine alone completed the relatively large shipment of a thousand tons of zinc ore to local reduction works, and other mines have recently installed machinery or adapted their mills for the concentration of their zinc as well as the lead products. As further indication of industrial progress in this connection is the fact that the Kootenay Ore Company's sampling works at Kaslo are being very considerably extended and specially equipped for the treatment of zinc ores, whilst the erection of the new zinc reduction works at Rosebery, on Slocan Lake, is now well under way.

While the mineral exhibits at provincial exhibitions and at Spokane this autumn were not nearly so large and varied as they should have been to adequately represent the "mineral province" of Canada, it is gratifying to note that they were considered sufficiently good to merit awards being made to them. The province appears to have made an excellent showing at the St. Louis Exposition, according to a telegram received by the *Boundary Creek Times* from Mr. H. B. Munroe, of Greenwood, who is connected with the mineral department of the Canadian section there. The telegram reads: "Won on minerals 2 grand prizes, 25 gold medals, 31 silver medals, and 14 bronze medals, out of total of 85 entries." Particulars of British Columbia's display of minerals and the conditions of the competition in which these results were obtained will be awaited with interest.

Evidently the superintendent of the Kootenay-Boundary division of the Canadian Pacific railway does not anticipate that the construction of a branch of the Great Northern railway to Phoenix will reduce the ore-carrying business of the former railway, as suggested by some of the up-country press correspondents. Even if, as has been stated it will do, the Great Northern does secure the freight business of the Granby Company's mines, this will not mean, as reported to have been pointed out by Superintendent Lawrence, that it will have the haulage of all the ore produced in the Boundary district. There are other mines producing on an appreciably large scale, and it may reasonably be expected that still others will be developed as the treatment capacity of the district smelters shall be increased, for there are known to be large bodies of ore that have not yet been opened up. That the C. P. R. Company looks for an increase in its ore-hauling business is certain, for it has lately ordered the construction of fifty additional steel ore cars for use in the Boundary district.

The price of lead has lately been a source of much satisfaction to the owners of silver-lead mines in the Kootenay, and there seems to be a probability of the product of these mines returning even higher profits than under recent favourable conditions. Mr. G. O. Buchanan, inspector under the Lead Bounties Act, was reported early last month to have said: "The lead producers are now getting within ten shillings of the maximum intended to be reached under the provisions of the Act providing for the payment of bounties on lead. When, as now, lead is quoted in London at £12, the local producers receive $2.50 per 100 lb. This was the figure that they asked the government to aid them in obtaining when they applied for the lead bounty. Lead has been down to £10: 5: 0 since the bounty began to be payable, 15 months since. It has ranged a little under £10 to £22 in the last 20 years, with an average during that period of £12: 10: 0. I look for the price to go still higher, as there is a demand for lead in the United States and that country has no surplus for export, beside which there has been a falling off in the production of Mexican lead." If this expectation be realised the silver-lead mine owners of this province should receive even better returns and much higher than for several years.

The apt reply given at a recent public meeting, held at Ladysmith, to a Socialist who said the American people gave the people of Ladysmith their living by buying coal from the place, may well be given as wide publicity as possible. It was this: "The Americans bought our coal because they could not get such a good article elsewhere; because here we have the best coal on the Pacific coast." That is also the reason why the Great Northern Railway Company wants Vancouver Island coal for its new line of big steamships that will trade between Puget Sound and the Orient; and, too, if it be true, as lately reported in local newspapers, that Japan is seeking to obtain a supply of Comox coal the reasons are evident—Vancouver Island possesses an abundance of coal of superior quality occurring so near tidewater that it is to the advantage of large consumers to obtain their supplies from here. Quantity, quality and low cost—these are the exceptional advantages Island collieries offer, and strict business considerations alone impel consumers to avail themselves of them.

The attitude of Mr. Geo. S. Waterlow, a director of the Le Roi Mining Company and a large shareholder, and of the managing director, Mr. A. J. McMillan, in regard to the proceedings taken by the Provincial Government before a Court of Revision to recover from the Le Roi Company the sum of $19,637.23 claimed to be due over and above the amounts paid by the company on account of the mineral tax on ore mined by it during the fiscal years ended June 30, 1902 and 1903, respectively, we are assured is this: They have instructed the company's legal advisers to examine closely the position, and if in the opinion of those gentlemen the claim of the Government is a just one, they will wish the liability to be discharged without hesitation. The directors of the Le Roi Company have neither intention nor desire to act otherwise than honourably, so will pay all moneys they shall be convinced are justly due, whether to the Government or to any one else. It is not a pleasant position to have a legacy of debt—if there be such—left by their predecessors, but to preserve the good name of the company for integrity and fair-dealing is the first consideration of the present management. If, however, on the other hand, they believe any claim to be an unjust one, they will not be disposed to pay it without an effort to prevent such unwarranted disbursement of the company's funds.

According to Senator Templeman the mint that British Columbian mining interests have long been more or less earnestly hoping to see established in Canada will yet become an accomplished fact, notwithstanding that the Dominion government appears to be proceeding with the preliminary arrangements but slowly. Several weeks ago the secretary of the Provincial Mining Association of British Columbia was informed by Mr. Templeman that: "The mint has not been built, but it will be. There has been unavoidable delay in procuring a site, but steps are now in progress to expropriate, and the plans being all ready it should now be built and in operation in 12 or 18 months." Lately a little interest in this subject was temporarily revived by the observations of the general manager of one of the chartered banks of Canada who visited the province, but beyond a few press comments not much notice was taken of his expression of opinion, though it was timely and relevant. The fact seems to be that little if any real and continuous interest is evinced, even in this province, in the early establishment of a mint, and so long as this is the case we must expect to be treated accordingly by the Dominion government. We are not importunate, and an occasional general assurance that the matter is receiving attention satisfies us until another spasmodic but languid enquiry calls for similar treatment.

One of these days, not, we think, very distant, Northwest America will successfully compete with any other country in the world for the record in the matter of mining low-grade ores at a minimum cost, and this notwithstanding that miners are here paid a fair living wage. The achievements in this respect of the Alaska-Treadwell have long been regarded as remarkable and the relatively low costs of mining in the Boundary district are also beginning to excite comment. The last annual report of the Alaska-Treadwell Company is of even greater interest than usual as showing what may be accomplished under a system eminently precise and businesslike. Both as regards development work and ore crushed all previous records were exceeded during the past year, whilst the ore reserves estimated at over four million tons afford at least five years' supply at the present crushing rate. The average gross value of the ore is given at $2.3948 per ton, the total costs being $1.3265, $1.0683 per ton representing profit. Costs per ton were distributed as follows: mining, $0.9247; milling, $0.1583; sulphurets treatment, $0.1461; general expense, $0.0231; taxes, etc., $0.0743. The improved position is, however, best shown by comparing last year's returns with those of four years ago. In 1900-1 457,802 tons of ore were crushed; in 1903-4, 775,150 tons, whilst the total value of the yield in 1900-1 was $86,737 and in 1903-4, $1,856,337. The annual dividend has also been increased from $1.50 to $2.50 per share.

Whether or not, as is expected, the gold output from the Atlin district this year will be found to considerably exceed that of last season, it can yet be very confidently asserted that the results of development work on the creeks have been eminently encouraging, as demonstrating most clearly the hydraulicing and dredging potentialities of this northern territory. It is, in particular, gratifying to note that operating costs are being steadily reduced as a result largely of the consolidation of interests and the consequent working of larger areas with greater effectiveness and economy. From information at our disposal there seems little reason to question the successful inauguration of gold-dredging in the district, the returns from the Pine Creek undertaking this season being sufficiently good to justify the conclusion that this method of gold mining will be extensively employed here in the future in mining the large areas of auriferous gravel where an unlimited supply of water requisite for hydraulicing is not to be depended on. Whilst perhaps transportation and other conditions are not as yet sufficiently favourable to induce any very considerable investment of capital in quartz development, still this branch of mining has not been neglected during the past season, and in addition to the operation of the several claims on which work had previously been done and from which small consignments of ore have been shipped, a number of promising new quartz discoveries are reported to have been made this year.

The announcement that the Carnegie Steel Company has installed at its Duquesne Steel Works, at Duquesne, Pennsylvania, a new labour saving device that will effect a large saving in the cost of unload-

ing cars as compared with the wages heretofore paid labourers employed in this work, has more than a passing interest for the owners of smelters in British Columbia. This device, used in conjunction with self-dumping hopper cars, provides for the almost instantaneous unloading of the cars from either side or bottom, by the pressing of a lever. It has been tested, with such satisfactory results that it is stated one thousand of the cars are to be at once ordered for use at the works mentioned. Under existing arrangements in this province much of the custom ore—self-dumping cars are supplied by the railways for ore from the larger mines—and the coal and coke is delivered in either box or gondola cars, consequently the material has to be shovelled out of the cars by men. Not only is there the important consideration of expense, but there is as well that of time. As the capacity of British Columbia smelters becomes greater so does the necessity for the use of bottom dumping cars increase. The urgency of the case has already been strongly represented to the Canadian Pacific Railway Company. So long as a smelter requires only enough coke for the treatment daily of less than a thousand tons of ore the difficulty remains mainly one of increased cost, but when much larger quantities shall be treated daily the substitution of self-dumping cars for the present antiquated and costly method of unloading coke will become imperative.

Mr. E. R. Wood, a director of the Crow's Nest Pass Coal Company, was reported by the *Globe* to have said in the course of an interview after his return to Toronto from a visit to British Columbia a few weeks since: "Where there was a wilderness six or seven years ago, there are now the towns of Michel, Fernie, Coal Creek and Morrissey, with a population of at least 7,500, and the monthly wages to their employees exceed $125,000. The result is based on a paying business proposition. The Crow's Nest Pass Coal Company has quite recently been able to realize its aim: that is, to be able to supply the demand for coal and coke. It has now 1,140 coke ovens turning out 1,500 tons of coke daily. Through the extension of the Great Northern it has obtained a market in Montana, the greatest for coke in America outside of Pittsburg. It is now supplying coke to the smelters at Great Falls, Butte, Anaconda, Helena and Northport, in the United States, as well as to all the Canadian smelters at Nelson, Trail, Greenwood and Grand Forks. There are no complaints about the quality of the coke, and, so far as Canadian smelters are concerned, none that they do not receive a sufficient supply." This is the kind of advertising that cannot but be beneficial to the coal-mining industry of British Columbia, and it is likely to prove the more effective from the fact that the statements quoted were made by a man prominent in commercial and financial circles in Toronto, and one not in the habit of making rash assertions.

The Western Federation of Miners does not seem to grow in favour in British Columbia: certainly not in the coal-mining districts. The set-back it received among the Crow's Nest Pass coal miners last year was a serious blow to its prestige in this province; the outcome of the recently-tried action in the Supreme Court, which resulted in an adverse verdict far-reaching in its results, is a wholesome lesson to its extremist agents and advocates in the metalliferous mining camps of the Kootenay; and the voice of warning has again been heard, this time in a coal-mining centre on Vancouver Island. A press report states that at a crowded public meeting, Mr. Ralph Smith, a well known British Columbian labour leader, "had a special word for the miners, advising them in the interests of peace and harmony to have nothing to do with the Western Federation of Miners, as that body was composed of Socialists and was responsible for the strike eighteen months ago. That strike was engineered at the bidding of Socialist leaders in the United States, and the stoppage of the output of coal had enabled fuel oil to become a formidable opponent and had forced foreign users of coal to make long contracts with the mine owners of other places, so that to-day not more than forty per cent of the coal that was being produced before the strike was being mined on this Island, a state of things that would take a long time to overcome." And this, too, at a time when the speaker was seeking the votes of those whom he was addressing. It would therefore appear that the Western Federation of Miners is not favourably regarded by the greater number of the Island coal miners, otherwise a candidate seeking election would not thus risk arousing their opposition to himself.

We have received another letter from Mr. R. C. Campbell-Johnston in which he "still claims that the cheapest smelting extant is in British Columbia." On the other hand practical smelting men most positively assure us that it is not. Our advices are that there is no question about Tennessee smelters being able to smelt more cheaply than British Columbia; in fact the opinion is expressed that this year the former have probably been making matte for 85 cents a ton. Mr. Campbell-Johnston states that their costs are $1.15 for smelting to matte. As we think the sources of our information likely to be the more accurate, we cannot see that any good can come from publishing Mr. Campbell-Johnston's verbose communication on this subject. Then Mr. Campbell-Johnston flies off at a tangent regarding what he erroneously characterises as our "championship of provincial coke" and introduces the question of analysis of coke, but this is not the point at issue. Mr. Johnston caused a misstatement to be published in the London *Mining Journal* to the effect that the present practice of British Columbia coal companies is to coke the coal in the ovens for only twenty-four hours. We stated that at the Crow's Nest Pass collieries the coke is burned for sixty to seventy-two hours, and that the Union (Vancouver Island) coke is seventy-two hour coke. Either Mr. Campbell-Johnston is wrong or we are. We are not to be drawn away from this simple state

ment of fact by any red herring dragged across the trail. If it can be shown we are in error we will admit it; if not, we repeat that Mr. Campbell-Johnston "can best demonstrate his sincerity by giving his acknowledgment of his error as wide publicity, through the London *Mining Journal*, as he gave to his unjust reflection on the coal companies." If he will not do this he must not be surprised if his sincerity be doubted.

If pluck and perseverance go for anything, then the Cariboo Consolidated, the London company engaged in deep level mining at Slough Creek, deserves to succeed. We almost forget how many times the company has been reconstructed, but on each occasion the shareholders have if not over-cheerfully, at least courageously, faced the situation, agreed to what was proposed and put their hands in their pockets in response to the call for more money. This month in London an extraordinary general meeting was held to sanction yet another arrangement by which, in brief, a new company is to be formed with a nominal capital of £200,000 to take over the property and assets of the Cariboo Consolidated and the Gold Lands Corporation, each of which receive a hundred thousand shares in the new organization, subject to a liability of three shillings per share. The Gold Lands Corporation, it should be explained, was the parent company of the Cariboo Consolidated, and held the controlling interest, but apparently as a corporation was not in a position to afford further financial assistance to the subsidiary company, whereas by the present amalgamation some eight hundred individual shareholders in the Gold Lands became liable for an assessment up to three shillings for each share held by them. It will be noted also that the arrangement contemplates a very considerable reduction in the capital of the company, this being originally, in the case alone of the Cariboo Consolidated, £350,000. From all accounts there seems to be every prospect that the pumps at the mine will eventually succeed in coping with the flow of water in the workings, which has hitherto prevented the actual working of the mine, and if the chairman's hopes and predictions are well-founded, it will not be many months before the company will reap the reward of persistence and well directed effort by the earning of substantial profits, for there can be no question that the ancient river channels which are being exploited are very rich in gold, once it can be got at.

The conclusions of Mr. J. W. Grier, who for nearly a year conducted a newspaper at Poplar Creek and whose business it was to keep himself informed as to the condition and progress of the camp, should be of more value than the opinions of many men who pay the camp a brief visit, see a number of rich gold specimens and a few good surface showings, and more likely than not take their cue from parties interested in mineral claims in the vicinity. Mr. Grier is reported to have stated that "Poplar camp is a really good one, but there has been no mining to any extent done there yet. What is needed is more deep mining and a stamp mill to reduce the ore. Poplar will never amount to much until capital is put in to develop the properties and to provide plants to reduce the ore. Just as soon as this is done the camp will forge ahead at a rapid rate." In October, 1903, we published a description of this camp, written by our own representative who paid Poplar Creek a special visit to ascertain what its prospects were. He wrote in conclusion: "With such excellent surface showings, so large an area of mineral-bearing country, and transportation difficulties already overcome, the district should be quickly proved. There will not be many legitimate reasons for delaying development; work should be vigorously prosecuted right through the winter, at any rate on claims that have already come into prominent notice. If they prove to be payable enterprises, next spring should see a transformation of the district from a little-known camp having a few prospectors scattered here and there over it, as it was a few months ago, to a busy gold and silver mining centre." Unfortunately for the camp, development is still inadequate to demonstrate that its mineral resources may be regarded as giving sufficient promise of permanence to induce men with capital to acquire them. Then, too, prices asked are stated to be much too high for undeveloped claims, and other unfavourable conditions have combined with those mentioned to impede progress. It is hoped, though, that all difficulties will ere long be overcome, and that the camp will yet prove the confident expectations of its most sanguine claim owners to have been amply warranted.

In confirmation of the statement made by Mr. E. Jacobs, in his article printed elsewhere in this issue, relative to the reason why the Le Roi smelter was built at Northport, we quote the following from the Provincial Mineralogist's report on Trail Creek Division, published in the Report of the Minister of Mines for 1897: "In respect to smelting charges, there has been little or no reduction, the average price being $11 for freight and treatment. The Le Roi Company recently completed its contract of 75,000 tons for Mr. Heinze's smelter, and during the past year has erected a smelter at Northport, on the American side, whither ore is now being regularly shipped direct from the mine tramway over the Red Mountain railroad. While Mr. Breen is general manager, Mr. H. C. Bellinger has resigned his superintendency at Trail to assume that office at the Le Roi smelter, where he will be at home with the best methods of handling this and other Rossland ores, as this smelter will do custom work. It is much to be regretted that this plant has left Canada, but the Le Roi people, feeling that money could be thus saved, have been constrained to build there, as the most strategic point available, although with further railroad facilities, as will be afforded when the C.P.R. builds from Rossland to Robson, on the Columbia, where cheap coke and coal will be landed from the Crow's Nest Pass, conditions, having a very material effect on this camp, will be

considerably altered, and had this road come sooner this smelter might have been saved to the Province." This testimony, coming as it did from such a reliable source—for it is unlikely the disinterestedness of Mr. W. A. Carlyle, then Provincial Mineralogist, will be called into question—is of particular value at this time when, in certain quarters and for reasons not made public, the Le Roi Mining Company is being sharply taken to task for continuing to have the ore product of its mine smelted at its own works, which represent an outlay of a large sum of money, and consequently should not be closed down except for better reasons than either sentiment or the circulation in any British Columbia town of money paid for labour in connection with the reduction of that ore.

Bulletin No. 19, on Mining in British Columbia, issued by the Bureau of Provincial Information, has been generally well received and favourably mentioned. Among many complimentary references to it the following has been selected as strong testimony to its practical value, since it is from the well known manager of an important mine situate in West Kootenay, who wrote: "Allow me to congratulate you on the excellent form in which this bulletin has been presented to the public. I am sure it will do a great deal of good in furthering the mining industry of British Columbia. I am to-day writing the Bureau a long list giving the names of people to whom the bulletin will be valuable." But much depends upon the point of view, as has been evidenced by the comment of the Nelson *Tribune*, as follows: "The Joly-McBride government has issued a bulletin, No. 19, entitled 'Mining in British Columbia.' The only thing original about the bulletin is the cover page, which is quite attractve. The reading matter is made up from last year's report of the Minister of Mines, which is old and stale. But what better could be expected from a government whose Minister of Mines was never in but one mine in his life?" Now, no one familiar with its general attitude in this connection will charge the *Boundary Creek Times* with any partiality towards the McBride government, yet its opposition has not so embittered it as to prevent it from doing simple justice to so useful a department as the Bureau of Provincial Information. The comment of the *Times* was: "The bulletin is a most creditable one from every viewpoint and far and away the best issued by the government. While much of the matter and many of the views have appeared before in some form or other, the pamphlet needs no criticism except words of commendation. The general scope of the pamphlet is broad enough to cover all localities and all branches of the industry. Bulletin No. 19 has merits which would justify the publication of a much larger issue than 15,000 copies, and we regret that it has been limited to that number. There is nothing of boom about it but cold statement of facts based on the very best available authorities." Mr. R. E. Gosnell, the late secretary of the Bureau, need not, therefore, feel much concerned over the unfavourable criticism of the *Tribune*, especially under the circumstances that the Bureau has received from mine and smelter managers and others prominently associated with the mining industry, numerous lists of names of residents in Eastern Canada, the United States, Great Britain and other countries, to whom it was requested that copies of the bulletin be sent. Bulletin No. 19 was the last got out under the direction of Mr. Gosnell, and it fully sustained his reputation for good work in disseminating valuable information relative to the province, as shown by the almost universal verdict as to its timeliness, distinct usefulness and general acceptability.

