The Mining Record

VOL. X. DECEMBER, 1903. No. 12

BRITISH COLUMBIA
MINING RECORD

Devoted to the Mining Interests of the Pacific Northwest.

PUBLISHED BY

THE BRITISH COLUMBIA RECORD, LIMITED

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Victoria, B. C., Office, Province Building.
Vancouver, P. W. Charleson, Hastings St.
London Office: 24 Coleman Street, E. C.
Denver, Col.: National Advertising Co.
San Francisco: Dake's Agency.

SUBSCRIPTION TERMS:

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

Advertising Rates on Application.

Address all communications to

THE MANAGING EDITOR, B. C. RECORD, LTD.,
P. O. Drawer 645, Victoria, B. C.

THE MONTH.

Development in the Camborne district this year has afforded most encouraging results, and it is satisfactory to note that the mines in this promising section are already becoming productive, while if present values are maintained, operations promise to yield reasonably profitable returns. During the year stamp-mills have been erected at three properties, and crushing was started at the Eva last month, the first clean-up resulting in a fair recovery.

Mr. Jay P. Graves, general manager of the Granby Company, is reported to have stated in an interview the other day that the directors hope to commence the payment of regular dividends in the near future at the quarterly rate of one per cent., or what would be equivalent to 10 per cent. per annum on the present market value ($4) of the shares. An announcement made unofficially in this manner cannot, however, be accepted unreservedly, but if it be true that the Granby Company is in a position to distribute profits among its shareholders, it is certainly strange that this intimation was not given at the recent annual meeting, at what would seem to have been a fit and opportune occasion. Of course this might possibly have been the case, but certainly no mention of it having been done appeared to our knowledge at the time in any of the published reports of the meeting in question.

Rather an interesting shipment of ore was made a week or so ago from a mine in the Burnt Basin to a Welsh refinery. The ore from this property is supposed to contain platinum in commercial quantities, and previous tests, of which there have been four in all, have certainly confirmed this presumption, detailed analyses having revealed not only the presence of platinum but also of osmium and iridium, while one quantitative test gave a result of a quarter of an ounce of platinum to the ton, this being described as a "commercial" percentage. The present consignment of ore to Wales is made with a view of ascertaining the state in which platinum is contained in the ore, and of determining the best method of recovering it. The lead in addition carries values in gold and copper.

Speculation in the shares of local mining companies has practically ceased, and it is noteworthy that with the solitary exception of the Crow's Nest Pass Coal Company's shares, which are at a premium, all mining stocks are now quoted at a very considerable discount. In several instances, in fact, present prices do not fairly represent the intrinsic value of the securities any more than was the case when the market was absurdly inflated, and there can be no doubt that judicious investment in standard Rossland and other mining stocks at this moment would prove at no distant date decidedly remunerative. The British Columbian section of the London market is equally flat, but relatively speaking the speculative opportunities are less promising in the case of British-owned mines than are afforded by investment in the shares at present prices of either Canadian or American companies operating in the Province. Recently we expressed the view that all signs pointed towards a general revival of mining activity in British Columbia. Already a distinct improvement in the situation has taken place, and it is safe to say that 1904 will witness greater industrial growth, wider expansion of the industry, and its establishment on a more generally profitable footing.

The London *Mining Journal* in a recent issue gives an interesting description of a new invention, a rock-boring machine designed to reduce the number of men employed in hand-drilling by dispensing with a man to hold the drill-steel. The machine consists of a cylinder in which the drill steel is held, and in which there is also a spring to set the steel again for another blow, and a ratchet movement for altering the position of the drill-steel edge. The miner striking the drill stands with one foot on an iron plate, and when the blow has been delivered he simultaneously releases the footplate by which the spring ratchet movement is brought into play, and thus sets the tool for another

blow. The machine is very compact and portable, and is adapted for either face working with tripod stand, or with spreader bar for work in mine levels in any position and at any angle. It is claimed for the machine that the tool, which is inexpensive, will save its cost in a few weeks by dispensing with the services of a holder-up and by cleaner and more rapid drilling. At a trial the machine worked well in either sandstone or granite, and seemed adapted for unskilled labour.