The annual report and financial statement of the Providence Mining Company, of Greenwood, Boundary district, shows that the company has been well and economically managed and that its operations have been profitable during the year ended September 30, 1904. As compared with the preceding year, which was the first year of the company's existence, the profits made were not so great, but the conditions were exceptionally favourable the previous year, when the bulk of the ore was taken from a comparatively shallow depth. During the year just closed the output of ore was 944 tons, having a net value, that is after deduction of freight and treatment charges, of $72.48 per ton, as against 543 tons, the net value of which was a little higher than $100 per ton, for the previous year. Total mining costs—direct and indirect—as was to be expected with greater depth, were somewhat higher, having been $44.87 as compared with $42.55 per ton; it may be, though, that the several amounts written off from development account and for depreciation of plant, buildings, etc., and properly charged to operating expenses, were higher and would thus account for the increased mining costs shown for the year under review. An analysis of the financial statement shows that the direct mining costs were $35.85, indirect $3.38 and amount written off $5.64 per ton, these together making a total of $44.87 per ton of ore shipped. It should be mentioned that mining costs were in some measure increased by the occasional variation in the width of the ore vein and by faulting, the cost of much work occasioned by the latter having been charged to production. Making due allowance for the less favourable conditions, the result of the year's work should be regarded as satisfactory. The net profit was equal to $27.61 per ton of ore shipped, the stockholders received dividends aggregating about ten per cent of the par value of their stock (of which only $139,000 had been issued when the year opened, although an increase to $158,000, partly in payment for the Dimond fractional claim adjoining, was made by its close) and the balance at credit of profit and loss account, after a book asset of $16,437.50 but which had no real value had been written off, was $23,261.48, or only $5,171.36 less than that with which the year opened. A perusal of the manager's report and an examination of the financial statement, which appear elsewhere in this issue, should serve to show that the conclusions we published in October of last year, viz.,

that "the secret of the success of the Providence Company is an open one—good judgment in the selection of the mineral claim to be opened up, an executive of resident business men of known ability and rectitude, economic and capable mine management, and a comparatively small number of shares" still hold good. We heartily congratulate the Boundary district upon the excellent showing the Providence Company continues to make, albeit it is not operating on a large scale, and, too, on the encouragement its success has given others to proceed with the development of neighbouring properties upon which also occur quartz veins carrying gold and silver.

The present year, ten months of which have now passed, has been a curiously uneventful one in the history of the mining industry of the province, or rather the period has been unmarked by any incident of particular note; but at the same time if no remarkable new discoveries have been made, no rush of prospectors to any particular locality, this is more than counterbalanced by the steady industrial advancement that has undoubtedly taken place, by the absence of labour troubles, and the more hopeful feeling consequent upon the general improvement of conditions. Already it is clear that both in tonnage and values the 1904 returns will compare most favourably with previous achievements in this regard; in fact it is reasonably certain that last year's tonnage will be exceeded, whilst in point of values the 1901 record of over twenty million dollars should be at least equalled. The high returns in 1901 were due largely to the considerable production of silver and lead in that year, the value of which represented about one-fourth of the entire coal and mineral output. In the two following years conditions being less favourable, silver-lead mining languished to such a degree that in 1903 the silver and lead yield represented little more than that produced in 1895—when the industry was practically first established. This year, however, thanks to the impetus afforded by the lead bounty, this important industry has, in the Slocan, Ainsworth and East Kootenay, shown very much greater activity and although operations were not resumed in the case of some of the larger mines until late in the spring, yet a sufficiently large production has already been made to appreciably increase this year's returns over those of 1903. In copper mining the excellent showing of the Boundary, which has already made an output nearly equal to the district's tonnage of last year, and the satisfactory manner in which production has been maintained by the Rossland and Coast mines, renders it safe to predict an increase in this direction. Gold from free milling quartz should also show some gain as a result of the greater activity in the Camborne and Ymir camps and the considerable output from the Nickel Plate mine at Camp Hedley, although suspension of operations at Camp McKinney and elsewhere must, of course, be taken into account on the other side. Reports from the placer mining districts have been tolerably assuring. In Cariboo the long dry summer affected the water supply to a considerable extent, thereby restricting operations, but the Atlin gold yield is said to have been the highest for several years. Coal and coke production should rather exceed the 1903 totals, work having been in steady progress during the year at the East Kootenay collieries, whilst the Vancouver Island coal mines have been also in continuous operation, except for a delay of some few weeks in the case of the Western Fuel Company's Nanaimo mine to admit of the installation of new head-works replacing those destroyed by fire. The total of this year's mineral production will, too, be increased by zinc shipments and iron-copper ores used for fluxing purposes.

LE ROI AND ITS CRITICS.

THE adverse criticism by which the policy of the directors of the Le Roi Company has during recent months been assailed by the *Rossland Miner* and one or two other newspapers can be justified only on the grounds that that criticism is disinterested and well-founded. We question whether in either respect this can be clearly shown to be the case. Take for example the assertions that an elaborate report on the Le Roi mine prepared by Mr. Mackenzie had been suppressed; that the public had not been informed concerning what action the directors proposed taking on the establishment of concentration works, recommended by Mr. Mackenzie; that other smelters were in a position and willing to treat Le Roi ores more cheaply than can be done at Northport—the suggested saving in this direction being estimated at from one to two dollars and a half per ton; and the contention that the recent changes in respect to local administration by the creation of a new office of general superintendent were extravagant. In none of these instances is, we have reason to assert, criticism warranted; generally speaking the statements are untrue. Thus, we understand, so far as the directors are aware, there is no elaborate unpublished report on the mine, of which Mr. Mackenzie is the author, in existence; but even if such were the case, the directors would have an undoubted right to withhold at their discretion the publication of any report should they conclude that by so doing they were serving the interest of shareholders. This may be affirmed as a general principle. Again, the bare statement that Le Roi ores may be treated more cheaply at custom smelters than at the company's works at Northport cannot be accepted without reserve in the absence of actual proof. It is frequently urged by those who are anxious to bring about this change that coke costs more at Northport than at British Columbia smelters on account of the duty on coke going into the United

States. Those who put forward this argument usually forget to mention the fact that lime, which is a very large factor in smelting, costs very much more at Trail than at Northport, and probably offsets any advantage in the matter of coke. It is now a matter of history that during the notorious disturbances in connection with the Le Roi mine over two years ago, efforts were made to close up the Northport smelter and get the Le Roi to send its output to Trail, and that those managing the property at that time strongly advised against such a course. As to the recent executive changes at Rossland, by which the managing director, Mr. McMillan, assumed the additional duties of general manager with the assistance of Mr. Astley as general superintendent, we are in a position to state positively that by that arrangement a considerable saving has been effected, instead of the reverse, and in addition it is understood that Mr. Astley is devoting much attention to the concentration question, which is one of great importance to the Le Roi Company. Within two or three weeks of Mr. McMillan's arrival from England last May it was announced that he had placed Mr. Trevorrow, the present mine superintendent, in charge of active operations at the mine, and during the past few months the reduction of costs at the Le Roi has been little short of remarkable, the profit per ton, as shown by the published monthly returns having increased from about $1.20 in May to about $3.50 in August. That the costs have been greatly reduced is evident from the fact that the value of the ore shipped in August is less than $1 per ton higher than that shipped in May. These results may be arrived at from the published statements of the company. With reference to the appointment of Mr. McMillan as general manager, it may also be pointed out in passing, that the Crow's Nest Pass Coal Company took a very similar step recently in appointing a man of business in the person of their managing director, Mr. Lindsey, to the general managership of their collieries, and any one who has followed the history of the two companies will understand in what manner the situation by which a change in management arrangements at the Crow's Nest Collieries became necessary was to some extent analogous with that not long since obtaining at the Le Roi mine.

Although as we have said there has been little warrant for the recent criticisms or attacks on the directors of the Le Roi Company, allowance can well be made for the natural desire of the *Rossland Miner* to witness an improvement in the position of the mine, not only with the credit of the district in particular and British Columbia in general in view, but also that the active operation of so important a property means a great deal to the prosperity and welfare of Rossland itself. Thus it is possible to account for the solicitude of the *Rossland Miner* for Le Roi shareholders, and its advice to the directors to abandon the Northport works in order that a custom smelter in Canada may reap the benefit. All of which of course is unquestionably patriotic. But, as we remarked last month, sentiment must necessarily, in a question of this kind, play an unimportant part. The Le Roi board has a very difficult problem to solve. In the first place it is almost impossible to expect that the mine can ever be made to pay reasonable profits on its excessive capital. The establishment of concentration works cannot overcome this difficulty; even if there were funds available for the purpose, and it is hardly likely that shareholders would approve of a plan by which they would be asked not only to submit to a call in order that a concentrator might be built, but also give their cheerful acquiescence to a proposal contemplating the closing down of the Northport smelter or in other words the wiping out of an asset representing an investment of at least a quarter of a million dollars. But what is true in the case of the Le Roi, is also true in the case of the other big Rossland mines, the War Eagle and Centre Star. These, too, are over-burdened with a capitalization which renders the prospect of regular or adequate dividends thereon remote to a degree. We confess, therefore, that the scheme for the amalgamation of these important Rossland mines, taking in possibly a valuable Boundary district copper property, negotiations for which instead of being as many supposed, abandoned, are now in progress, appeal to us as eminently feasible and businesslike, the more so that the capital of the four undertakings would thereby be reduced to an amount more approximately commensurate with their profit earning capabilities, and, too, as we understand, sufficient capital would be forthcoming for working purposes as well as providing for the liquidation of existing liabilities. Meanwhile the result of such a consolidation would be in every way advantatgeous to British Columbia, particularly in the sense that one really strong, dividend-paying undertaking would assist in restoring confidence among British and Eastern Canadian investors in Rossland mines and lead to the further investment of capital in mining development in that district. But by including in the combination a well-developed Boundary district mine the company would naturally be forced to consider in what manner the lower-grade product from this locality should be most economically treated in conjunction with Rossland ores. It would probably not pay to haul the Snowshoe ores to Northport unless an exceedingly low freight could be secured, and it is therefore not beyond the bounds of possibility under a new arrangement that the Northport plant may be ultimately removed in conformity with the changed conditions. This of course is mere surmise on our part, but it nevertheless presents itself as a reasonable solution of a difficulty which may later on arise.

COSTS OF SMELTING OF ROSSLAND MINING COMPANIES.

FROM a leading article published in last month's issue of the *Canadian Mining Review* dealing with the affairs of the Le Roi Company we quote the following paragraph:

"To show that Rossland ores can be, and have been, treated more advantageously at Canadian than American smelters, it is only necessary to point out that the adjoining mine to the Le Roi (Centre Star) during its last financial year, made a net profit of $228,359.00, as per balance sheet published. This was on the sale of 88,387 tons of ore, averaging $10.58 a ton gross assay value. This ore was treated at the Trail smelter, and received an advantageous freight and treatment rate, which enabled the mine, using the Canadian smelter, to obtain actual cash results that compare more than favourably with its bigger neighbour. The Le Roi shipped to its own smelter at Northport 172,669 tons of first class ore of an average gross value of $13.36 per ton, and 7,196 tons of second class ore averaging $11.18 per ton, upon the whole of which the estimated profit of $3,78,421.00 was made, though later developments tend to cast doubt on the accuracy of the estimate. A comparison of these results shows a surplus in favour of the are treated at the Canadian smelter of $3.00 a ton. Of course this is not all accounted for by cheaper treatment, but, after making every allowance for other items, it is evident that a substantial balance is attributable to that source."

Now, while we are not questioning the *bona fides* of our Ottawa contemporary, it is a coincidence that at this particular time the Le Roi Company, or rather the Directorate, should be simultaneously assailed and bebludgeoned not only by certain newspapers and mining journals but by anonymous writers on this one question of smelting costs, the object, seemingly being to force the company into closing the Northport smelter in order that Le Roi ores shall be treated instead at the Canadian Smelting Works at Trail. By such an arrangement it is obvious that the Canadian smelter would benefit very considerably; and if the interests of this concern are to be alone considered, there is, of course, nothing to be said against the proposal. But, after all, these critics have ostensibly, constituted themselves protectors of the defenceless stockholders in the Le Roi Company, and, consequently, it is from this standpoint that the wisdom and disinterestedness of their advice must be scrutinized. Thus, the recommendation to abandon the Northport smelter is based on the assumption that costs there are so excessive as to reduce Le Roi profits to a minimum, it being variously asserted that by smelting the ore at Trail, it would have been possible to realize an additional profit of from $1 to $3 per ton. It will be seen from the above extract, however, that this "surplus" is arrived at by assuming the average gross assay value of Centre Star ore to have been $10.58 per ton, when as a matter of fact this valuation represents the smelter's gross assay value, and not the full assay value at New York quotations which was $13.05. As the corresponding assay value of the Le Roi is shown at but $13.36 it will be observed that the difference in profit earning results achieved by the two companies respectively is not after all so wide. If the *Mining Review* will take the trouble to refer to the last annual reports of the Centre Star Company, it will, we are sure, find we are correct in this contention. As to smelting costs, direct and indirect, the following table should be conclusive:

1901.

Name of Company.	Full Assay Value New York Quotations.	Indirect Smelting Charges.	Direct Charges Including Freight From Mine	Total Smelting Charge.
War Eagle	20.71	5 07	6 00	11.07
Centre Star	18.12	3 48	6.00	9.48
Le Roi (first class ore only).	13.16	....	....	6.578*

*No allowance for metal losses.
Second class ore shipped to Northport 10,454 tons.

1902.

War Eagle	18 79	4.21	4.91	9.12
Centre Star	16 24	2.93	5.22	8.15
Le Roi (first class ore only).	11 695	....	...	6.777

Second class ore shipped to Northport 3,525 tons.

1903.

War Eagle	13 00	3.13	4 56	7.69
Centre Star	13 05	2.47	4 58	7.05
Le Roi (first-class ore only).	13.36	...	....	7.456

Second class ore shipped to Northport 7,195 tons.

(The foregoing figures are for the several financial years of the respective companies. That for the Le Roi ends on June 30, the Centre Star on September 30 and the War Eagle on December 31.)

From the above it will be noticed that until last year the direct and indirect smelting charges at Trail were actually higher than those at Northport, although in 1901, the then manager of the Le Roi, Mr. MacDonald, made no allowance in computing costs for metal losses in smelting. In 1902 an allowance of 78 cents per ton was made for metal losses, and in 1903, 83 cents per ton.

There can be no doubt meanwhile that in the past Le Roi ore values have been overestimated, and that when these values were not realised from the sale of matte, it was assumed that the metal losses were enormous, whereas as a matter of fact there is little doubt that for many years the values alleged to have been in the ore were not there. Faulty sampling has no doubt been largely responsible for these miscalculations, which should not again occur, a dependable system of sampling having been established this year.

The Le Roi Company's costs for this year not yet having been published, we are not in a position to show what reductions have been made in smelting costs, but according to the statements of the late smelter manager, Mr. E. J. Wilson, these during recent months have been appreciably less.

THE GRANBY COMPANY'S REPORT.

THE published address of the reting president of the Granby Consolidated Mining, Smelting & Power Company, Ltd., to the stockholders, which together with the Treasurer's Report is printed ls where in this issue, is noticeable rather for its repetition of the old story of great expectations than for a record of profitable results achieved during the fiscal year under review. The president drew attention to the amount of profit for the year (which was only $283,513.91, or $11,949.59 less than that of the previous year and less than two and one-eighth per cent on the face value of the issued capital stock amounting to $13,363,030) and intimated that he was "somewhat disappointed with this result." Probably the general body of shareholders will have regarded such an expression of feeling as altogether too mild to meet their case, for it will be remembered that when announcement was made of the company's intention to pay a dividend of one per cent last December, press comments regarding the prospects for more dividends were decidedly optimistic, but, as is now realised, entirely unwarranted. While it was scarcely to be expected that those anticipations would be officially disclaimed as unauthorized, it cannot but be regretted that that virtual misleading of the public was permitted by the directors to go without contradiction, especially as, according to the late president's own showing, the unproductive expenditure to which he attributed the "result that little or no money was made for about four months" commenced in November, that is a month before the dividend was paid.

It is to be noted that the decrease in receipts from rents and sales of real estate ($20,716.37) was higher than the decrease in the amount of net profit earned, yet since the company had two more furnaces available for operation during nearly eight months of the ear under notice, and operating costs were stated to have been reduced 44 cents per ton during the year, a higher aggregate of profit might reasonably have been expected to result. Further, seeing that there was an increase of about 86 per cent in the tonnage of ore treated—552,241 tons as against 297,273 tons in 1902-3—it would seem that there should have been a larger profit made. It is true there was less foreign matte purchased—4,290 tons as against 6,130 tons for the year before—but as it was of a higher average value, the loss of revenue from this source was no doubt less than the difference in tonnage alone might seem to indicate. As no information was given in the printed statement regarding the reasons why "some changes were made in the staff" near the end of the fiscal year, and as several officials either resigned or their services were dispensed with and others were not appointed in their stead, the public is left to draw its own inferences as to whether or not unnecessarily heavy management expenses were to some extent responsible for the less satisfactory financial results of the year's operations than had been looked for.

For the purpose of comparison the following figures are quoted from the Treasurer's Report of the two fiscal years ended June 30, 1904, and June 30, 1903, respectively, those for the latter year appearing in brackets: Production: Fine copper, 16,024,415 lb. (12,551,758 lb.); silver, 275,960 oz. (277,574 oz.); gold, 54,231 oz. (35,121 oz.); total net proceeds after deduction from gross receipts of freight to New York, refining and other charges, $2,948,551.73 ($2,232,741.12). Receipts from rents and real estate sales, $17,795.43 ($38,511.80). Total net receipts, $2,966,347.16 ($2,271,252.92). Expenditure: Working expenses at mines and smelter, $1,814,213.38 ($1,136,830.82); foreign ore purchased, $141,073.18 ($72,954.06); foreign matte purchased, $727,546.69 ($766,004.54); total, $2,682,833.25 ($1,975,789.42). Net profits for year, $283,513 91 ($295,463,50). Amount expended in new construction at mines and smelter during year, $97,247.48 ($207,481). Assets: Cost of land, real estate, machinery, buildings, dwellings, equipment, etc., $13,999,771.33 ($13,845,516.40); cash, copper in transit and on hand, less advances, $187,915.15 ($179,807.95); store supplies, $124,415.94 ($93,913.41); stocks, bonds, and bills receivable, $63,744.54 ($55,496.82); total assets, $14,375,846.96 ($14,174,734.58). Liabilities: Capital stock, $13,363,030 ($13,363,030); bills payable, $60,000 (nil); accounts payable, current for month, $119,397.92 ($128,169.15); surplus, $833,419.04 ($683,535.43); total, $14,375,846.96 ($14,174,734.58). Other figures published are as follows: Mine development, 5,698 lin. ft. (3,127 lin. ft.); mine surface stripping, nil (28,400 cu. yd.); Granby ore shipped to smelter, 514,387 dry tons (295,820 tons); Granby ore smelted 516,059 dry tons (289,583 tons); foreign ore smelted, 36,182 dry tons (7,690 tons); foreign matte treated, 4,290 tons (6,130 tons).

In regard to the increase in the book value of the properties from $13,845,516.40 in 1902-3 to $13,999,771.33, the published information is insufficient to show how the increase of $154,254.93 was arrived at. The report states that "there has been expended in new construction at the mines and smelter during the year $97,247.48. All development work and renewals and repairs have been charged to working expenses." There is nothing to show that an adequate percentage was written off for depreciation, whether of buildings or plant or as allowance against real estate sold or the gross value—approximately $2,000,000—of ore extracted from the mine during the year, nor can it be ascertained from the published accounts what is represented by the difference—$57,007.45—between the value placed on the new construction above mentioned and the total added to property account. If, therefore, the amount shown as "surplus" be regarded as probably subject to such

deductions as a conservative valuation requires, the directors will have only themselves to blame for this conclusion, since they have withheld information such as is frequently given in statements of companies accounts, and which would show in some detail how the position stated had been arrived at.

An axiom impressed by an English professor upon the students he was addressing was that "metallurgy is the science of extracting money from ores." An Australian journal after contrasting the large gold yield of one mine which paid a comparatively small amount in dividends with the much smaller yield and higher total of dividends of another, sagely remarked, "It is not what gold comes out of the mine, but how much gold goes to the shareholders which counts most." Having in view the fact that the Granby Company had up to June 30 last, extracted fully $5,000,000 worth of ore from its mines, besides making profits out of the treatment of custom ores and matte and from sales of real estate, and that it had made a dividend return to its shareholders of only $133,630.30, there would seem to be room for serious reflection along the lines suggested by the foregoing quotations. It is encouraging, though, to have reason to expect that the pruning knife having already been used in one necessary direction the new board of directors will continue a similar policy in others, to the monetary benefit of the stockholders generally.

MISLEADING STATEMENTS IN PROSPECTUSES OF MINING COMPANIES.

THE Black Hills Mining Men's Association at Lead, South Dakota recently discussed the question of misrepresentations and misleading statements contained in the prospectuses of some mining companies, and passed resolutions thereon. Two of these resolutions follow.

"The prospectus referred to contained numerous statements and representations that are manifestly untrue and calculated to mislead persons not familiar with the facts; particularly as to the location of the property in relation to prominent mines. The association deprecates the use of statements of that character in connection with any of the mining properties of the Black Hills, and will use its influence as an association to discountenance and discourage any misrepresentations regarding the mines of the Black Hills.

"In this connection the association takes occasion to express its disapproval of extravagant and misleading statements appearing from time to time in the public press regarding Black Hills mining properties. The mines of the Black Hills are among the best in the world, and are being developed more rapidly and satisfactorily at the present time than ever before. The simple truth regarding these properties is good enough. As an association we will do what we can at all times to discourage misrepresentation and likewise to assist in the proper promotion and development of all legitimate mining prospects and enterprises."

We commend the foregoing to the careful attention of those who have in strong terms denounced the MINING RECORD for having repeatedly followed a similar course in regard to British Columbia mining properties.

RECIPROCITY IN THE COAL TRADE.

ANOTHER evidence of the growing recognition in the United States of the advantages that would result from reciprocal trade relations between Canada and the United States is to be found in the recent advocacy by the *New York Times* of the removal of the duty on bituminous coal. Dealing with this question that journal lately made the following comment:

"New England manufacturers wish to buy cheap coal, in order to compete successfully with their more favoured rivals in the coal districts of the South and West. Nova Scotia produces quantities of bituminous coal, and looks eagerly to shipping it free of duty to New England. The coal operators of Ohio and Western Pennsylvania, on the other hand, desire to sell coal and wish Canada to take her tariff off bituminous coal, which they could then export with advantage to Canada's central manufacturing districts. The duty exacted by either country is 67 cents a gross ton. Obviously there is need of reciprocity in the coal trade between the United States and Canada.

"Nova Scotia cannot reach profitably the great and growing central portion of Canada; neither can Vancouver Island, which produces a high grade bituminous coal, largely used in the Pacific States in preference to their own coal. Convenient access to Canada's vital centres is found only from points in the United States by rail or water along Lake Ontario and Lake Erie from Oswego to Cleveland and Toledo. Moreover, Canada's consumption of coal far exceeds her production, and is rapidly increasing. In 1886 it was but a fraction over three-fourths of a ton per capita, in 1903 it reached 2.3 tons per capita, having fully tripled in seventeen years. The total consumption in 1903 was 12,720,455 tons, of which 6,678,450 tons were imported. She exported 1,979,951 tons, mainly from Vancouver Island to the Pacific States. Canada levies no tax on anthracite coal, for she produces none. The central portion took 1,606,000 gross tons of anthracite from this country by way of Buffalo, besides 1,531 tons imported from the Cuyahoga district, which measures the importance of this trade to Ohio and Western Pennsylvania, and reveals their reason for wanting the duty off bituminous.

"Under a reciprocity agreement American mine owners would gain practically entire control of the increasing central Canadian trade in coal, while New England and the Pacific States which are already dependent upon outside sources for fuel supply, would get their fuel cheaper. Benefit would accrue both to the United States and Canada."

Our New York contemporary might well also have referred to the situation on the Pacific slope to point out the reciprocal advantages of an arrangement by which our Vancouver Island coal might enter the San Francisco and Puget Sound markets duty free.

THE LE ROI MINING CO.'S SMELTER AT NORTHPORT, WASHINGTON, U. S. A.

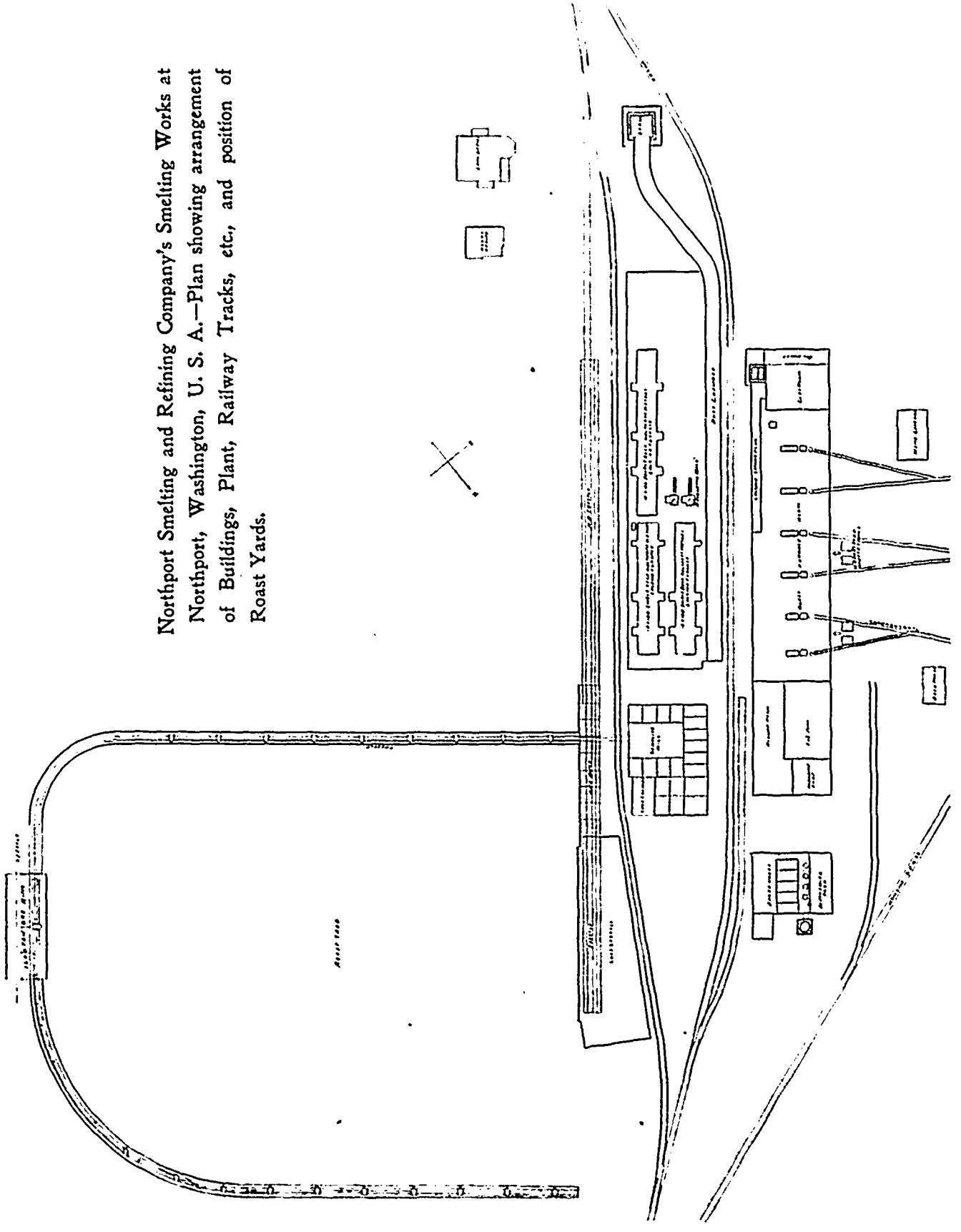
(By E. Jacobs.)

THE erection of the Le Roi Mining Company's smelting works at Northport, Washington, instead of in British Columbia, was the outcome of conditions regarded by the management as unfavourable to the company's interests that prevailed when, in 1897-8, the smelter was built . The Le Roi Mining & Smelting Company, with a nominal capital of $2,500,000—that is the original Le Roi Company, not that now owning the Le Roi mine and the smelter—was organized in the spring of 1901 by Spokane men who a few months earlier obtained from Col. Topping, of Trail, a working bond on the Le Roi mineral claim. The company was registered on June 22, 1891, and thereafter until the erection of the furnace was fired up at the smelter. Later, the management of the Le Roi were not satisfied to continue paying the rate charged by the Trail smelter, so the Northport Smelting & Refining Company was organized and arrangements for the erection of a smelter were made with Mr. Jas. Breen, who selected Northport as the site for the new works. It is asserted that the decision to build at Northport was arrived at, not simply for the sake of having the smelter located in the United States but, for the reason that from a business point of view that place offered the most advantages, prominent among them being that it had railway connection with points from which coke could be obtained. At that time neither the Trail-Robson nor the Crow's Nest Pass railway was built; in fact Le Roi ore was being smelted at Northport months before the railway was completed to the Crow's Nest Pass Coal Company's colliery near Fernie, and before coke was made there.

Northport Smelter—General View of Works.

B. C. Smelting & Refining Company's smelter—since greatly enlarged and improved and now known as the Canadian Smelting Works—at Trail, Le Roi ore was hauled in wagons and sleighs to the Columbia River and shipped thence to smelters in the United States. In 1895 the attention of Mr. F. Aug. Heinze, then at the head of smelting works in Butte, Montana, had been drawn to the Trail Creek camp, which by that time had several shipping mines, and he sent in representatives, the result of whose investigation was that, after much negotiation, Mr. Heinze made a contract with the management of the Le Roi mine under which he was to be supplied with 37,500 tons of Le Roi ore at a freight and treatment rate of $11 per ton, and an additional 37,500 tons on which the charges should be at the lowest rates obtainable in the open market. The erection of the smelter at Trail and the construction of a tramway between Trail and Rossland, were then proceeded with, and in February, 1896, the first

The contract made by the promoters of the Northport Smelting & Refining Company, who were also practically the management of the Le Roi Company, with Mr. Breen appears to have had in view the interests of that gentleman and the smelting company rather than those of the mining company, as the British America Corporation found to its cost when, after it had acquired the Le Roi mine and a three-fourths interest in the smelter, it realized the necessity of purchasing Mr. Breen's one-fourth interest in the latter. That contract was with Mr. Breen (not with the Northport Smelting Co.) who under it had the right to smelt, at a rate of $8 per ton, all ore shipped by the Le Roi, so that the alternative to allowing that gentleman to either continue taking one-fourth of the profit the smelter was making or to smelt the ore elsewhere, was to buy him out. Eventually an option of purchase of Mr. Breen's interest for $250,000 was obtained, but was not taken advantage of, and finally



Northport Smelting and Refining Company's Smelting Works at Northport, Washington, U. S. A.—Plan showing arrangement of Buildings, Plant, Railway Tracks, etc., and position of Roast Yards.

it cost the B. A. C. $300,000 to get rid of Mr. Breen. Mr. H. C. Bellinger, who had resigned the superintendency of the Trail smelter to take the position of metallurgist at Northport, is stated to have received $30,000 as his share of the B. A. C.-Breen transaction.

In the spring of 1898 smelting was commenced at Northport, which is situated on the Columbia River, about 10 miles south of the International Boundary, and near the junction of the Nelson & Fort Sheppard and Red Mountain branches of the Great Northern Railway Company's Spokane Falls & Northern Railway. Spokane lies 129 miles south from Northport. At Marcus, 28 miles southward, the Grand Forks-Republic branch leaves the S. F. & N. line, this branch giving railway connection with the Boundary and Republic mining camps. From Marcus to Grand Forks the railway distance is 41 miles, while Phoenix, to which ore-producing locality the railway is now

Northport Smelter—Roast Yard.—Showing Steam Shovel Loading Burnt Ore.

being extended, is about 20 miles farther. From Northport to Nelson the distance by rail is 71 miles, passing through the Ymir mining camp at 43 miles, en route. From Northport to Rossland, which is the main source of ore supply for this smelter, the distance by the Red Mountain railway is 18 miles. Custom ores come from various points along these several railway lines. Coke is obtained from the Crow's Nest Pass Coal Company's collieries. If hauled from the ovens at Morrissey via Jennings and Spokane, over Great Northern tracks all the way, the distance is 405 miles, but if brought by C.P.R. to Nelson (194 miles) and thence over the Nelson & Fort Sheppard line, the distance is 265 miles. Other sources of coke supply are still farther away.

The bulk of the ore treated at these works is roasted before being charged into the blast furnaces. It is dumped from the railway cars into what are known as the "high line" ore bins, built on an elevated site above the roast yard. These are receiving bins, and they have a total holding capacity of about 1,600 tons. From them the ore is trammed to the roast piles. The roast yard covers an area of 500 feet square. The floor of the yard is about 17 feet below the bottom of the high-line bins. The roast piles are built on from 12 to 18 in. thick of cordwood. For each pile three temporary trestles are constructed and from these the ore is dumped until the heaps are 15 feet high: the intervening spaces are then filled, making each completed heap a compact pile, 350 by 130 feet, and containing approximately 24,000 tons of ore. The time taken in burning is about 6 weeks, during which period the sulphur content of the ore is reduced from about 10 per cent to 3 to 4 per cent. The consumption of cordwood is 0.02 per ton of ore. A steam shovel is used for loading the roasted ore into self-dumping cars, which are hauled by a small steam locomotive up an incline track built over the roasted ore bunkers situated immediately behind the blast furnace building. With steam shovel and locomotive in use about 600 tons of ore can be transferred from the roast piles to the bunkers in 10 hours.

Custom or other ores requiring sampling are delivered into the lower ore bins, near the sampling mill, which have a capacity of about 900 tons. Other bins conveniently arranged on three sides of the sampler, provide a storage capacity of about 1,500 tons of ore discarded in sampling. These bins are filled from chutes, a swinging spout receiving the rejected ore and delivering it into any chute desired. Ample storage for lime-rock flux and coke is also provided. The lime bins will hold about 1,000 tons, and they are arranged around the lime crusher similarly to the bins about the sampling mill.

The dimensions of the sampling mill building are 98 by 70 ft. The machinery and plant includes a No. 6 Comet crusher; two Blake crushers (one 10 by 20 in. and one 7 by 10 in.); Reliance rolls 12 by 20 in.;

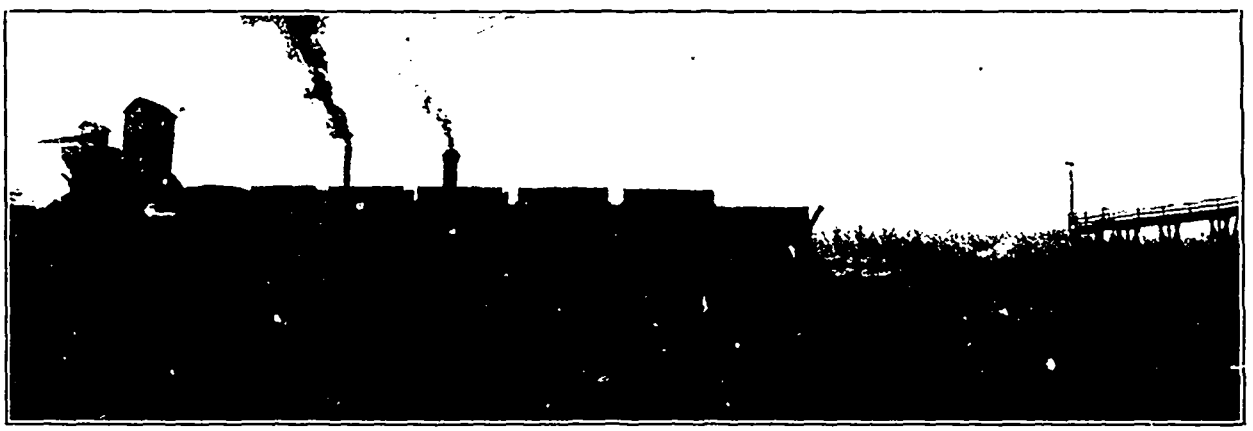
Bridgman automatic sampler, size A; Constant sampler, 20 in., and three belt elevators, No. 1 being a 20-in. belt, having 73 8 by 18 in. buckets, No. 2 a 12-in. belt having 56 6 by 10 in. buckets, and No. 3 a 20-in. belt with 60 8 by 18 in. buckets. The Comet crusher crushes to a size not exceeding 4 in. at the rate of about 100 tons per hour, and the rolls crush still smaller. The Constant sampler retains 20 per cent of the ore, discarding the remainder, which passes into the swinging spout and thence through the chutes into the discard bins. The Bridgman sampler is not now used, having this year been superseded by a Vezin sampler. In the bucking room there is a set of small finishing rolls, a sample grinder, and a Jones' divider for quartering down.

The lime rock for fluxing comes from the company's own quarry, stated to be the best in the district and situated about a mile below Northport and along the Spokane Falls & Northern railway. It is quarried by contract and is a very pure lime—nothing less than 52 to 53 per cent CaO, with only 2 per cent or less insoluble It is brought by rail, delivered directly to a No. 6 Gates crusher, is crushed to a size not exceeding 4 in., elevated and discharged into the lime storage bins. It is intended to substitute to some extent for the barren lime flux silver-bearing lime ore from the Hunter V. mine, near Ymir.

The blast furnace building proper is 240 by 69 ft.: the oil and clay room, at its southern end, is 55 by 69 ft., while the engine and blower room and machine shop, at the northern end, is 100 by 69 ft. There are six water-jacketted blast furnaces. The two installed by the Le Roi Mining & Smelting Company when the smelter was built are 38 by 120 in. at the tuyeres, one put in later is 40 by 160 in. and three are 42 by 160 in. Each furnace has its own separate blower. The larger furnaces will smelt 350 to 400 tons of ore and lime per day. The furnace charge consists of roasted and raw ore, lime flux and coke. It is dumped into the furnaces from side-dumping cars. Steel plate downtakes, 60 in. diameter, connect with the dust chamber. The slag is granulated and washed into the Columbia River.

The matte made on first smelting is low grade, running about 25 per cent copper. This is granulated, roasted, briquetted and re-smelted, the second smelting resulting in the production of a 50 per cent copper matte, which goes to New York for converting and refining. Formerly the low-grade matte was crushed before roasting, for which purpose the matte house was equipped with a Blake crusher 10 by 20 in., a set of rolls 14 by 30 in., a set of trommels and a Constant sampler. This last is now used for sampling the matte that is sent to the refinery.

The brick dust chamber is 10 by 11 ft. inside measurement and 428 ft. long. It is built with a hoppered bottom and side-discharge gates. Its maximum depth is 12 ft., and its minimum 8 ft. 2 in. With the plant running at its full daily capacity of about 1,500 tons some 18 tons of flue dust are caught and removed each day. This flue dust is briquetted, lime being used as a binding material, and is again put through the blast furnace. The brick smoke stack at the end of the dust chamber is 182 ft. high and 10 ft. in square section. There are two other brick stacks, one 125 ft. high to carry off the smoke from the calciners and another, 100 ft. high, that from the boiler flues, beside a steel plate stack from the latter.



Northport Smelter—Lower Ore Bins and Sample Mill.

The power plant consists of 5 Heine boilers, each nominally 250 h.p. (together giving a maximum of about 1,500 h.p.), run at a steam pressure of 125 lb. to the sq. in.; a Bates cross compound condensing engine, high pressure cylinder 16 by 42 in., low pressure cylinder 30 by 42, estimated at 550 h.p., an E. P. Allis Co. compound condensing Corliss engine of about 400 h.p. ,and a Hamilton-Corliss engine, 16 by 36 in., about 175 h.p. The larger engines drive, by means of rope transmission, the two No. 7 and four No. 8 Connersville blowers and a 56¼ k.w. Westinghouse dynamo of 500 lights capacity, while the Hamilton engine runs the sampling mill, matte crusher and matte granulator, also by a rope drive. The boiler room and blacksmith shop, 60 by 55 ft., is about 50 ft. away from the engine room. The machine shop, etc., are well equipped to do all necessary repair and renewal work for the smelter except casting. The

coal for burning under the boilers is obtained from Rosslyn, Washington.

The question of substituting electricity for steam power has been under consideration, but no announcement of intention to make this change has yet been given out.