The local management of the Hall Mining & Smelting Company in one instance, and several mining and smelting men, also of Nelson, in another, have during the past twelve months brought about changes in conditions affecting the smelters, more particularly those treating silver-lead ores, that tend to reduce the cost of smelting. The opening up in the Boundary district of the Emma mine, the ore from which has a high iron content suitable for fluxing purposes, and as well sufficient values in copper and precious metals to pay a considerable proportion, if not all of the mining and freight charges, has done away with the previously existing necessity for using a barren iron flux. Similarly the development of the Hunter V. mine, in the Ymir district, has provided an ore having a high percentage of lime, also very necessary as a flux, and carrying values in gold and silver that return nearly $10 per ton above freight and treatment charges, this obviating the necessity for using a barren lime flux. A double benefit is derived from these improved conditions, viz: two mines are being worked at a profit to their owners, and the smelters can obtain fluxes at little or no cost instead of having to pay for quarrying and transporting them.

The enterprise of Mr. P. H. Craven in leasing the O. K. stamp mill, near Rossland, and in making and carrying out arrangements to treat on a royalty basis the 2,000 to 3,000 tons of ore contained in the second-grade ore dump of the neighbouring I. X. L. mine, is an object lesson that might with advantage be carefully studied elsewhere in the Province. The I. X. L. ore that Mr. Craven is handling successfully and profitably, contains, so we are informed, only about $4 to the ton in free gold, and the greater part of this is saved on the amalgamating plates. About 25 tons a day were put through the mill during four mill-runs the last three months, with the result that 434 ozs. of gold were recovered. The money value of this gold is not large—$7,000 to $7,500—but the value of this example of what may be done where practical experience and pluck are combined, should be considerable. Mr. Craven deserves success, for he recognized an opportunity that few if any others realized was open to them as well as to him. It is gratifying to know that his operations are leaving him a margin of profit, and still more satisfactory to learn that his enterprise has in some measure demonstrated the practicability of turning to good account ore dumps heretofore considered too low grade for profitable treatment.

The returns of the season's operations in the Yukon, which are now practically complete may be regarded as reasonably satisfactory. They certainly do not afford any evidence of an early exhaustion of the alluvial gold deposits of that region, despite the fact that the gold yield is somewhat below the amount recovered in 1902. This decrease is, however, easily accounted for on the score of a drought of six weeks duration during the summer, and a consequent shortage of water at a critical time. As an indication, moreover, of the extent of mining activity on the creeks in the vicinity of Dawson, the output again cannot be considered as affording a trustworthy measure for comparison, for it fails to take into account a great deal of exploitation and development work, the result of which generally is said to be most promising. Although fewer claims are now being worked than was the case at the time of the earlier excitements of '98 and '99, operations are now carried on much more effectively, the payable portion of the gravels on the proved gold-bearing creeks having been accurately determined, with the consequent result that there is less waste of effort. The productive area is meanwhile gradually expanding, while costs are being steadily reduced by the introduction and employment of modern mining appliances and methods.

The prompt punishment by imprisonment of the man Tanghe who sought by a subterfuge to obtain possession of a portion of the Lucky Jack claim at Poplar Creek is a matter for congratulation, although it is only what should be looked for as a matter of right in our mining camps, where justice rather than smartness prevails. The position was a very simple one; a deal of gold quartz, commonly known among prospectors as "float," lay loose in a draw immediately below where the Lucky Jack ledge stood out from the face of the bluff above. From personal knowledge of the position we have no hesitation in expressing the opinion that by no ordinary stretch of imagination could the ground where this quartz lay be properly designated placer ground. The action of the Gold Commissioner, therefore, in ordering the jumper Tanghe to remove his stakes was, in our judgment, an eminently proper one. Equally so was the action of the magistrate, if within his powers, in giving Tanghe three months' imprisonment for his defiance of the Gold Commissioner, and it is well that an example was immediately made of this offender. Swift and sure justice is imperative in a mining camp if the rights of *bona fide* holders of mineral claims are to be maintained. There should be no room for sharks and sharpers in British Columbia mining camps, and the sooner and oftener this truth is brought home to members of that class the better for the camp immediately affected and the mining districts of the Province at large. Further, the only way to secure proper respect being paid to the decisions of the Gold Commissioner is to punish those who refuse to abide by them. That this was done in the Poplar Creek case under notice will have the effect of impressing upon those disposed

to be a law unto themselves that in British Columbia they must either obey the properly constituted authorities or take the consequences of their disobedience, as Tanghe has had to do.

The Revelstoke *Herald* recently published a timely editorial advocating the establishment in the Province of Mining Courts to deal summarily with any ordinary mining litigation. It pointed out that such courts exist in most mining countries in the British Empire; that they deal promptly and satisfactorily with most mining disputes; and that they would be a boon in outlying districts like Cariboo, Omineca, Cassiar and Atlin especially, while even in the less remote mining districts the law's delays, so vexatious to litigants, would, so far as mining matters are concerned, be removed. It appears that before British Columbia joined the Dominion a similar system to that now advocated was in force, and that after entering the Confederation the Province attempted to revive the procedure, re-constituting the Mining Courts and giving large judicial powers to Gold Commissioners, provision being made for appeals to higher courts where necessary. In 1900, however, it was held that the Province had exceeded its powers under the British North America Act in thus giving Gold Commissioners judicial powers, the appointment of judges resting with the Dominion only. The *Herald* proposes as a way out of the difficulty that the Governor-General-in-Council be requested by the Provincial Government to make an Order that upon the appointment of a Gold Commissioner in British Columbit he shall, *ipso facto*, become judge of the Mining Court in his district. If an assurance were obtained that upon the recommendation of the Provincial Executive Gold Commissioners would be appointed Mining Court judges the Provincial Legislature would very quickly provide for the establishment of Mining Courts, to be held whenever necessary at the offices of Gold Commissioners throughout the Province. As a rule Gold Commissioners are men who have lived many years in mining districts and are familiar with mining regulations and conditions, consequently in any ordinary dispute they could be relied upon to do justice in matters referred to them for adjudication. At any rate the system works well in other British mining countries, so it should prove equally satisfactory in this Province.

A review of that part of the Summary Report of the Geological Survey Department of Canada for the year 1902 which relates more particularly to British Columbia and other parts of the far western portion of the Dominion, appears elsewhere in this issue of the RECORD. At its close expression is given to the hope that the British Columbia members of the Federal House of Commons will support more liberal appropriations being made to the Survey, so that its useful work may be continued and enlarged, particularly in the West, where the mineral resources of the country are believed to be enormous. The fact that an appropriation of $10,000 has already been made by the Dominion Parliament to provide for the establishment of a Mining Bureau in connection with the Department of the Interior does not lessen the necessity for making adequate monetary provision for continuing the valuable work of the Survey. It is stated that $5,000 has also been appropriated with the object of providing metallurgical assistance to the Survey, but the contention of Mr. E. D. Ingall, Chief of the Mines Section of the Survey, that with the present rapid growth of our mineral industries a much more vigorous policy is needed to meet even the most pressing needs of those interested in exploiting our mineral resources, is heartily approved in the West, where mining has before it a future big with possibilities which may fairly be described as stupendous, but where there is still a very large area of little-known country, much of it believed to be mineral-bearing, to be examined. With the Survey keeping well in view the present and growing importance of continuing to give attention to practical work, looking to the development of our various mineral resources, and the Mining Bureau collecting and promptly publishing information and statistics relative to the mining industry—and such information to be of the greatest utility must be published promptly, not held over for months, as has been the custom of both the Survey and the Provincial Department of Mines—much benefit will result, both to the country at large and to those directly interested in mining.

The adaptability of the Elmore process of oil concentration to the treatment of certain classes of Rossland ores seems now to be fairly well substantiated, the War Eagle and Centre Star companies having already, in consequence of the successful test runs made by the Le Roi No. 2 concentrator, and doubtless also after obtaining satisfactory proof of the commercial and metallurgical efficiency of the method, ordered a mill of 50 tons daily capacity from the Canadian Ore Concentration Co., while other mines at Rossland are, we are informed, likely ere long to follow suit. It is impossible to overestimate the importance of this intelligence, and we think we hardly exaggerate in stating that the successful application of oil concentration in Rossland will prove to be one of the most memorable events in the history of mining in British Columbia. Meanwhile strong representations are to be made to the Dominion Government suggesting the removal of the duty of 5 cents per gallon on mineral oil of the character used in connection with this process, it being advanced that the duty adds materially to the cost of a metallurgical process which promises to prove of great practical benefit to the mining industry of the Province, and therefore to Canada. The Canadian Ore Concentration Company and its licensees would, it is stated, prefer to use an oil of Canadian origin, were such available, but so far the oil employed has had to be imported from the United States and has been subject to an import duty of 5 cents per gallon in addition to a duty on the barrels in

which it is packed. Such barrels are unsalable in Rossland. As the loss of oil incident to the operation of the Elmore process is, on the average, one gallon per ton of ore treated and may rise in some cases to two gallons per ton, it is evident that the duty levies a tax of from five cents to ten cents per ton of ore in addition to the duty on the barrels. This is such a severe charge on the treatment of low-grade ores as to materially limit the introduction of the process. It is submitted that as the necessary supply of oil cannot be obtained in the Dominion, and in view of the facts above set out, that the duty on the oil and on the packages should be abolished. The physical properties of the oil required are: (a) A high viscosity; (b) a low specific gravity; (c) a high flash point; (d) a low price; and it has been proved by careful and patient inquiry that the elements (a), (b) and (c) cannot be secured in any of the Canadian oils, samples of which have so far been obtained.