The calcine furnace building is 350 by 72 ft. In it are two single-decked Holthoff-Wethey furnaces, 10 ft. wide by 100 ft. long, and one double-decked furnace by same makers and having hearths of similar size. These are for roasting matte or concentrates, but when the works were visited the double-decker was not in use. The daily capacity of the single-decked furnaces is between 30 and 40 tons of granulated matte, roasting this down to about 3 per cent sulphur. A 24 in. Pelton waterwheel operates the two single-decked furnaces and an 18 in. the double-decked furnace. Wood is used for fuel in these furnaces. The two briquetting machines in the same building are improved White mineral presses, which make 72 briquettes per minute, each briquette weighing about 3½ lb. All fine material from the calciners and the flue dust are briquetted for charging in the blast furnace.

The water supply is obtained from Deep Creek, which runs east and north of Northport. The water is conveyed in a box flume 4 by 5 ft. and 3 miles long. It is discharged into two tanks, each having a holding capacity of 125,000 gallons, built a short distance behind the smelter at an elevation of 145 ft. above the works. This gives a pressure of about 60 lb. and the system supplies water for driving Pelton wheels for calciners and machine shop, for the furnace water jackets, granulating the slag, and for all other requirements of the works, beside providing for fire protection. The town of Northport is also supplied from this source. A pumping station on the Columbia River provides for an alternative supply of water to the smelter should the other at any time fail through accident to flume line or from other cause.

Mr. A. J. McMillan is general manager of the Le Roi Mining Company owning both mine and smelter. Mr. Albert I. Goodell, in the capacity of superintendent, is in charge of all smelter matters. A staff of three is kept in the general office which, with the manager's residence, is situated in close proximity to the works.

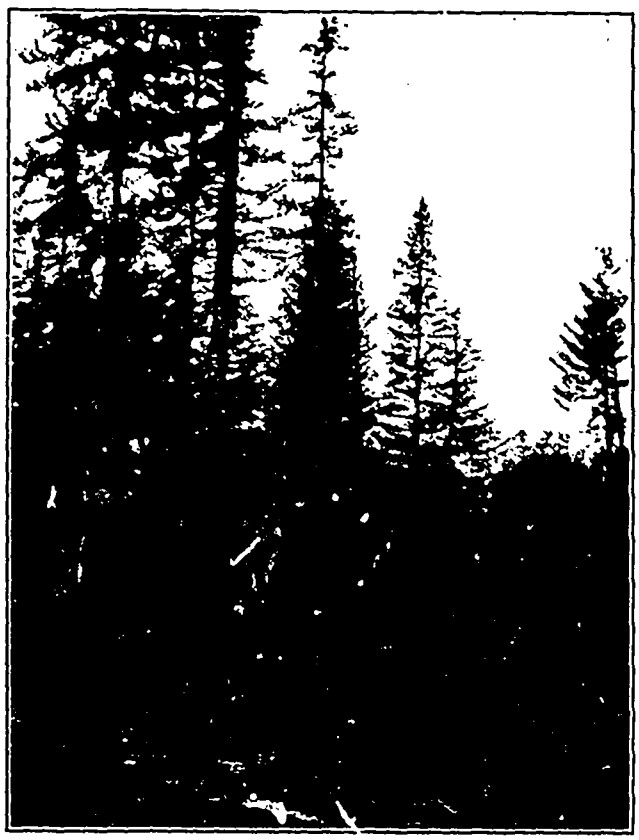
Northport Smelter—Roast Yard.—Calciner Building on left. "High Line" to Receiving Bins on right.

STATE OWNED COAL MINES.

NOW that the Crow's Nest Pass collieries are easily supplying the demand for coal and coke in the Kootenay and Boundary districts nothing more is heard of the suggestions, made when fuel supplies were short, that the Dominion Government should develop the coal seams known to occur on its lands in the Crow's Nest region and either operate collieries or lease the properties on conditions that would ensure a regular supply of fuel at a low price. In Europe, we learn from the London *Mining Journal*, the proposal of the German Government to purchase one of the three largest undertakings comprised in the Rhenish-Westphalian coal syndicate—the Hibernia mines, with an annual output of 5,000,000 tons—has aroused a considerable opposition in industrial, financial and banking circles, because of the attempt made by the State to obtain a footing in, and power of interference with, the syndicate and its controllable production of 73,000,000 tons per annum. It has been officially stated that the object of the Government in endeavouring to acquire the Hibernia mines is to secure through memberbership of the syndicate a moderating influence upon the prices charged for coal. State ownership and operation of coal mines is an accomplished fact in New Zealand, though as yet not on a large scale. It is stated that the coal from the Government mines is, without exception, the finest household coal in Australia. The whole of the output from these mines is, however, required at present by the Government railways, so there is none available for the public from this source. But the mines are being developed rapidly, so there should shortly be a surplus over the requirements of the Government and

the Admiralty, which will together absorb about 150,000 tons a year. It is asserted that the State coal mines give promise of proving a profitable industry for the Government. For its enterprise in embarking upon such an important industry the Government is said to be deserving of great praise, its action in this direction meaning that the poor household consumer will soon be able to obtain coal at a very much lower price than that charged before the State mines came into existence.

The Amber Oil Seepage Sage Creek.



The Big Seepage.

THE FLATHEAD VALLEY—A DESCRIPTION OF THE NEW EAST KOOTENAY OIL REGION.

(By D. B. Bogle.)

THE Flathead Valley as describing the region in which oil has been discovered in Alberta, East Kootenay and Montana, is to some extent a misnomer. In Alberta and in Montana there are abundant indications of oil on the east side of the Rocky Mountains. In fact it is in these two sections of the territory that the most development is at present going on. In St. Mary's, Boulder and Swift Current Creek district of Montana five companies are at present engaged in boring for oil, and according to all reports, success is attending the efforts of one or two of them. While in Alberta two companies are operating with most encouraging results. Nevertheless it is in the Flathead Valley, and in that portion of it contained within the boundaries of British Columbia, that by far the greatest and most important natural indications of oil exist. Up to within a very short time ago development in the district has been impossible through circumstances which it is needless to recapitulate. Now, however, the opening up of the territory is within measureable distance.

The main indications of oil are on Kintla Creek, Kish-e-me-nah Creek and Sage Creek, all of which rise in British Columbia and flow into the Flathead river from the east; although what is known as the Aldredge seepage in Alberta very close to the summit of the range, is as large as any individual seepage in the province.

It would not be fair to say that the oil field is confined to the belt along which the seepages occur, but so far as natural indications go, and hitherto successful developments, there is no doubt that a belt of territory striking northwest and southeast along the main range of the Rocky Mountains is at present the most apparently valuable territory.

The best known seepages of petroleum in this portion of the province are the Beaver Dam seepage on Kish-e-me-nah Creek, and three seepages on Sage Creek which may be called the White Oil seepage, the Amber Oil seepage and the Big Spring.

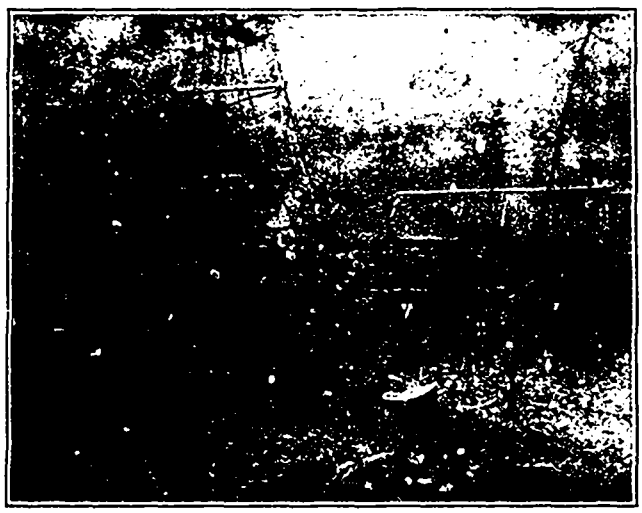
In visiting any of these seepages it is impossible not to accept the evidence of the senses as to the presence of petroleum. The oil can be smelt, seen

The Sage Creek Trail.

and tasted too, if one is not careful, in fact it is one of the most persuasive substances ever discovered. It is much easier to discover it than to rid boots, hands, clothes, tobacco and everything else of the evidence of its existence.

All the seepages seen by the writer on a trip through the country come to the surface through a shale formation. Whether this is universally true or whether, if universally true, it has any bearing upon the best formation in that country in which to look for oil wells, is another question. In the meantime it is simply noted as a fact.

What is known as the Beaver Dam seepage exists on the shore of a little lake formed by the beavers and quite close to the main trail up Kish-e-me-nah Creek. Most of the oil at this point escapes over the surface of the water and no provision has been made for the collection of adequte samples.



Rocky Mountain Co's Well.

On Sage Creek the three main seepages occur roughly at the three angles of an equilateral triangle about half or three-quarters of a mile apart.

At the lowest of these, the White Oil seepage, the oil accompanied with gas is actually issuing from the cracks and crevices of the shale. The oil is of a very pale yellow colour, almost white, extremely valuable and can be burned in an ordinary kerosene lamp. It is practicaly a distilled oil, but by what process of natural chemistry it has been distilled it is for others to say. At all three seepages on Sage Creek the petroleum is as thin as it were as water, it will not smear glass even for a moment. At this particular seepage the escaping gas can be ignited, and will sputter in little jets of flame if a lighted match is held to it. Both this seepage and the Amber Oil seepage

The Beaver Dam Seepage, Kish-e-me nah Trail.

occur in the bed of Sage Creek. The Big Spring, however, lies some distance back towards the base of the mountain and is certainly a very remarkable phenomenon. On a very slight peaty mound the oil rises in the midst of oozing mud into which a pole can be thrust three or four feet with ease. The oil is of a darker colour than the other two seepages and there is more of it. Whether there is any appreciable difference in its composition the writer does not know. Only a few feet away from the oozing oil there is a spring of pure water good for drinking purposes and absolutely uncontaminated with petroleum.

From the surface indications here briefly described it would of course be impossible to predict the development of a great oil field in British Columbia. But the success of recent operations in Alberta and Montana point in the direction of great developments in the near future. And it is not too much to say that the addition of an oil industry to the wealth-producing activities of the province would be of enormous advantage from every point of view and is certainly an end worth striving for.

THE QUILCHENA COAL BASIN, NICOLA DISTRICT.

MR. J. W. COLLIS' interesting and trustworthy articles on the Nicola District which appeared in recent issues of the MINING RECORD (May and July, p.p. 163 and 238) having been, we are pleased to ascertain, highly appreciated by a number of our readers who are concerned in the opening up of what promises to become one of the most valuable coal and mineral areas in British Columbia, we gladly avail ourselves of the opportunity of presenting extracts from a preliminary report prepared by permission of the Minister of the Interior, by Dr. R. W. Ells, of the Geological Survey of Canada, for the Diamond Vale Coal & Iron Mines, Ltd.:—

Typical View of the Nicola District.

Quilchena Creek flows northerly from the vicinity of the Aspen Grove copper camp and empties into Lake Nicola at a point about eight miles east from the outlet near Nicola Village.

The geology of the district was examined some twenty-five years ago by the late Dr. G. M. Dawson, in whose reports several references are found to the area in question. At the date of his examination, however, practically nothing was known as to the extent of the coal seams included in the Quilchena district other than that the presence of coal or lignite was observed, it outcropping near the stream, the rock descriptions in the reports more particularly referring to the great series of volcanic rocks which have a very wide development in this district.

Quite recently the area has come into prominence as a possible source of supply for coal and a number of seams have been located, and to a limited extent opened up. The examinations of the present season by my assistant, Mr. R. A. A. Johnston, and by myself, have served to outline the area of coal rocks very closely, it is believed, taking into consideration the large amount of drift material which covers a large portion of the surface in this part of the province.

The surrounding rocks underlying the sandstone, conglomerate and shale making up the rocks of the coal basin proper consist of volcanics, which comprise diabase, porphyries, and basalts. They are similar to those surrounding the Nicola coal area along the Coldwater, which is situated about 14 miles west of the Quilchena, and small areas of limestone are seen at several points.

Generally speaking the Quilchena coal basin may be said to extend from the northern margin southward for about eight miles along the course of the creek. It has a breadth of two to two and a half miles for the lower portion, and the entire area probably comprises about 14 square miles.

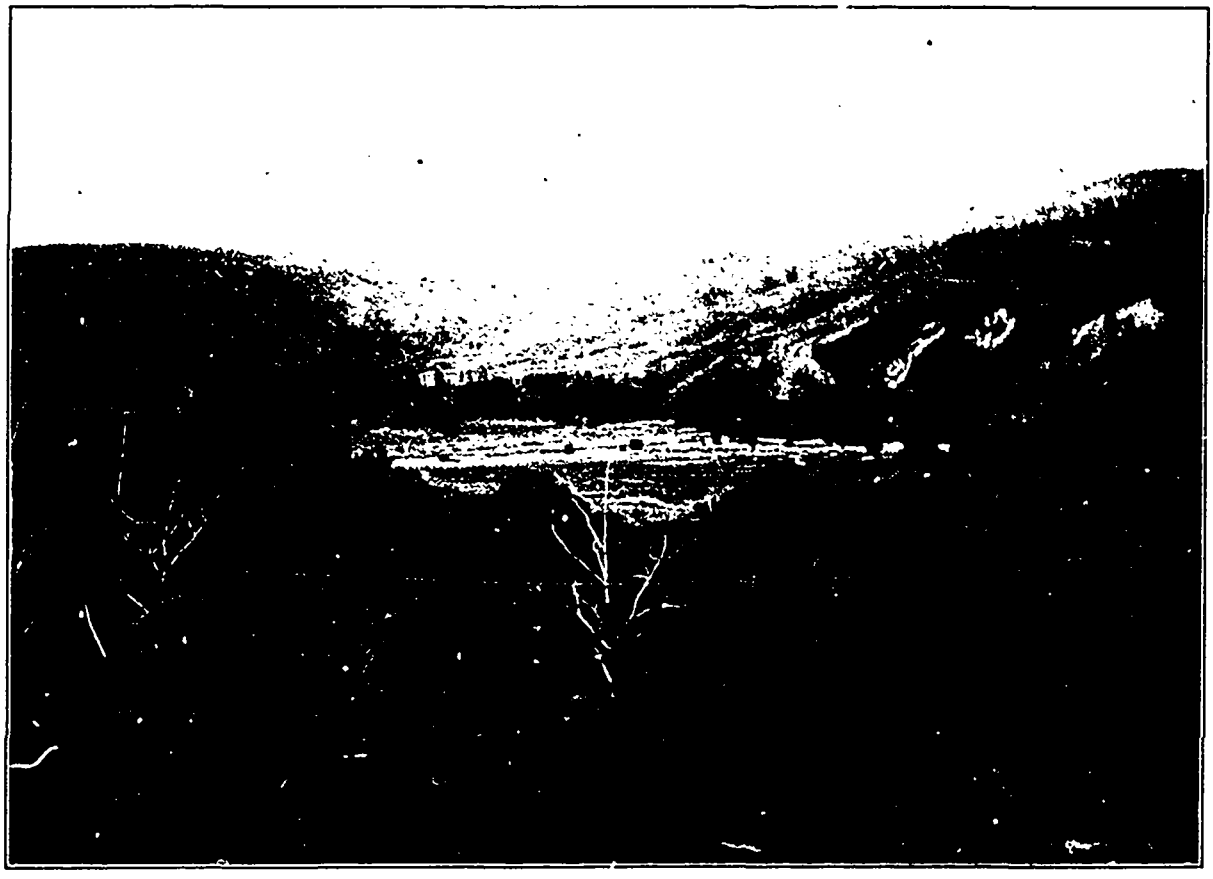
The greater part of this area lies to the east of

Quilchena Creek and the sandstones and associated rocks pertaining to the coal formation terminate against the volcanics along a gully, situated about one mile and a half south-east of the post road at *Quilchena post office. South of this the formation* occurs as a rather prominent ridge facing steeply towards the creek and rising on the east side to an elevation of 750 to 900 feet above the creek bottom. On the west side of the creek the area of coal rocks is small.

Practically, therefore, the economic portion of this basin is confined to that portion lying to the east of the creek. In this area the rocks are exposed in a number of gullies which traverse the western slope of the area. In these a series of sandstones, conglomerates and shales are seen which have a general dip to the north-east and east at angles of twenty to forty degrees. At the northern end in an outcrop seen a short distance east of the road which traverses the Triangle ranch, and about one mile and three-fourths from the post road, the dip of the shales and contained coal is to the south-east, indicating the northern limit of the basin in this direction, while at the south end, though there are indications of faults at several points in the sandstones, the dip is to the east and north-east.

This southern part of the basin is comparatively narrow. The volcanic rocks converge and apparently close round the basin near the line between lots 1282 and 1291. In the last two miles of this part of the basin the outcrops are mostly sandstone and conglomerate, and the contacts of these with the underlying volcanics, as seen on lot 1280 and on the Indian reserve, show the breadth of the coal rocks to be scarcely more than one mile. Northward of this line, however, it widens out quite rapidly.

From an examination of a number of outcrops it would appear that there are at least six seams of coal and probably a seventh. What is probably the lowest of these seams is disclosed in a small excavation on the north flank of the hill in the Triangle ranch, already referred to as about two miles south-east of the post road. The outcrop at this place is at an elevation of about 100 feet above the flat and includes a considerable thickness of dark grey and black carbonaceous shales with a dip of S. 65 E. at an angle of 40 degrees. In this outcrop several seams of coal appear, resting on a brown shale at the base. This was opened up by an excavation extending into bank for about eight feet and the coal became much more pronounced in this distance, showing a thickness of coal with shale partings of about six feet. Above this outcrop at a further elevation of fifty feet is another outcrop of brown and black carbonaceous shale, also holding thin bands of coal, but this was not opened up at the date of my visit, so that its actual coal content

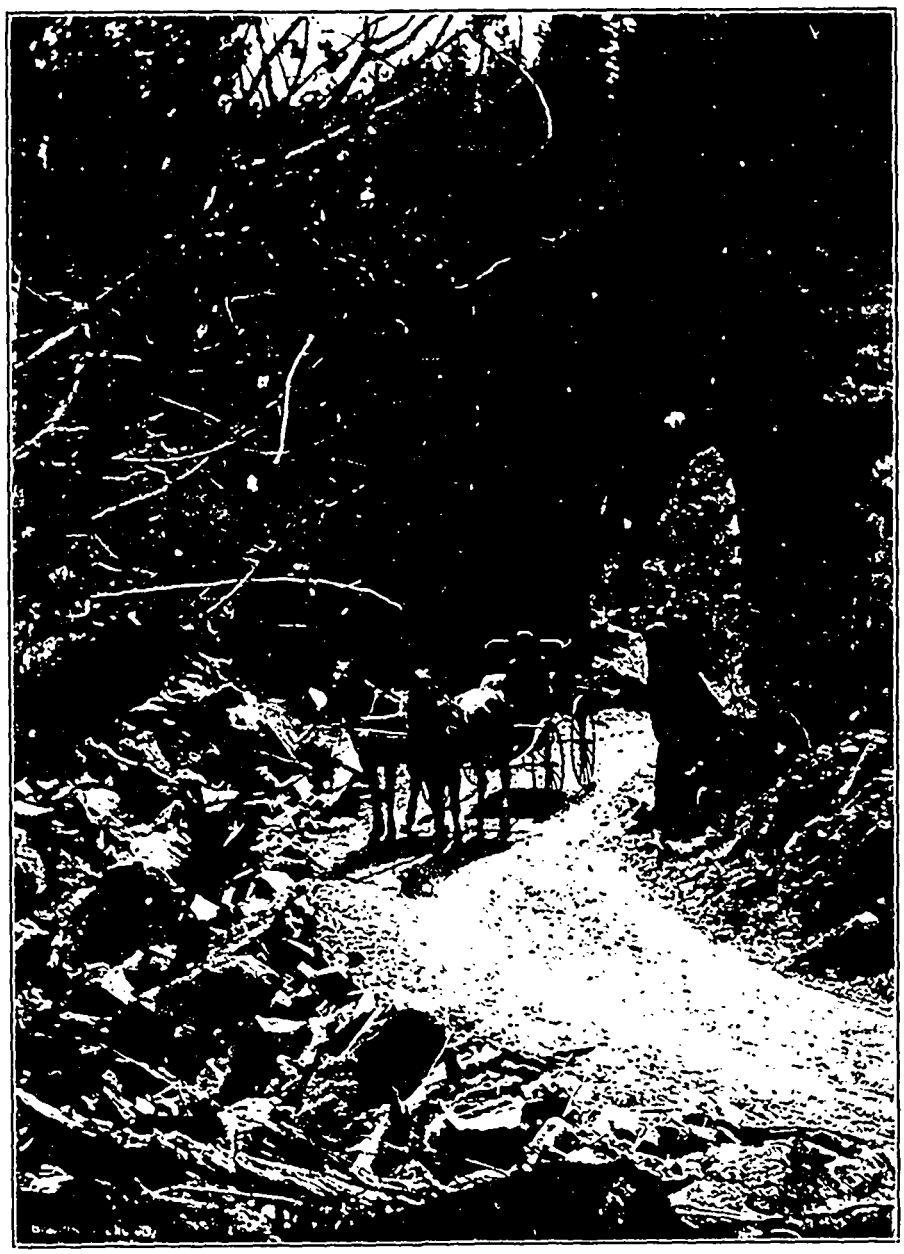


On Quilchenna Creek.

was not ascertained. It may possibly indicate another well defined coal seam and is worth proving. These two outcrops apparently represent the lowest seams in this part of the basin.

Ascending the creek, in a gully to the east, greyish sandstone and shale similar to those seen in the Nicola basin and the coal gully, are exposed, with beds of conglomerate and carbonaceous shale. These dip N. 60 E. 20 degrees. Thin beds of coal also occur but owing to the clay deposits it is impossible to determine the exact succession of beds at this place. Similar rocks are seen in several parallel side gullies, and seams of coal from 4 to 6 feet in thickness are reported as outcropping at elevations of about 350 feet above the creek bottom.

In the gully further to the south on the same lot, the shales and sandstones contain several beds of coal. One of these has been opened to some extent by a tunnel of 45 feet driven in transversely across the seam, which here has an exposed thickness of about six feet. Though the coal at the outcrop is weathered the greater part appears to be a bituminous coal of good quality. The seam has a dip to the north-east at an angle of about thirty degrees and the coal contains



Gorge on Princeton Road, Near Otter Flat, B. C.

two thin partings of one to two inches of sandy shale. The elevation of the mouth of the tunnel is said to be 275 feet above the creek. The roof and floor of this coal is a greyish sandstone.

Above this on the gully outcrops of coal and shale are seen indicating the presence apparently of several seams, the thickness of which could not be definitely ascertained, but one bed near the top of the gully is stated to have a thickness of about six feet. The sandstone and shale are similar to what is seen in the Nicola coal area. These rocks are exposed to the top of the gully at intervals, the top of the bench being about 420 above the creek bottom. It would appear that above the tunnel seam there are thus three other seams of coal, the exact dimensions of which could not be made out owing to clay covering, and the upper one apparently consists of several small beds with shale partings, aggregating from six to seven feet of coal.

The highest exposed seam in this area is that near the top of the bench exposed in a gully near the camp. This has an elevation of 775 feet above the creek bottom and 500 feet above the tunnel seam outcrop. This seam as exposed in the gully has a thickness of about 15 feet but the outcrop is crushed owing to the pressure of overlying beds. It was also struck in a shaft sunk to the north-east to a depth of 52 feet, and was also opened by a short drift which had, however fallen in places so it could not be entered. The coal in so far as it could be examined appeared to be of good quality for surface showings.

The outcrop of the lowest or Triangle ranch seam is probably seen on the slope of the hill about half a mile to the south of the place where opened, and also on the west side of the creek in the broken exposure on the Indian reserve.

The outcrops of the several seams being on the side of a bench which rises to a height of nearly 1,000 feet above the creek bottom renders the mining of these coals comparatively easy. That there is a large body of good coal in this part of the basin is quite evident, and though the contact of the sandstones and shales with the volcanics along the eastern margin is for the most part concealed, the structure of the whole of the coal-bearing rocks is probably basin-shaped, and the seams which outcrop in the face of the hill should underlie the generally level area of the highland east and north-east of the camp. This basin is certainly an important one and well worth careful development by boring.

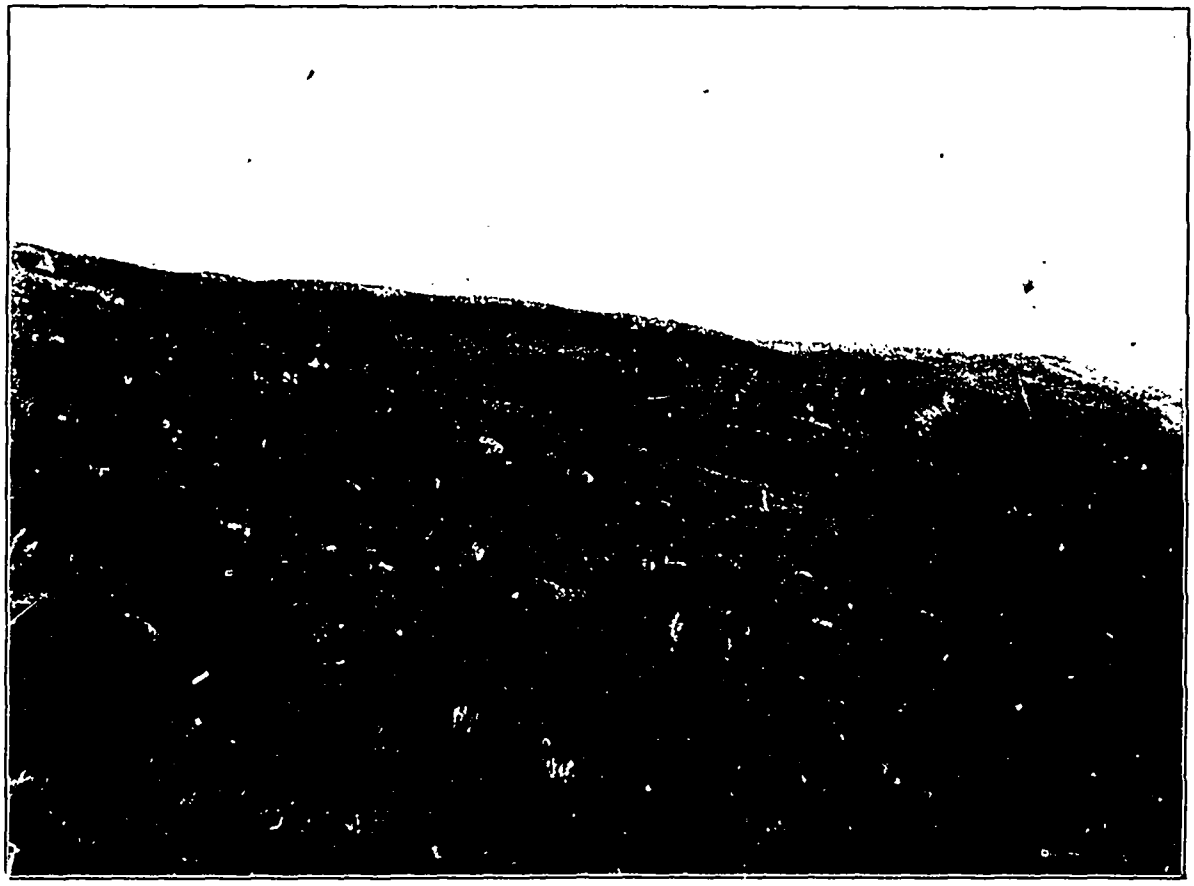
Nicola Valley Looking East from Coldwater River.

COINS AND CURRENCY.

AS the question of establishing a branch of the Royal Mint has been engaging attention in this province, the following article from *Australasian Hardware and Machinery* may be read with interest:—

"The inquiry on coinage conducted by a Select Committee of the Federal Parliament of the Australian Commonwealth brought out much interesting evidence concerning a very interesting subject—the money we carry in our pockets. As the committee's report will meet the glance of few or none of our readers, and as, moreover, the subject is one about which a good deal of haziness exists in the average mind, we think it well to present a few of the facts, concerning the use and value of coins, from the document named and other sources of information. We do not touch the intensely interesting history of the coinage, but merely take it up as we have it now.

"And, first of all, our coinage is British, the gold coins, or most of them, being produced at local branches of the Royal Mint, and the silver and bronze coins brought oversea from the Royal Mint itself. Our coinage rests on a sound basis, the purity and weight of each new-minted coin is guaranteed, and worn coins are withdrawn from circulation at the expense of the Crown. In Australia, it is true, the last holder of an underweight gold coin has to bear the loss, but if he went to the Royal Mint in London he would get full face value for it. The basis, however, is not the same for all three classes of coins. We are a monometallic country: gold is the standard, silver and bronze coins being merely tokens. In a sense, the price of gold is fixed by Act of Parliament, the Royal Mint and its branches being under obligation to mint bar gold for any person free of charge, every ounce of standard gold being worth £3 17s 10½d. (about $18.69) in coin. Gold is legal tender for any amount, while silver is legal tender up to 40s. (about $9.60) and bronze up to 1s. (24 cents) only.



Surface of Diamond Vale Coal Field.

"Standard gold is 22-carat fine, gold coins containing 22 parts of gold of 2 parts of hardening alloy, principally copper. Silver coins contain 37 parts of silver to 3 of copper, and bronze coins 95 parts of copper to 4 of tin and 1 of zinc. Intrinsically, the sovereign when new is worth its face value (£1), while at the present price of silver and copper a new shilling is worth about 7d. (14 cents), and a new penny about ½d. There is reason, consequently, for the confidence with which the British sovereign—like the Sovereign whose effigy it bears—is everywhere regarded. In foreign countries, according to the testimony of travellers, it can be exchanged on better terms than the standard coin of any other country in the world. The token coins are not valuable because of the material

of which they are made, but because they are fractions of the sovereign, or because, in other words, the accredited gold coin can be obtained in exchange for an unvarying number of any one of them. Confidence is maintained in the silver and copper coins by limiting the quantity minted and by calling them in for renewal from time to time, giving the full nominal value.

"A well-known Melbourne banker, who was one of the witnesses called by the committee in question, gave an estimate of the number of gold coins in use. In Great Britain, he believed, the circulation was limited to about £100,000,000 (about $480,000,000), while in the Commonwealth, as far as he could judge, it approached £30,000,000. It might appear strange, he added, that four millions of people should require nearly a third of the medium required by forty millions of people. But it had to be remembered that the enormous transactions of British commerce were all carried on without the intervention of coin, or nearly so, and that in Australia the banks held a very much stronger gold reserve against their liabilities than did the banks in Great Britain. There were 20,000,000 sovereigns lying in the banks of the Commonwealth as a basis for their obligations. The Deputy Master of the Mint in Melbourne showed that in the ten years from 1891 to 1900, inclusive, there were 74,324,302 sovereigns and 1,376,651 half-sovereigns coined in Australia (Sydney, Melbourne, and, latterly, Perth), or £75,012,627 10s. altogether. The half-sovereign, from all accounts, is an unpopular coin. It is fast-wearing, too, its average 'legal life'—that is, the period within which it remains heavy enough to pass as legal tender—being nine years; whereas the sovereign will stand, on the average, 19½ years of wear and tear before reaching the withdrawal limit.

"It is noticeable that a large proportion of the gold raised in Australia now passes through the mints. In 1900, according to Coglan (the Australian statistician), the gold-production of the Commonwealth was valued at £13,578,275, while the combined output of the three mints for the same year represented £9,995,911. As is well known, part of the gold coined locally is sent out of the country, and of these exported sovereigns many are thrown into the melting-pot when they reach their destination, either for conversion into other coins or fabrication into articles of jewellery. Our cousins of the United States and other outside customers with whom we have accounts to balance know what British sovereigns are, and accept them as the least troublesome and most reliable medium of barter."

FINANCIAL POSITION OF THE PAYNE CONSOLIDATED MINING CO.

So long ago as June of last year we expressed the fear that the financial position of the Payne Company was such that, unless the mine became at once self-supporting, the shareholders would be forced to consider some arrangement for re-construction. The possibility of this was, at the time, indignantly denied through the public press by the managing director of the company, but it certainly affords us no gratification now to learn that our prediction was not unfounded, and that the company has been at length compelled to face a financial crisis. Recently the directors, we understand, endeavoured to bridge over pressing difficulties by an issue of debentures, but the appeal to shareholders did not meet with a ready response. The position is only bad, however, in the sense that it is still difficult to raise money in Eastern Canada for British Columbian mining undertakings, Eastern investors having not yet recovered from the effects of previous heavy losses. Otherwise the profit-earning capabilities of the mine are as a result of the systematic development, now greater than for many years past, and given a fair chance the Payne should yet regain its place as one of the most important dividend paying mines in the country.

APPRAISAL OF THE VALUE OF COAL LANDS.*

(By N. H. Chance.)

IN appraising the value of coal property, it is customary to include only those coal beds that are now, or shortly will be, workable; and to ignore the thinner and impure veins. For the reason that past experience has proven that in time the latter will become valuable, attention should be directed to this additional asset of large prospective but of indeterminate present value.

The cost of mining is a most important element. It is no essential to success that the mining cost at any operation should be low as compared with the region or State in which the mine is located; but it is important that the cost should not exceed the average of the district in which it is located. This statement is true because coal from each district usually has a definite market; *i.e.*, the market is limited to certain districts, certain railroads or a certain class of consumers who are best suited by the coal from that particular district; and coals from different geographic districts commonly do not compete in open market upon an equal basis, except where the transportation companies make compensating differences in freight rates, in order to enable the miner to deliver coal from a district where the mining cost is relatively high at the cost of more cheaply mined coal from other districts.

The question of transportation enters vitally into every discussion of values. Coal land so located that it cannot be reached by railroad at a reasonable cost is of small value. Coal underlying farm lands situated at a distance from existing railroads is of little value so long as the ownership remains vested in the farmer, or those unable to secure its development.

The value of a coal property is affected by ownership. If the coal is owned by those able to mine it quickly, the value is greater; if it is to remain untouched for a long period, or to be worked on a small

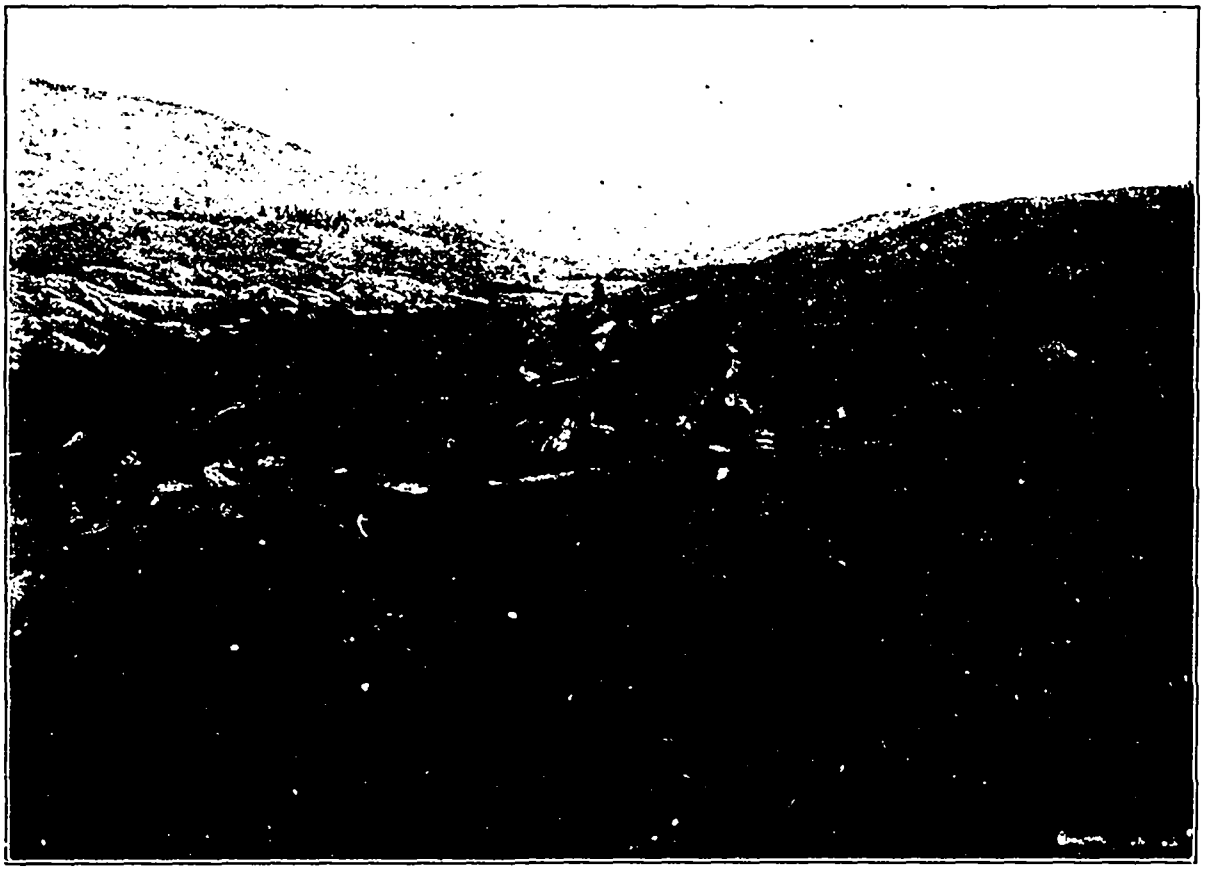
*Extract from a paper contributed to the American Institute of Mining Engineers, Sept. 1904.

scale, the value is less. The concentration of large holdings into one corporation increases the value of the whole as a unit to a sum far greater than the sum of the values of the individual tracts, because a corporation can establish selling agencies at all important distributing and consuming centres; can spend large sums for advertising; can form close affiliations with manufacturing and transportation companies; can retain able counsel and employ the best managers and representatives that can be found; can own its cars and can make whatever outlay may be necessary to build up a large and permanent business.

The larger the territory controlled by one corporation, the greater the value per acre of that territory, because the value of coal property is greater where the coal can be quickly mined.

The factors affecting the cost of mining are: (1) Actual cost of mining operation; (2) possibility of planning large development with improvements of a permanent nature; (3) output possible from each operation; (4) the capital required for the plant and its development. These items depend upon many other conditions besides the thickness and purity of the coal; among which may be noted: the depth at which the coal is found; the dip, pitch or slope of the bed; the quantity of water to be pumped, or the facilities for draining it away from the lands; the relative ease or difficulty of maintaining efficient ventilation; the character of the roof and the floor of the coal bed; the hardness of the coal; the presence of gas in the mine; the character of the coal dust (whether readily explosive or not); and the presence or absence of faults, rolls, and other disturbances affecting the regularity of the coal bed.

It not infrequently happens that, while the quality and thickness of a coal bed may be all that could be desired, other conditions may exist which render the bed almost, if not absolutely, unworkable under existing competitive conditions of other mines. These objectionable conditions are: Extreme depth or dip, troublesome faults or rolls, bad roof, soft floor, a great quantity of gas, a large quantity of water to be pumped and troublesome dust.



Lateral Ravines Entering Quilchenna Creek Exposing Coal Formation.

The value of any coal property is affected by the cost of the plant necessary for its efficient development. If this be small and inexpensive, the property will have greater value than if a large and expensive plant be necessary. The character of the improvements needed depends somewhat upon the uses to which the coal is to be put. If it is to be sold for steaming purposes a very simple tipple is required. If sold in markets demanding screened coal, or if the vein contains objectionable impurities, screening and cleaning devices must be installed. Should the coal be especially adapted to coking, and the mines situated in a district where the economic conditions render

it necessary or desirable to transform the coal into coke, the erection of coke ovens, and possibly also of cleaning or washing appliances may be unavoidable. The name of a coal bed is valuable. Furthermore, the mere location within the boundaries of some districts is an asset materially enhancing the value of coal lands. This is a matter of importance in the appraisal of coal properties in the older districts, because it may enable the operator to find a ready market, and to derive large benefit from the established reputation of coal from other mines and from other coal beds in the same district.

THE EXPLORATION OF THE LOWER DEPTHS OF THE EARTH.