Persistent efforts continue to be made to secure from every prominent mining camp in the United States a thoroughly characteristic and complete mineral exhibit at the St. Louis Exposition, to be held next year. There is good reason to conclude that the exhibit in the Mines and Metallurgy Department of the Exposition will be the most comprehensive yet seen on this Continent, and that this unusually good opportunity to make an effective display of ores fully representative of the mineral resources of their respective leading mining camps will be taken advantage of by the mining States generally. But whilst our neighbours south of the international boundary line appear to be alive to the importance of the occasion, and to recognize that material benefit may be expected to result to mining districts using this means of attracting attention to their mines and the openings they offer for the employment of capital, British Columbia gives no sign of a similar appreciation of the duty it owes to its mining industry, to secure the more extensive development of which should be its constant care. It is true that some months since circulars were sent out on behalf of the Exhibition Branch of the Dominion Department of Agriculture, requesting that mineral specimens for St. Louis be sent to Ottawa, but it is doubtful if any general response resulted. So far as we have been informed, not one of the mining camps of the Province has yet sent a thoroughly representative collection of minerals for exhibition at St. Louis. Individual properties here and there have sent ore exhibits, and in several camps visited last spring by a representative of the Department of Agriculture collections of mineral specimens were made and sent to Ottawa. Good as these may be in their way they are neither complete nor even fairly representative of the mining industry of British Columbia. It may be that it is now too late to secure as much space at the Exposition as so important a mining section of the Dominion should have, but surely there is still time to make something more than a patchwork display. The total value of the Dominion's production of these four metals (including placer gold) in 1902 was $28,511,767, in the following proportions: Yukon Territory (placer gold only), $14,500,000; British Columbia, $12,174,242; remainder of Canada, $1,837,525. From this it will be seen that this Province easily leads in the Dominion in the production of lode gold, silver, copper and lead, so it should be well represented on the few occasions that offer to widely advertise its mineral wealth. But if anything effective is to be done at St. Louis it should be done without farther delay. Will the Boards of Trade of the Province take the initiative and endeavour to arouse a genuine and general interest in this matter, or is this unusually favourable opportunity to call attention to the mineral resources of the Province to be, by general consent, neglected?

The possibility of the successful adoption of a new and very economical process for the treatment of the low-grade ferruginous ores of the Rossland camp is a matter of great interest. This new process, the invention of Dr. Hendryx, of Los Angeles, a brief account of which we published last month, is a development of the cyanide process in conjunction with the use of electricity. It is claimed for it, that it will accomplish all that the cyanide process proper is capable of accomplishing but with this further advantage, that reduction is completed in from an eighth to a quarter of the time, while costs are if anything less. In the Rossland district, the ores may be divided into two general classes, both low-grade, the one a siliceous ore and the other containing a very large percentage of iron. The iron ores are found in very large quantities on Monte Christo and Kootenay mountains and also at the No. 1, Jumbo and other properties. On Monte Christo and Kootenay mountains, for example, there are probably at least half a dozen mines that might be profitably operated provided some such cheap and easy method for the recovery of values as the Hendryx process is said to afford could be effectively applied. The "if" in the case, is, of course all-embracing, and it may be yet early, until something more definite is known, to discuss probabilities and the influence the introduction of the process is likely to exert in the stimulation of mining activity at Rossland. There is this, however, to be added, that by laboratory experiment, not always, it is true, a satisfactory means of demonstrating the economical value of a chemical process, the Hendryx process or a slight modification of it has given excellent results when tested upon the iron ores of the Rossland-Kootenay and other mines. Again, with the steady advance of metallurgical science it is difficult to believe that failing the Hendryx, a means will not be ere long discovered by which these large Rossland deposits may be turned to commercial account. There are, of course, at present, methods by which the iron ores can be treated, but to all of them there is an objection. The ores, for example, are amenable to smelter treatment, but the demand of this class of ore for fluxing purposes is comparatively limited, and it would not pay to smelt them for the value of their contents alone.