IN the course of his presidential address to the Engineering Section of the British Association in August, the Hon. C. A. Parsons referred to many problems of the highest importance in physics, engineering, chemistry, geology, and the arts of which the investigation might prove of great benefit to the human race, but would involve considerable, sometimes very great, monetary cost. As an illustration of his meaning, the London *Mining Journal* states, he took two investigations. One was the problem of aerial navigation. Another, and perhaps more important, investigation, which had not been attacked to any material extent, was the exploration of the lower depths of the earth. At present the deepest shaft was, he believed, at the Cape; it was a little over one mile in depth; and the deepest borehole was one made in Silesia by the Austrian Government, of about the same depth. What would be found at greater depths was at present a matter for conjecture. To sink a shaft to a great depth presented no unsurmountable difficulties beyond those incidental to an enterprise of considerable magnitude involving the ordinary methods of procedure and the ordinary methods adopted by mining engineers. It was proposed to sink such a shaft. That there would be some departures from ordinary practice, on account of the great depth, it was true, but these were more of the character of detail. On the design of this boring he had consulted Mr. John Bell Simpson, the eminent authority on mining in the North of England. The shaft would be sunk in a locality to avoid as far as possible water-bearing strata and the necessity of pumping. It would be of a size usual in ordinary mines or coal pits. The exact position of such shaft would require some consideration as to whether it should commence in the primary or secondary strata. It would be sunk in stages, each of about half a mile in depth, and at each stage there would be placed the hauling and other machinery, to be worked electrically, for dealing with each stage. The depth of each stage would be restricted to half a mile, in order to avoid disproportionate cost in the hauling machinery and the weight of rope, as well as increased cost in the cooling arrangements arising from excessive hydraulic pressures. At each second or third mile in depth there would be air locks to prevent the air pressure from becoming excessive owing the weight of the superincumbent air, which at ... two to three miles would reach about double the atmospheric pressure at the surface. A greater rise of pressure than this would be objectionable for two reasons —first, from the inconvenience to the workmen; secondly, from the rise of temperature due to the adiabatic compression of the circulating air for ventilating purposes. The air pressure immediately above each air lock would thus reach to about two atmospheres, and beneath to one atmosphere. In order to carry on the transfer of air through the air locks for ventilating purposes pumps coupled to air engines would be provided, the energy to work the pumps being obtained from electro-motors. To maintain the shaft at a reasonable temperature at the greater depth powerful means of carrying the heat to the surface would be provided. The amount of heat conducted inwards through the rockwall and requiring to be absorbed and transferred to the surface depended on the temperature and conductibility of the strata. But there was no doubt that it would be possible to maintain a moderate temperature in the shaft to depths of twelve miles. During the process of sinking at the greater depths the shaft bottom would require the application of a special cooling process in advance of the sinkers, similar to the Belgian freezing system of M. Poesche, used for sinking through water-bearing strata and quicksands, and now in general use. A number of boreholes were driven in a circle outside the perimeter of the shaft to be sunk, and through these very cold brine was circulated, thus freezing the rocks and quicksands and the water therein. When this process was completed the sinking of the shaft was easily accomplished.

As to the cost, rate of boring, and normal temperature of the rock, an approximate estimate had been made, based on the experience gained on the Rand, but including the extra costs for air locks and cooling:

2 miles	... 500,000	... 10	...	122 F.
4 miles	... 1,100,000	... 25	...	152
6 miles	... 1,800,000	... 40	...	182
8 miles	... 2,700,000	... 55	...	212
10 miles	... 3,700,000	... 70	...	242
12 miles	... 5,000,000	... 85	...	272

THE OCCURRENCE OF PLATINUM.

(By E. Jacobs.)

THE increasing use of platinum has created a strong demand for this metal, and it is now nearly as valuable as gold. Its principal source is in alluvial sands, in which it occurs with garnet, magnetite, gold and other heavy minerals. In sands it is sometimes very fine and of a brown or lead colour. Treated with nitric acid it shows a white colour. When found in place it has been principally confined to serpentine, and when it occurs in sands it is frequently in the neighbourhood of serpentine; consequently streams draining masses of serpentine should be prospected for platinum.

Dealing with the subject of "The World's Supply of Platinum," the London *Mining Journal* a few weeks ago observed:

"Of all metals of economic importance there is none which is more directly affected by the condition and fortunes of the Russian Empire than platinum. The output is one which has grown gradually in response to enhanced prices due to an increased demand in the arts. The output for last year amounted to about eight tons, and the price for refined stands now at £4 an ounce troy. Of this total Russia contributes some 95 per cent., so that speaking broadly that country possesses a monopoly of this rare metal. The best known deposits are situated on the slopes of the Urals in the districts known respectively as Nijne-Taguilsk on the western side, and Goroblagodatsk and Bisersk on the eastern side, lying about 130 miles further to the north. The former area has been worked the longer, and as it does not exceed an area of 80 square miles it is of less importance than the other deposits, which are estimated to extend over 2,000 square miles, and are, in their present stage of development, also considerably richer. The deposits worked are placers, and attention is given both to the present stream beds, the gravels of which are dredged, and to alluvial deposits of earlier ages, when the water-flow was higher

Cropping on Upper Seam of Diamond Vale Coal Field, Showing 15 ft. of Coal on Palmer Claim.

than it is at present. Platinum, however, occurs extensively in the gold-bearing gravels of Siberia, and probably some is recovered in connection with the gold working. Tht output for 1902 is given as 5,438 kilos. Next, through hardly comparable as a producer, at the present time, are apparently the Fifield leads, in New South Wales, which last year produced about 530 crude ounces. The production of the United States in 1902 was estimated at 94 ozs., though the decline on 1,408 ozs. of the previous year was probably due to irregular marketing of the commodity. The Republic of Colombia is believed to contain deposits which can be worked at a profit on a commercial scale. These deposits were, in fact, the source from which platinum was first introduced into Europe towards the middle of the eighteenth century. The placers are found along the head waters of Atrato and San Juan Rivers on the Western Cordillera slope. The region is not particularly accessible, and in the state of the country in recent times mining has been largely at a standstill. As regards the occurrence of platinum generally, the metal has been found in igneous rocks, in iron fillings, and in secondary alluvial deposits. Where the metal has been found in the original formation, however, it has been too sparsely disseminated to make profitable working possible, and only the natural concentrates, the result of extensive disintegration coupled with sluggish currents, are at present of value. Attempts have been made to utilise the magnetic properties of native platinum for concentration purposes, though with what success does not appear. It is also thought that where platinum occurs in ores which are worked for other metals, as in the Sudbury copper-nickel deposits, the recovery of platinum as a by-product may be remunerative* The metal, however, is one which owing to its high price, is exceedingly limited in its industrial applications, and the present supplies are more or less adequate to the demand. As regards the internal condition in Russia at the present time, it should be borne in mind that the Ural area, from which at any rate the great bulk of the metal comes, is of very limited extent, and that local disturbances or military exigencies might cause a reduction or even cessation of the output."

Mr. R. W. Brock, of the Geological Survey Department of Canada, as a result of his observations when engaged in geological work in this Province, recommended prospectors and other mining men to be on the look-out for platinum in the West Kootenay and Boundary districts. He reminded them that it had long been known to occur in the placers of the Tulameen and other branches of the Similkameen River, some distance to the west of the Boundary, and it seemed probable that its occurrence would not be confined to one locality. The special reasons he gave for suspecting the occurrence of platinum in West Kootenay and the Boundary district were· First, the general resemblance in many essential particulars between the rocks and ores of these districts and those of the Similkameen; second, the presence of masses of basic eruptive rocks, now frequently altered to serpentines—rocks in which platinum had been most frequently found "in place," and which seemed to be the chief source of the platinum of the Similkameen; and third, the fact that the chalcopyrite-pyrrhotite ore-bodies of these districts, sometimes slightly nickeliferous, bore a marked resemblance to the platinum-bearing copper-nickel deposits of Sudbury, Ontario. The subsequent discovery of platinum in the copper ore of the Rambler mine, near Encampment, Albany County, Wyoming, U. S. A., in the same form (sperrylite) as in the Sudbury copper ores, further emphasized this possibility.

Mr. Brock also made known some interesting particulars in connection with his examination of the prospect workings on the Contract group, Burnt Basin, in the mountains between the Boundary district and the Columbia River. Here he found that the veins lay in greenstone, between two large porphyry dykes. The quartz, which was somewhat milky, had small amounts of metallic sulphides scattered through it. Pyrite, galena and blende were the commonest, but chalcopyrite and some molybdenite also occurred. Tests of samples of the ordinary sulphide-bearing quartz from different points in the veins proved the presence of platinum, which was unevenly distributed through the veins, in which respect it was similar to the gold and sulphide. In what form the platinum occurred was not determined, but it was considered probable that it was held by the sulphides, as was the gold. If it were associated with the copper in the vein, that fact would account for its irregular distribution, because the chalcopyrite content varied greatly from point to point.

Regarding the occurrence of platinum in the region of the Upper Similkameen and Tulameen—it is worthy of note that the late Dr. Dawson stated in his "Mineral Wealth of British Columbia," that "the platiniferous region of the Upper Similkameen and Tulameen is the most important as yet discovered in North America." True, that was many years ago, yet since it is on record that the estimated yield of platinum in that district was from 1,400 to 2,000 ounces in 1887, and about 1,500 ounces in 1888—those having been the years in which placer mining was most active in the district—it would seem probable now that the mineral resources of this region are again receiving attention, that the production of platinum in the locality may be revived.

Professor James F. Kemp, of Columbia University, New York, who spent nearly three months of the summer of 1900 investigating the geology of platinum along the Tulameen, gave the results of his investigations in U. S. Geological Survey Bulletin No. 193. He found that a great dyke of peridotite (made up of olivine) crossed the Tulameen at its junction with Eagle Creek and extended in one direction as a huge mountain ridge, while in another it reached into the headwaters of Slate Creek, there constituting the

*The recovery of platinum at Sudbury has been proved remunerative Associated with it in that locality are considerable quantities of palladium and osmiridium.

highest summit of the divide which, for convenience of reference in his report, he named Mount Olivine. The richest platinum ground began at Eagle Creek, which entered the Tulameen from the north, about 12 miles above Granite Creek, and it extended downstream. Platinum also bore a high proportion to gold in Slate Creek, a tributary which entered the Tulameen from the south, about 8 miles above Granite Creek. The platinum in instances attained a ratio of 1 to 3 as compared with the gold. Mr. W. J. Waterman, M.E., in an article on "Economic Geology in the Similkameen District," published in the MINING RECORD in November, 1900, stated that "at the head of Slate Creek the country rock is heavily impregnated with chrome iron and magnetite and there is little question but that this is the mother country of the platinum which is found in all the creeks draining this watershed. Numerous assays have, however failed to prove the existence of this metal in *situ* on the veins, and it is probably scattered through the country rock in fine grains or in conjunction with the chromic iron."

More extended references might be made to the occurrence of platinum in British Columbia—for instance, in the Report of the Minister of Mines for 1902 information is given relative to the occurrence of this mineral throughout the drainage area of the Quesnel River, and in the Fraser River from above Quesnel Mouth down to Lytton—but enough has been written to direct attention anew to the prospects for platinum in the Province, so, in conclusion, the only further information that will be quoted will be the closing comments of Mr. R. W. Brock in his contribution to the *Engineering and Mining Journal*, as follows:

"Platinum, then, has been found to occur under the following conditions in British Columbia:—

"(1.) In the placers of the Similkameen.
"(2.) In peridotite and serpentines and in an associated granite in the same district.
"(3.) In gold-bearing quartz veins.

"Since there exist family resemblances between the rocks and ores of several districts of Southern British Columbia, and a platinum content may be one of these family traits, it should be looked for in other localities than those in which it has already been found. It is not impossible that some of the copper ores contain this metal.

"Basic igneous rocks, such as those in which platinum so often finds a home, are not confined to Southern British Columbia, but are found as far north as the Atlin district, so that platinum possibilities are not restricted to the southern part of the Province."

VALUES CONTAINED IN SLOCAN ORES.

THE following table serves to show the yearly average gold, silver and lead contents of the ores produced in the Slocan over a period of nine years, 1895-1903, both inclusive. The Ainsworth production is omitted, the requisite detail for the earlier years not being available. The Slocan production ($605,534) prior to 1895 has also had to be left out, for a similar reason. However, the table covers the great bulk of the ore produced; it includes 198,207 tons of a total value of $17,374,108. The calculations are based on the tonnage and metallic contents of the ores as published in the Annual Reports of the Minister of Mines for British Columbia. It should be noted that zinc is now, and will hereafter be, adding appreciably to the recovered values of the ore:—

Year.	Tons.	Gold	Silver	Lead	VALUE.	
		Oz. per ton	Oz. per ton	Per Ct.	Average per ton	Total for Year.
1895	9,619	0.00062	117 84	60 53	$109 61	$1,037,677
1896	18,215	0.00334	117.54	52.73	110 35	2,010,048
1897	33,567	0.00375	108.48	45 74	97 73	3,280,686
1898	30,691	0.00195	99 98	44.09	85 36	2,619 852
1899	21,507	0.00065	87.92	38.73	80 92	1,740,372
1900	25,520	0.00019	83.12	38.33	80 87	2,063,908
1901	25,493	0.00097	89.29	29.47	73 19	1,865,752
1902	21,153	0.01667	105.13	32.27	76 05	1,608,827
1903	12,412	0.02070	118.18	39.80	90 80	1,126,986
	198,207					$17374.108

The total quantity of valuable metals recovered from the output of 198,207 tons was: Gold, 1.284 oz.; silver, 19,967,264 oz., and lead, 161.517,255 lb., of the total value shown above. The general average metal contents and value per ton were; Gold, 0.00648 oz.; silver, 100.74 oz.; lead, 40.74 per cent; value, $87.66.

UNIFORMITY IN MINE-OFFICE SYSTEMS.

THE advantage that would result from the adoption by mining companies of an uniform system of keeping accounts and of preparing for publication information relative to mining costs and production, appears to be generally recognised. Among other countries, Western Australia has given attention to this important matter, and at a mining conference in that State of the Commonwealth it was resolved: "That it is desirable that an uniform system of keeping accounts and publishing costs and outputs should be adopted by the mines." The Western Australia Chamber of Mines in its report thus refers to this subject: "In order to give effect to this resolution the council appointed a special committee to deal with the subject, but no definite result has been arrived at. Uniformity in the matter of publishing gold yields has virtually been attained by the orders issued from the Mines Department that all returns shall be declared in fine ounces, and the Chamber has already adopted this system in its monthly analysis of gold production. Diversity of opinion exists, however, with regard to the use of the standard or long ton (2,240 lbs.) or the short ton (2,000 lbs.), each system having its supporters. The strongest argument in favour of the adoption of the short ton is the facility it affords for comparison with

South African and American mining costs, the 2,000 lbs. ton being used in both those countries. In both America and the United Kingdom there are strong advocates of the metric system of weights and measures, indeed a Bill providing for the compulsory adoption of the metric system throughout the United Kindgom within two years of the passing of the Act, has already passed its second reading in the House of Lords, and in view of the fact that four-fifths of the European countries now use the metric system, its value for comparative purposes—apart from other considerations—is obvious."

A SUMMARY OF RECENT MINING DEVELOPMENTS.

THE month has been one of steady progress and development and throughout the mining districts in general a better feeling prevails. On the Coast attention is again being directed to mining development in the Alberni district, which, however, has heretofore yielded but poor results, partly ascribable to ill-directed effort. Operations are also about to be resumed—as a result of recent examination—on several properties on Quatsino Sound to the North of the Island. The ore here carries values in gold and copper, but the grade of material shipped as yet has not been high. A Sidney Inlet mine, the Indian Chief, commenced the shipment of ore in October, having sent to the Ladysmith smelter a first consignment of a hundred tons of high-grade bornite. On the East Coast, a recently opened prospect near Cowichan has been acquired by a syndicate of Victoria residents on working-bond terms and a trial shipment of ore said to average 8 per cent copper was sent to the smelter. The Tyee mine continues to ship at the rate of about four thousand tons a month to Ladysmith, from which the average monthly realization is in the neighbourhood of forty thousand dollars. At Howe Sound, great progress has been made in the extensive installation of plant and equipment, and by the end of the year the mine should be in readiness for the commencement of productive operations on a very large scale At Steveston near Vancouver boring for oil has been continued, a depth of over 1,100 feet having been reached.

The hydraulicing season in the Atlin district closed on the 15th of October. From all reports there seems to be reasonable assurance that the 1904 gold production will be found to considerably exceed that of last year, and may possibly reach a valuation of half a million dollars, or from fifty to a hundred thousand dollars' increase. On many of the creeks winter work is to be carried on, while before next season opens it is expected that a consolidation of some of the important hydraulic interests will have been arranged.

A small increase in gold yield is also expected from the Cariboo district. In the vicinity of Barkerville steady production has been made from a number of hydraulic properties, the Waverley on Grouse Creek having, it is reported, done exceptionally well this season, the shareholders receiving a dividend of $4 per share. Mosquito Creek, which is probably the steadiest producing mine in Cariboo, has to its credit this season between $9,000 and $10,000, or $2,000 to $3,000 more than last year. On Stout's Gulch over 200 ounces have been extracted, and the Point claim, on Lightning Creek, still continues to yield from 50 to 75 ounces a week. Although the yield of the Consol. Hydraulic at Bullion is twice as great as that of last year, a gold recovery of about $90,000 having been made, this is far from satisfactory in view of operating costs, the disappointing results being attributable to an unusually dry summer. The feature of the month has been the consummation of arrangements in England for the reconstruction of the Cariboo Consolidated, Ltd., engaged in deep level mining in Lightning Creek. By the new arrangement sufficient capital, it is anticipated, will be obtainable to meet all requirements until the properties shall become profit-earning.

Attention in Nicola district is being given chiefly to coal exploitation, and boring is in active progress between the Quilchena and Otter Valleys, under the direction of respectively the Diamond Vale Coal Co., the Nicola Lake Coal and Coke Co., and the C. P. R. Dr. R. W. Ells, of the Geological Survey of Canada, who has just completed a season's work in this locality speaks, in a preliminary report, in most favourable terms of the coal prospects in the Quilchena basin, an area comprising about 14 square miles, in which occur six and probably seven seams, from four to sixteen feet thick.

No new developments of importance have taken place in the Kamloops or Revelstoke districts during the month.

While residents in the Lardeau are somewhat disappointed that capital has not been invested as readily as was anticipated in mining development in the district this year, yet, on the whole, very satisfactory progress has been made, particularly in the opening up of the free milling quartz properties at Camborne, from which a steady production has been maintained. It was announced in October that the capacity of the Oyster-Criterion ten-stamp mill was to be doubled shortly and other arrangements made for an increased output: the Eva tramway, destroyed during the summer by fire is being replaced, while during the month shipments of rich ore were commenced from the Mammoth on Goat Mountain At the Silver Dollar mine, in this camp, a promising new strike is reported to have been made a week or so ago At Ferguson, the Silver Cup combination mill is now said to be running satisfactorily and a considerable tonnage of concentrates aggregating 300 tons monthly is being shipped therefrom to the Trail smelter. Three new mines were added to the productive list in October and arrangements were satisfactorily concluded providing for the re-organization of the company owning the Lucky Boy group. Systematic development work, to be continued throughout the winter, has been in progress at the Triune.

In view of recent industrial improvements in the Slocan, the announcement just made that the Payne Con. Mining Company has been obliged to suspend operations on account of financial embarrassments comes as a serious blow. For some years past, however, the company has been seriously handicapped by debt and for working capital wherewith to continue the development of the mine, and consequently the present crisis was not unlooked for. Some months ago the directors attempted to raise the necessary funds by an issue of debentures, but Eastern Canadian investors have not yet recovered from the effect of heavy losses incurred from the slump in B. C. mining stocks following the unjustifiable "boom" of some years ago, and Payne shareholders failed to respond to this appeal. The mine now, however, thanks to the excellent work of the late manager, Mr. A. C. Garde, is a much more valuable property than when that gentleman assumed charge, and could, we are assured, be made to pay well, once the load of debt is removed. It is probable that shareholders will take this view of the case, and agree to some reconstruction scheme by which the money will be found. Concerning the other large mines about Sandon, work has been actively carried on during the month, although a scarcity of water interfered seriously with the operation of the concentrators. In addition several previously inoperative properties including the American Boy, were re-opened in October. Increased attention is being paid to the saving of zinc values and the Jackson and other mills are being remodelled for the treatment of these ores, while the construction is well under way of an addition to the Kootenay Ore Company's works at Kaslo, and of a new plant at Rosebery to afford additional zinc treatment facilities. The growing importance of the industry is also shown by the fact that one mine alone completed in October a shipment of a thousand tons of zinc ore. The Slocan City Division is also making an improved showing, the production to the end of October being six hundred tons greater than last year's aggregate yield. The number of shipping mines was increased last month by the addition of two properties, from which some very high grade ore was sent out, while preparations were made for the resumption of operations in some other instances. In the Nelson Division, the Ymir district is at

present the chief centre of activity. Here five stamp mills are crushing ore, and in October a number of new and promising discoveries of ore were reported to have been made, notably in the case of the Ymir and Foghorn mines. The Hunter V. mine which has been shipping heavily during the year is now arranging for the installation of additional machinery, and surveys were made during the month with a view to obtaining power from the Porcupine Creek. Mention may also be made of a meeting recently held in Nelson preliminary to a proposed re-organization of the Mollie Gibson Company, owning the promising mine of that name on Kokanee Creek. Work at the property is meanwhile in progress, and it is proposed ere long to erect a concentrator on the ground.

The chief topic of interest at Rossland is the proposed amalgamation of the Le Roi, and Centre Star-War Eagle mines in the camp taking in also a large copper property, the Snowshoe, in the Boundary. Recently negotiations, which seemingly had dropped, were re-opened. Meanwhile Prof. Brock, of the Geological Survey of Canada, has been retained to examine the properties and give an independent report on the proposal to consolidate, while examinations will be also made by Mr. E. B. Kirby, representing the War Eagle-Centre Star interests and by Mr. J. W. Astley representing Le Roi-Snowshoe. In the case of each of these undertakings capitalization is too high to admit of adequately profitable returns in dividends thereon, and the scheme not only contemplates a general and substantial reduction in this respect but also provision will be made for the liquidation of existing liabilities, as well as additional capital for working purposes. During the month steps were taken by the Rossland Power and White Bear companies to improve the water system, and thus avoid a recurrence of the difficulties experienced this season by the inadequacy of the water supply. Among other incidents of the month worthy of mention may be cited the bonding of the Caribou claim, adjoining the Jumbo mine; the fifty-ton addition to the Velvet-Portland mill; the completion of the Elmore plant at the White Bear mine; and the prosecution of work resulting in a promising discovery of auriferous quartz on the Evening-Eureka group, recently bonded by the Le Roi No. 2 Company.

The high-grade gold-silver mines in the vicinity of Greenwood in the Boundary district continue to attract much attention and during the month work was started on six more properties of this character. The excellent showing of the Providence is largely responsible for this activity. Thus at the annual meeting at Greenwood last week it was reported that 994 tons of ore had been shipped yielding a net value of $68,424, or of an average value per ton of $72.48, enabling the company to pay substantial dividends on its issued capital. The meeting was also held this month of the Granby Company, the accounts showing the net value of the metal produced to have been $2,948,551, and the net profits for the year $283,513. Shipments from the district during the month have averaged about 15,000 tons weekly, but these returns should ere long be considerably increased in consequence of the operation of the Montreal & Boston Company's mines and smelter.

In East Kootenay the Crow's Nest Pass Coal Company's collieries have been in steady operation, the output having been in the neighbourhood of 65,000 tons. At Michel the building of new coke ovens which now number 461, have been completed A large production of silver lead ore from the St. Eugene and North Star mines is being made, it being decided last month to continue operations at the latter mine throughout the winter. In the Windermere district three mines have sent out ore.

COMPANY MEETINGS AND REPORTS.

Sullivan Group Mining Co.

At the annual meeting of the Sullivan Group Mining Co. held last month at Spokane, Wash., last year's trustees were re-elected. Afterwards the officers of the company were re-appointed. The re-elected officers are Messrs. Charles Sweeny, president, George Turner, vice-president; J. C. Williams, secretary, Bruce Clendenning, treasurer. These four with the five following, make the board of nine trustees. Messrs W. Clayton Miller, William J. Hall, and L. F. Williams of Spokane, J. W. Van Dyke of Philadelphia and B. W. Layton of Washington, D. C.

It is stated that the policy of the Company will continue the same as during recent months. Work on the smelter at Marysville, will continue to be pushed, and, as soon as the smelter is finished, the company will put a large force at work taking out ore from the mine.

Providence Mining Co., Ltd.

At the annual meeting held at Greenwood in October, the Managing Director presented the following report:

During the year just ended we have shipped 944 tons of ore at a net value, after deducting freight and treatment, of $68,424.84. The average value per ton, after the same deduction, is $72.48. Last year the values were $100.00 net, showing a difference of $27.52, per ton. This loss has been principally in gold, if not entirely, the silver values being about the same as last year.

The total cost of mining, after both direct and indirect charges including depreciation written off machinery, taxes, liability, insurance, etc., was $44.87 per ton, or a net profit on 944 tons at $27.61 per ton, amounting to $26,066.14. of which $14,800 00 has been distributed amongst the various stock holders in dividends, after charging off, as you will see by the balance sheet, depreciation on surface improvements mining machinery, mine equipment and mine development. The amount of work done during the year was as follows: 650 feet of drifting, 91 feet of sinking, and 119 feet of raising, There was much more work done, in what should properly be called cross-cutting through faults, and rising, through faults, which I have not entered up in this, but have charged direct to stoping. The faults are still here, we have not yet got through them, nor from general appearances will we do so for some time to come. They come in from the south, striking to the north, and dipping to the west, throwing the ore shoot in a northerly direction at each fault. The north end of the mine still continues to be the profitable end, the best ore being there and less disturbances. The faults seem to become smaller as they work northerly, or at least as far as present experience shows.

We have an ore shoot on number four level, or the lowest level in the mine, 343 feet long. It cannot be called an entire shoot, as there are spots in it which become barren, and other spots where it pinches down to an inch or so, but at no point does it entirely pinch out, therefore I call it a continuous ore shoot, and still the ore continues in the north end. In the south it is cut by a dark gray rock dyke, which I would call gabbro. We have not penetrated this dyke to any extent, merely gone far enough to determine its character, strike and dip. From indications on the surface, I should judge that the dyke is of considerable extent. Still I believe in drifting through it ore can be found on the south end. The dyke is very hard, and it would be very expensive to cut through it by hand work, therefore for the present we have left it alone.

Ore in Sight.—It is very hard under present conditions at the mine, to estimate the ore in sight. In the first place the size of the lead varies very much, varying all the way from a foot to one and a half inches, with an average not exceeding six inches. This together with the hard rock, is one of the great reasons the cost of mining is so high. There is a fault of about 14 feet running the entire length of the stope. We have cut through this fault in two places and found the ore. In two other places instead of finding the ore, we found what I believe is a spur of the dyke of porphyry, which lies between the number three and number four levels, which cuts the vein, faulting the vein for 80 feet. The amount of ore that would be in sight depends entirely on the extent of the spurs through this dyke. If the dyke were regular, it would be possible to estimate the ore both above and below the dyke, between the two levels. But being what we found it, not regular, it would be merely a matter of guess for me to state the ore in sight, as there is but one opening

on the ore between the number three and number four levels. Still there should be several hundred tons of ore between the two levels, of a grade similar to that which we have shipped during the year.

The statement of profit and loss for the year ending September, 30th, 1904, follows:

Ore shipped, net smaller returns		68 424 84
MINE COSTS, DIRECT		
Mining	24 736 12	
Fuel	1 011 70	
Maintenance Machinery	214 93	
Blacksmith Shop	173 45	
Salaries	1 800 00	
Assaying and Sampling	285 80	
Hauling	1 164 96	
Mine Supplies	1 561 54	
Explosives	2 893 50	
Development—written off	4 972 50	
Surface Improvements—Depreciation	62 23	
Plant Machinery and Equipment Depreciation	285 68	
INDIRECT COSTS.		
General Expense Account	922 67	
Salaries	740 55	
Interest and Exchange	165 48	
Taxes	1 367 59	
		42 358 70
Net Profits on Year's Operations		26 066 14
Balance from Last Year		28 432 84
Total		54 498 98
Dividends Paid During 1903-4	14 800 00	
Amount Written Off for Discount on Shares Account	16 437 50	
		31 237 50
		23 261 48
Balance at Credit Profit and Loss Account		23 261 48

ASSETS.

Providence Mine		150 000 00
Dimond Fractional Claim		8 000 00
Development		14 917 52
Plant, Machinery and Equipment	3 809 07	
Less Depreciation 7½ per ct	285 68	3 523 39
Surface improvements and buildings	622 36	
Less Depreciation 10 per ct	62 23	560 13
Unexpired Insurance (Liability)		363 75
Explosives and Mine Supplies		329 82
Furniture and Fixtures		25 00
Sundry Debtors		
Canadian Smelting Works Estimated balance due	2 421 05	
B. C. Copper Company	167 65	
Dominion Government Bounty due	32 99	2 621 69
Cash in Bank		5 330 21
		185 671 51

LIABILITIES.

Capital Stock		
Authorized 40,000 Shares, each $5.00	200 000 00	
Subscribed and Paid up 31,7000 Shares		158 500 00
Pay Roll, Balance for September		2 193 50
Sundry Creditors		1 716 53
Balance at Credit of Profit Loss Account Being		162 410 03
Excess of Assets over Liabilities		23 261 48
		185 671 51

CARIBOO CONSOLIDATED, LTD.

At an extraordinary general meeting of shareholders held in London last month, the following resolution was carried unanimously.

1. "That the directors be and they are hereby authorized to concur in the sale of (a) all the property and assets (but subject to the liabilities other than liabilities to share-holders on their shares) of this company, and (b) all the property and assets (but subject to the liabilities other than the liabilities of the share-holders on their shares) in Gold Lands Corporation, Ltd, for 200,000 shares of £1 each (credited with 17s per share) in the capital of a new company to be formed with a nominal capital of 200,000 shares of £1 each, and to be called Cariboo Consolidated, Ltd., or by such other name as the directors shall approve."

2. That the share-holders hereby expressly consent to the registration of a new company, to be named Cariboo Consolidated, Ltd., or to bear such other name as the directors shall approve."

3. "That out of the aforesaid 200,000 shares Gold Lands Corporation, Ltd., shall receive (in respect of its shareholdings in this company and also by way of purchasing its property and assets other than such shareholding) 100,000 of the aforesaid shares of the said new company (credited with 17s. per share), the remaining 100,000 of such shares being received by this company."

4. "That the directors be and they are hereby authorized on behalf of the company to approve and execute all documents and to take all other steps necessary for giving effect to the above resolutions."

The chairman in speaking to this resolution said:

"It appears to the Board and myself that having arrived at our present stage, having carried on our work to a pitch which ensures to us the fruition of all our hopes, and having proved our mine to be of great value, we see no difficulty beyond that of time and a small amount of additional capital to enable us to bring about, I trust, a brilliant success in the future. We are operating in a new country, and if we succeed we shall be the first to bring a mine to a success in that part of the world. By so doing we shall place ourselves in an exceedingly powerful position and develop our valuable properties in the country. The division of these shares between the Gold Lands Corporation and the Cariboo was very carefully considered, and we came to the conclusion that 100,000 shares each would meet all requirements. I do not knew whether the whole of the shares will be taken up, but I do know that we have already received very substantial promises. If any shareholder wishes to secure more than his pro rata allotment, he may possibly be able to do so; but that can only be done, I may safely say, in the first application, because at the price of 3s per share, I consider this share one of the best mining speculations in the London market, as it cannot be more than six or eight months, or probably sooner, before we shall be on a profit earning basis."

WEST KOOTENAY P. & L. CO.

At the annual meeting of the West Kootenay Power & Light Company, held recently at Rossland, a dividend of 2½ per cent on the capital stock of the company was declared. This is stated to be the first dividend paid by this company since it commenced to supply power to Rossland mines, in 1898. The board of directors, consisting of Sir Charles Ross, Messrs. W. M. Doull, C. R. Hosmer, T. G. Blackstock, Robert Ross, Frank Paul and George Benson. The demand for power is now almost equal to the present capacity of the company's hydro-electric plant at Bonnington Falls, but the company will be prepared to increase its capacity whenever more power shall be regularly required.

WELLINGTON COLLIERY CO.

The annual meeting of the Wellington Colliery Company, Ltd., was held at Victoria early last month. The following are the directors of the company. Messrs. James Dunsmuir, Joseph Hunter, F. D. Little and Charles E. Pooley. The officers are: President, Mr. James Dunsmuir, vice-president, Mr. F. D. Little, treasurer, Mr. J. A. Lindsay, secretary, Mr. Charles E. Pooley.

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

THE published report of the treasurer of this company for the fiscal year ended June 30, 1904, is as follows:—

The production of the year amounted to, 16,024,415 lb. fine copper; 275,960 oz. silver; 54,231 oz. gold; for which we received....	$2,948,551	73
From rents and land sales.....	17,795	43
	$2,966,347	16

The above represents the net proceeds at Granby Works, freight to New York, refining and other charges having been deducted from the gross receipts.

COSTS.

Working expenses at mines and smelter	$1,814,213	38
Foreign ore purchased	141,073	18
Foreign matte purchased	727,546	69
	$2,682,833	25
Net profits for year ending June 30, 1904	283,513	91
Surplus from previous year .	683,535	43
	$967,049	34
Dividend paid December, 1903....	133,630	30
Net surplus as shown in annexed Statement of Assets and Liabilities	$833,419	04

ASSETS.

Cost of land, real estate, machinery, buildings, dwellings and equipment	$13,999,771	33
Cash, copper in transit and on land less advances	187,915	15
Store supplies	124,415	94
Stocks, bonds, and bills receivable	63,744	54
	$14,375,846	96

LIABILITIES.

Capital stock	$13,363,030	00
Bills payable	60,000	00
Accounts payable, current for month	119,397	92
Surplus	833,419	04
	$14,375,846	96
There has been expended in new construction at the mines and smelter during the year	$97,247	48

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

Mine development 5,698	lineal feet.
Granby ore shipped to smelter 514,387	dry tons.
Granby ore smelted 516,059	" "
Foreign ore smelted 36,182	" "
Foreign matte treated 4,290	" "

G. W. Wooster,
Treasurer.

THE PRESIDENT'S ADDRESS.

To the Stockholders of the Granby Consolidated Mining, Smelting & Power Co., Ltd.

Gentlemen:—You will notice the treasurer's Report gives us a profit of $283,000 for the year ending June 30th, 1904. I am somewhat disappointed with this result as conditions seemed to indicate a much larger profit for the year when we last met in October, 1903. There have been several causes for this. In November there was an extra opening made in another part of the mines which caused considerable expense and considerable delay. This work was suspended. The result was that little or no money was made for about four months time. Otherwise a much better showing would have been in evidence today.

At the smelting plant two new furnaces with necessary machinery to operate them, and two locomotives with necessary slag cars have been added. The furnace building was enlarged to accomodate the same. Total operating costs have been reduced 44 cents per ton during the fiscal year.

In June some changes were made in the staff. Mr. A. B. W. Hodges was appointed General Superintendent of both mines and smelter and now reports independently to the Board of Directors. We have every reason to expect good results the coming year; our costs are being reduced steadily, and with improvements now being completed expect them to be reduced much more The mines and smelter are in better condition than at any time during the past year. The Company is practically free from debt, except for current monthly accounts, and has large assets.

The Victoria, Vancouver & Eastern Ry. Coy. controlled by the Great Northern people is building into Phoenix and up to the smelter from Grand Forks, which will give us railway facilities with two great trans-continental systems namely, the Canadian Pacific and the Great Northern.

It is now seven years since I became identified with this work and the progress which the company has made has been secured only by your management, with some exceptions, working together with mutual confidence and unity of purpose. I feel that this is as essential to the future welfare of the company as it has been in the past. This has led me to the devision, in retiring to-day with the rest of the Board, to ask that my name be not put up for re-nomination to the Directorate. I am, however, one of the very largest shareholders in the company, notwithstanding all reports to the contrary. I have much faith in the property if well managed and shall always have a deep interest in, and best wishes for its success.

Respectfully submitted,
S. H. C. MINER.
President.

The following gentlemen were elected directors for the ensuing year: Messrs. John Stanton, President Wolverine Copper Mining Co., N. Y., and Mohawk Mining Co. William H. Nichols, President General Chemical Co., N. Y., and the Nichols Chemical Co., J. Langeloth, President the American Metal Co., Ltd., N. Y., Geo. Martin Luther, Secretary the Nichols Chemical Co., N. Y., Geo. Crawford Clark, of Clark, Dodge & Co.,N.Y., H. L. Higginson, of Lee, Higginson & Co., Boston, Arthur C. James, of Phelps, Dodge & Co., N. Y., Geo. F. Baker, Jr., First National Bank, N. Y., Payne Whitney, N. Y., W. H. Robinson, Manager Eastern Townships Bank, Quebec, Jay P. Graves, President Spokane Traction Co., Spokane, A. L. White, Vice-President Spokane Traction Co., Spokane.

AN EFFECTIVE DRILLING MACHINE.

THE *Pick and Drill*, published in San Francisco, referring to the new and effective machine recently patented and placed on the market by Mr. Martin Hardsocg, of Ottumwa, Iowa, and described as the "Little Wonder Air Hammer Rock Drill," states that several tests of this drill were made at the Fulton Engine Works in Los Angeles, Cal., demonstrating the ability of the drill to bore a hole in hard seasoned granite at the rate of five inches per minute. In one instance a hole was drilled in hard granite that had been lying in the yard for three years to a depth of 5¾ inches in one minute. There were present at these tests a number of mining men who were all highly pleased with the performance of the drill. It does not require an expert nor an engineer to handle it, for any one can learn to operate it in a few moments, and it will work in any position and at any angle, and requires no braces, columns or stays, but is simply held in the hand of the operator. All that is necessary is to place the bit in position and pull the air trigger. It requires but 14 feet of free air per minute—about one fourth of what other power drills use—and there is no moving in, setting up, and

moving out and taking down. All of that time is saved with this drill. This drill strikes 2,500 blows per minute, and has 8 cutting edges on the face of the bit; and rock yields much faster than with any other bit known. The exhaust air passing through the bit serves a double purpose of clearing the cuttings from under the bit, thereby keeping a clean place for the drill to work on, so it is never pounding on old cuttings; besides the air passing through keeps it cool. If it was not for the air passing through the bit, it would soon get red hot

The Little Wonder does not "fitcher", does not get "hung up"; does not lose holes. Slips, seams, talc streaks, "bug holes," etc., have no effect whatever upon the course which the drills take. It can furthermore be operated by a man in a rope swing over a ledge, or on a ladder, or any other place that is possible for a man to get at; will drill directly overhead or "back holes" with ease and rapidity.

DIVIDENDS FROM BRITISH COLUMBIA MINES.

THE following are some of the B. C. mines whose total dividends up to date each exceeded $100,000. More have paid totals ranging from $10,000 to $50,000 but the list given, though incomplete, will serve to show that an appreciably large amount has been returned by the mines over and above the still larger total of earnings that has been expended in development and equipment. As far as practicable, these figures have been verified by comparison with the published accounts of the companies concerned:—

Slocan District, West Kootenay:—	
Payne (Silver-lead)	$1,363,000
Slocan Star (Silver-lead)	575,000
Idaho (Silver-lead)	400,000
Reco (Silver-lead)	287,500
Rambler-Cariboo (Silver-lead)	230,000
Whitewater (Silver-lead)	209,500
Ruth (Silver-lead)	165,000
Rossland District, West Kootenay:—	
Le Roi (Gold-copper)	1,305,000
War Eagle (Gold-copper)	545,250
Le Roi No. 2 (Gold-copper)	316,800
Centre Star (Gold-copper)	210,000
Nelson District, West Kootenay:—	
Hall (Silver-copper)	220,000
Ymir (Gold)	192,000
Fort Steele Division, East Kootenay:—	
Crow's Nest (Coal)	968,947
North Star (Silver-lead)	312,000
St. Eugene (Silver-lead)	210,000
Boundary District, Yale:—	
Cariboo-McKinney (Gold)	546,837
Granby (Copper-gold)	133,630

MACHINERY NOTES.

THE following description of the recently completed concentrator at the Alice mine, Creston, was supplied by Mr. H. Roy Stoval, M.E., to a Nelson newspaper. The mill is connected with the mine by an automatic tramway, which dumps the ore into the upper ore bin. The ore is first passed through a 10 by 7 in. Blake rock crusher from which it falls into a lower bin. From here it is fed by a Gates feeder into the coarse rolls, where its size is reduced. Then it is taken to the elevator, which elevates it to the top of the mill. From there it is fed into a series of three trommels, where it is sized for the jigs. There are two double three and two double two compartment jigs. The middlings from the jigs are crushed by two more sets of rolls and again elevated to the trommels. The undersize from the last trommel passes through the classifier, which supplies the zinc jig, and then through three spitzkasten, which in turn supply three Overstrom tables. The concentrates from the jigs are collected in bins on the lower floor and those from the tables in a separate bin, which is also located on the lower floor. From these bins the concentrates are loaded in bulk on the cars for shipment to the smelter. The mill is provided with an Ames 14 by 18 automatic engine, which is supplied with steam from a 192 by 66 horizontal return tubular boiler, in which steam is kept up using wood. There is also a Webster feed water heater which heats water for the boiler, which water is pumped from the heater to the boiler by a Knowles feed pump. The mill and its equipment are very complete and are doing effective work.

The Nelson Iron Works has succeeded in making what is said to be the largest castings yet locally produced, consisting of two sections of a White-Howell ore-roaster for the Silver Cup Mines, Limited. These castings are five feet long, and have a diameter of five feet inches. Each weighs 2,700 pounds.

A Nelson engineering firm has secured the contract and begun the work of erecting a tramway for the Sullivan Group Mining Company in East Kootenay The tramway will have a total length of 6,000 feet and will extend from the mill to the smelter which the company is now erecting at Marysville. The capacity of the tram will be 500 tons of ore per day. The Sullivan Group Mining Company was recently acquired by the Federal Mining Company which has ample funds with which to place the mine and smelter on a paying footing. As soon as the tram is completed the smelter will be blown in and bullion turned out. There are, it is said, ample reserves of ore in the mine already blocked out sufficient to keep the smelter supplied with ore for a number of years.

The sixth furnace at the Granby smelter was recently blown out to allow of the installation of an electric charge car, a labor saving device of considerable value.

It is reported that the capacity of the Oyster-Criterion mill at Camborne is to be shortly increased by the installation of ten additional stamps.

COMPANY NOTES AND CABLES.

ALASKA-TREADWELL.—The report for the year ended May 15th last states that the exploration and development operations have totalled 9,372 ft. The ore mined and sent to the mill amounted to 774,575 tons. In addition to this, 575 tons were milled from the 3,300 tons left in the mill ore bins at the end of last year. The ore reserves in sight at May 15th totalled 4,017,289 tons. The cost of milling the ore was $122,658, or $0.1583 per ton. The ore yielded in free gold, including copper and base bars, $892,888, or $1.1519 per ton and from 15,663 tons of sulphurets treated $936,619, or $1.2083 per ton of ore milled, to which should be added 392 tons of sulphurets on hand at the end of the year, valued at $26,828, or $0.034 per ton. The foundry produced 482,627 lb. of iron castings and 5,652 lb. of brass castings, making a profit of $1,843 for the year. During the month of February last two fires occurred, involving the company in a loss of $3,435 Skilled labour is now very scarce, and has been so during the entire year.

LE ROI (Rossland).—The September report of the general manager states:

"Shipped from the mine to the Northport Smelter during the past month, 8,196 tons of specially selected ore, containing 3,949 oz. of gold, 4,795. of silver, and 280,300 lb. of copper. Estimated profit on this ore, after deducting cost of mining, smelting, realization and depreciation, $25,000. Expenditure on development work during the month, $9,500. Development of the mine fairly satisfactory. Have nothing special to report."

Le Roi No. 2—Mine manager reports:—"Shipped during the month of September, 1,800 tons. The net reciepts are $22,696, being preliminary payment for 1,828 tons shipped; $2,227 being deferred payment for 1,828 tons previously shipped. No payments for concentrates, in all $24,923."

Ymir—Return for August: 35 stamps ran 31 days and crushed 2,750 tons, producing 734 oz. bullion; estimated realisable value, $8,150; 257 tons of concentrates shipped; estimated value $6,700; cyanide plant treated 1,900 tons of tailings, producing bullion having estimated value of $1,250; sundry revenue, $461; total, $16,561 Working expenses.

$14,950; profit, $1,611. There was expended during month, on development, $1,232.

Fraser River Gold Dredging (Lillooet)—During the month of August No. 1 dredge worked 444 hours for a total recovery of 215 ozs. of gold. (Office note—The work of fitting the No. 2 dredge with the new winch has been completed, and a thorough trial of the machinery has given every satisfaction. The directors hope in the course of the next few weeks that this dredge also will be making regular returns.

Tyee Copper Co. (Mt. Sicker)—During the month of September the Tyee Copper Company's smelter at Ladysmith ran for 24 days. The statistics for the month show that 4,681 tons of Tyee ore were smelted in this time, giving a return, after deduction of freight and refining charges, of $52,033.

ELECTROLYTIC LEAD FROM BRITISH COLUMBIA.

The manager of the Canadian Smelting Works, Trail, has received from the Carter White Lead Company of Chicago, which is establishing lead corroding works in Montreal, an advice relative to lead shipped from Trail as follows:

"We might mention that we are extremely pleased with the results obtained from this car of electrolytic lead; in fact, the product was noticeably whiter than that produced from refined corroding lead we are in the habit of purchasing. The amount of tailings was also less than is usual. We sent a sample of lead to a chemist at Racine, Wisconsin, and his analysis is as follows:

Physical and Chemical Analysis.

Lead carbonate	71.42 p. c.
Lead hydroxide	28.57 p. c.
or	
Oxide of lead	86.10 p. c.
Carbonic acid	11.17 p. c.
Water	2.13 p. c.
Specific gravity	6,562

Volume, 12.53 pounds per gallon.

"The percentage of carbonate is a little higher than the average, but not enough to cause the slightest trouble. In fact, this analysis shows the finished article to be of very fine quality."

RECENT TECHNICAL PUBLICATIONS.

Geology Applied to Mining, by Josiah Edward Spurr, A.M., Geologist United States Geological Survey, etc.; Library edition, cloth 16mo, price $1.50 (6s. 6d.); Pocket edition, flexible morocco covers, for field use, price $2.00 (8s. 6d.).

This is a concise summary of the chief geological principles, a knowledge of which is necessary to the understanding and proper exploitation of ore deposits. It has been prepared primarily for the use of mining men and students, the author having perceived the great need that existed for some such work stating concisely those results of the science of geology which bear upon ore deposits. The demand for such information is great among men of the classes above mentioned, yet in any of the available works on geology they find very little of that for which they are searching, combined with a great deal that, for the moment, is immaterial. The author's endeavour has been; first, to make statements as clear as possible, considering the technical nature of the subject, and, second, to present the scientific facts accurately, and as fully as absolutely necessary. The first chapter deals with the processes of ore-deposition, it being necessary, first of all, that the student or other reader should have some idea of what ore-bodies are, and how they have been formed. Then follow chapters on, respectively, the study of the arrangement of the stratified rocks, of the igneous rocks, of dynamic and structural geology, of chemical geology, all as applied to mining, and finally, on the relation of physiography to mining. As an example of the scope of the work, the division dealing with placers may be instanced, in this the concentration of gold in placers, various kinds of stream gold-placers, beach placers, bench placers, old placers, fossil placers, reconcentrated placers, placers other than gold-placers, and residual deposits, are all separately dealt with, and the examples given, some of them of quite recent date, cover a wide range—Alaska, Klondike, Ural Mountains in Russia, Macedonia, Sumatra, several of the United States, etc. The aim of the author, in this excellent dissertation on the physical history of the earth, to impart to the reader a comprehensive study of the salient geological principles may be expected to meet with such appreciation as will admit of his desire that the work be improved and elaborated, being eventually carried into effect.

TALES OF PIONEER DAYS.

"The Mystic Spring and other Tales of Western Life." (William Briggs, Toronto), is the title Mr. D. W. Higgins, formerly speaker of the British Columbia Legislature, gives to an interesting and entertaining collection of stories originally published in serial form, by local Victoria newspapers dealing with incidents and phases of life of early pioneer times in British Columbia. The tales are well narrated, and apart from their historic value, possess considerable literary merit. We are glad to learn that the author's efforts have been well appreciated, the first edition of two thousand copies of the book having been already nearly sold.

MINING MEN AND MATTERS.

MENTION was made in the last annual report of the council of the North of England Institute of Mining and Mechanical Engineers of a bronze medal having been awarded to Mr. Blakemore for his paper upon "The Fernie Explosion."

Messrs. R. G. McConnell and F. H. MacLaren, of the Geological Survey of Canada, who spent the field-work season of this year in the Alsek country, Yukon Territory, came down from Whitehorse early last month and returned to Ottawa for the winter.

At the exhibition held at Nelson late in September Mrs. Jennie E. Harris and her son Mr. O. M. Harris, showed specimens of high-grade copper ore from the Harris group of mineral claims, situate on White Fish Creek, East Kootenay. This exhibit was one of a number for which diplomas were awarded.

Mr. J. D. Kendall, formerly resident partner in British Columbia of Messrs. Bewicke, Moreing & Co., arrived in Cariboo from London in October, and has been engaged in examining the Slough Creek mines. Writing to the editor, Mr. Kendall remarks: "I have not altered my opinion of B. C. as a great mineral field; but what has happened in the past few years has demonstrated a conclusion obvious to every one that mining in this country to be successful must be conducted by honest and capable men.

Dr. Robert Bell, Director of the Geological Survey of Canada, has returned to Ottawa from St. Louis, Mo., where he attended the eighth Universal Congress of Geologists.

Mr. George S. Waterlow, of London, after spending nearly a fortnight at Victoria and Vancouver, went up to Rossland late last month on business of the Le Roi and Snowshoe mining companies, of both of which he is a director.

Mr. E. Jacobs will leave Victoria early in November to visit the chief mining camps of West Kootenay and the Boundary for the purpose of obtaining information for a review of the mining industry in 1904.

Mr. W. M. Brewer, of Victoria, has been appointed Canadian representative of the *Mining and Scientific Press*, of San Francisco.

Mr. H. J. Baron has concluded his tour through the mining districts of Southern British Columbia in the interests of the *Mining Reporter*, of Denver, Colorado, and is now giving attention to Eastern Washington and Idaho.

Mr. Wm. Yolen Williams, late superintendent of the Granby Company's mines at Phoenix, will shortly leave Spokane to visit his old home in Wales.

Mr. Frederic Keffer, general manager for the British Columbia Copper Company, who left Greenwood last month on a vacation trip to New York and other places in the United States, is expected to return shortly

Mr. Colin F. Jackson, of Vancouver, last month visited the Kootenay and Boundary districts in the interests of C. F. Jackson & Co., Ltd., agents for wire rope, steel rails, fire bricks and other heavy lines of mine supplies

Mr. W. S. Jenkins has resigned the managership of the Idaho-Alamo mines, Slocan, and has been succeeded by Mr P. H. Ahier.

Mr. Edward Hooper, of London, who is consulting engineer to the Ymir Gold Mines, Ltd., recently arrived from England on his periodical visit to the Ymir mine. He was met at Nelson by Mr. S. J. Speak, who was lately appointed manager upon the resignation of Mr. Geo. H. Barnhart.

Mr. W. H. Sandiford, well known as manager of the Bosun mine, Slocan, is now resident in Victoria. He recently visited a number of mining properties on the West Coast of Vancouver Island.

The September report of the smelter at Tacoma, Washington, shows the value of ore received that month to have been $208,827.35, of limestone $2,295, and of merchandise $1,340. Smelter products shipped were valued at $334,862.39.

Messrs. Lewis Stockett and Paul Reisinger, of Great Falls, Montana, consulting coal experts, were recently in Victoria, after having examined some of the coal lands of the Similkameen.

Forty-two tons of scheelite, value about $7,000, was exported from New Zealand last year. For some time past scheelite has been obtained at Macrae's Falt, Otago, where it is a by-product in connection with gold-mining operations.

The following appointments have been made to the teaching force of the Michigan College of Mines, Houghton, Michigan: Arthur Alexander Koch, Ph.D., University of Basel, instructor in chemistry; Charles Franklin Bowen, M.S., University of Wisconsin and Eugene Thomas Hancock, B.S. University of Wisconsin, instructors in geology and mineralogy; Charles Hamilton Hoyt, C.E., Thayer College of Engineering, instructor in civil and mining engineering; Durward Copeland, B.S., Massachusetts Institute of Technology, instructor in metallurgy and ore dressing.

Mr. C. H. Gooderham, of Toronto, prominently associated with mining development in the Rossland district, as one of the promoters of the War Eagle and Centre Star companies, of which he was a director, died, after an illness of some weeks, at his residence on October 18th, aged 60 years.

REPORT ON PATENTS.

(Specially reported for the Mining Record by Dr. Oscar Nagel, New York.

767,926—Ore-Concentrator.—Christoffer A. Christensen, Oretown, Oregon. An ore-concentrator, consisting of a diamond shaped table having riffles formed across the same, said table provided with a rise or upward incline along one side and up which the ends of said riffles extend, troughs upon said rise or upward incline provided with lateral outlets facing the lowest portions or bottom of the riffles, means for supplying water to said troughs, a receiving trough disposed beneath the upwardly-inclined ends of the rises, a hopper at the upper side of the trough and opposite end from the said rise or upward incline, and means for imparting vibratory jarring motion to the table.

768,054—Electric Furnace. Carl G. P. de Laval, Stockholm, Sweden. An electric-furnace chamber having a horizontal feed-opening, an escape-opening and a focus of electric heat within said chamber and opposite said feed opening, the said escape-opening being located above said feed-opening and between said feed-opening and said focus.

768,035—Extracting Zinc or other Sulphides from their Ores. Guillaume D. Delprat, Broken Hill, New South Wales, Australia. A method of separating ores from the gangue, which consists in forming an aqueous solution of an acid capable of reacting with the ore to form a gas and increasing the density of said solution by adding thereto a suitable substance, then feeding the mixture of ore and gangue to the solution, decreasing the density of the gas as it is formed on the ore particles, and removing the ore particles raised to the surface.

768,841—Conveyor. James D. Brown, Fortescuse, Mo. The combination, with a band-cutter and feeder provided with a casing, of a longitudinally-slidable conveyor provided with projections at its rear end and guide-rails at its sides, forked brackets secured to the said casing for engaging with the said projections, and rollers for the said guide-rails to slide on also supported by said casing.

768,976—Conveyor. Isaac Christ, Tamaqua, Pa. A conveyor comprising slotted chain-links and slotted flight-links, and double-headed pins pivotally connecting the ends of the chain-links and also supporting and locking the flight-links in position, all of said links having slots formed with enlargements to permit the passage of the heads of said pins, the flight-links corresponding in length with the chain-links and supported against the sides thereof by said pins.

768,722—Dumping Mechanism for Metallic Cars. Anton Becker, Chicago, Ill., assignor to Joseph S. Ralston, Chicago, Ill. A car in combination with the frame of the car, a pivoted door adapted to retain a part of the load, a shaft adjacent to the door, a crank-arm on said shaft, a pinion on crank-arm in engagement with a rack on the under side of said door and means for turning said shaft, whereby as said shaft is moved, said pinion moves backward and forward on said rack and said door is opened and closed.

769,461—Mining Machinery.—Erastus S. Bennett, New York, N. Y. The combination with a car body, a vertically-movable rack-bar arranged to one side of the same, and working in a support connected with the car-body, a gear wheel meshing with the rack-bar, a worm-wheel on the shaft of the gear-wheel and a vertically extending shaft and worm thereon meshing with the worm-wheel and means for operating the vertically-extending shaft.

769,231—Ore Concentrator.—George E. Perkins, Providence R. I. A device comprising a concentrating-table, a distributing-trough arranged near one side thereof, and having perforations in its outer side, said trough being elevated whereby middlings may be passed thereunder, a second trough elevated above the plane of said discharge-trough and terminating at a point beyond the outer side of the latter and nearer the concentrate discharge than the initial pulp-feed, means for collecting the middlings from said table and delivering them to said elevated trough, and means for supplying water to said distributing-trough.

790,486—Placer-Mining Machine.—Nathaniel W. Pulsifer, Philadelphia, Pa. A hopper, supported in an elevated position by suitable framework, an inclined grizzly leading therefrom, in position to receive material discharging from the hopper, a chute into which the grizzly discharges, a series of conical-shaped screens suitably mounted to receive materials from the chute, an extended assorting-table suitably positioned with relation to the screens, lateral chutes steeply inclined having their upper ends adapted to receive material from the screens and having their lower ends oppositely curved and downwardly curved, with the discharge ends extending in a direction parallel with the assorting-table and adapted to spread the material thereover by impetus.

769,938—Process of Extracting Precious Metals from Ores or Slimes.—Henry R. Cassel, New York, N. Y. The process of extracting precious metals from ores, which consist in adding a bromide and a cyanide in solution to the ore, then passing chlorine gas through the mixture to convert the bromide into bromine and form solvents for the precious metals, and reconverting the bromine into bromide.

770,285—Mining Machine.—William F. Hamilton, Zanesville, Ohio. A machine comprising an elongated frame pivotally mounted at one end and carrying at its other end a cutter-frame and a cutter thereon and means mounted on said elongated frame for swinging said elongated frame and for

actuating said cutter, said elongated frame being arranged to permit free vertical and horizontal movement of its forward end.

770,561—Switch-off Device for Endless Conveyors.—Frederick O. Crowly, Oswego, N. Y. In combination with an endless conveyor, a guide or switch-off device upon or in close proximity to the conveyor, and having an inlet in one end for receiving the articles to be fed and its other end deflected laterally to the sides of the conveyor whereby the articles are fed by the belt from the inlet and diverted from the belt by the guide.

770,290—Amalgamating Machine.—Frederick J. Hoyt, Chicago, Ill. The combination, with an air-tube having an air-mover at one end and a nozzle at its other end, and a funnel under said nozzle of a bowl and a globe in said bowl semi-submerged in mercury.

770,283—Ore-Concentrator.—Abel Guionneau, Denver, Colo assignor of two-thirds to Charles M. Fueller and Robert J. Cory, Denver, Colo. A reciprocating table-concentrator a flat, smooth table-surface provided with several rows of inverted conical cups extending from the head-end portion of the table throughout a portion of each table's length, each row of cups connected together with a sunken groove or riffle.

770,498—Mine-Car.—William E. Hamilton, Zanesville, Ohio assignor to Hamilton Manufacturing Company ,Columbus, Ohio, a Corporation of Ohio. A mine-car comprising side and end walls, one of said walls having an opening therein adapted to receive a part of a loading-machine, and means on said wall normally projecting into said opening to engage said part to couple said car and loading-machine together.

771,107—Ore Washing or Concentrating Machine.—Enos A. Wall, Salt Lake City, Utah. An ore concentrating machine or table adapted to receive actuating impulse from the head end, in combination with an operating rod or bar attached to the head of the table, a buffer-bar through which the rod passes, a spring on the rod at the inner side of said buffer-bar and a buffer block secured to the rod or bar at the outer side of the buffer-bar or timber to receive and resist the impact of the spring and suddenly stop the forward movement of the table at its head end as it moves in the direction of the tail, and means for retracting the operating-rod against the spring and suddenly releasing it.

771,075—Separation of Mineral Substances by means of the Selective action of Oil.—Cosmo Kendall, Upper Norwood, England. A process for the treatment of finely-divided material for the separation of graphitic substance contained therein from associated rocky matter on gangue, consisting in mixing said material with water, bringing said material intimately into contact or thoroughly mixing it with suitable pure thin oil, as kerosene or paraffin oil, projecting at a considerable velocity the mixture so produced under the surface of a volume compose of said material, water, and oil, allowing the oil and grapahitic substance adhering thereto to pass upward to said surface, and drawing off from said surface oil and graphitic substances immediately on arrival at said surface.

771,684—Dumping Car.—Swan F. Swanson, Pueblo, Colo. The combination of a car-body provided with an outlet, a door closing said outlet, and carrying a stiffening-strip having extended portions, sliding pivoted catches to engage said extended portions to hold the door closed, a crank-shaft for actuating said catches, and means for actuating the crank-shaft.

771,277—Process of Concentrating Ores. Alice H. Schwarz, New York, N.Y., assignor to Schwarz Ore Treating Company, a Corporation of Arizona. A method which consists in mixing a melted fatty matter which is solid at normal temperatures with the ore, then solidifying the fatty matter and separating the gangue from the values entrained in the fatty matter while the latter is solidified.

771,909—Mineral or Ore Washing Jig.—Charles J. Hodge, Houghton, Mich. The combination of a driving shaft, a pair of eccentrics through which said shaft passes and which are adjustable transversely of said shaft, a fly-wheel mounted on said shaft between said eccentrics and a crank connection between said fly-wheels and each of said eccentrics.