Moreover, even the existing demand is likely to be reduced, when the high-grade concentrates produced by the Elmore process are offered in the market. Pyritic smelting also is possibly feasible, but apart from the metallurgical side of the question, here again local conditions, entailing a large original outlay for water supply and plant, are not especially favourable. The same objections apply to the Pohle-Croisdaile process, which also by-the-way is not yet sufficiently perfected. Hence the principal features of the Hendryx process in respect to economy of operation, practical completeness of extraction, and relatively low cost of installation, appear to peculiar advantage, and in consequence mining men at Rossland anticipate with the keenest possible interest the result of the investigations and practical tests now being made.

Since the above was written we learn that only one test with the Hendryx process has been made on Rossland ores, this being a sample of heavy iron ore from Kootenay mountain. The saving of gold in this case, however, was 87 per cent., leaving but 93 cents in the tailings. The operation was completed in six hours, the solution used containing about one-twentieth of one per cent. of cyanide, on 80-mesh. Our informant writes: "It is too soon to say that the Hendryx process will revolutionize milling, but the results of the few runs made so far have been truly wonderful. You know what it will mean, to be able to work Rossland or Republic ores assaying less than $5.00, at a profit."

At the meeting of the Hall Mining & Smelting Company held in London at the latter end of last month, the Chairman in the course of his address, referred to the arrangement which some time ago evoked the criticism of a London contemporary, of the leasing of the Silver King Mine to Mr. Davys, the late superintendent. The remarks made by this gentleman in relation to the matter, bear out the opinions we expressed on the occasion when defending the Company from the attack to which we have referred. In closing down the mine, and in subsequently leasing it to Mr. Davys, the directors, far from acting hastily or foolishly, followed the only course open to them as business men. Before deciding to abandon the property, they were informed by their own manager, "who was supposed to know every inch of the mine, that it was completely gutted of ore," and this opinion was corroborated by the testimony of two independent engineers. The Company was then short of funds and consequently had the directors, in the face of expert advice to the contrary, expended further sums in exploiting the property, they would undoubtedly have placed themselves in a very false position in the possible event of failure. It is true that Mr. Davys had persistently maintained his belief in the existence of pay ore beyond the worked-out ground in the upper levels, but it certainly seemed better at the time in the interests of the company that he should be given the opportunity, as lessor, to substantiate his contention at his own expense and risk, rather than the company's money should be put at stake in the endeavour. The shareholders have now at any rate no grounds for either dissatisfaction or complaint.

But with all due allowance for the natural disappointment of the Chairman of the Hall Mines at the poor showing made by the Company during the year, coupled with the knowledge that Mr. Davys had been able to earn from the Silver King an amount sufficient to have covered the Company's loss during the period had it continued to operate the property, his strictures on mining engineers as a class, and the opinion he offers, that "mining experts were worth very much less than the money which one had to pay them in order to obtain them," are surely somewhat childish and silly. In the case in point, two engineers were called in to give a definite opinion on the advisability of continuing work at the mine. They expressed the opinion that the indications did not warrant the risk of further expenditures, and there is no doubt at all that the condition of the mine at that time, the fruitless attempts that had been made to discover other ore bodies, by diamond drilling, fully justified the conclusions arrived at. If an ore body has become exhausted, it does not require special knowledge to determine that the ground can no longer be profitably mined. The advantage of expert opinion in such a case is to ascertain whether there is any thing to indicate a further discovery of ore. At the time the examination of the Silver King was made, the indications were not favourable to this presumption. If the Company had been advised to continue working and operation, as is quite likely, had proved unsuccessful, then the remarks of the Chairman might have been more justly bestowed. But even the average chairman of an English mining company can be wise after the event.

The Great Northern Mines, Ltd., is a new promotion recently advertised in such a manner as to suggest an inquiry whether the promoters have or have not in their advertising methods given cause for doubt as to their absolute sincerity. In a full-page advertisement of their prospectus they claim that "every statement in this prospectus is made advisedly, with a full knowledge of their responsibility as directors." The use of such superlatives and generalities as appear in prospectus does not appear to support this claim. Since, however, some of the mineral claims to be acquired by the new company are believed to give promise of developing, under careful and competent management, into payable mines, we are not in this criticism of the prospectus of the new company expressing any unfavourable opinion of the property. At present we are not even disposed to be too critical of what is stated in the prospectus. On one point, however we should be glad of further information. The nominal capital of the new company has been placed at $1,500,000 in 1,500,000 $1 shares, of which number 100,000 are being offered for public subscription at par. As it is announced that "the company will under no consideration sell more than 100,000 shares" the

question naturally arises: What is to become of the remaining 1,400,000? Are the promoters to take these in payment for 21 mineral claims upon the whole of which, so far as can be learned from the limited definite information given in the prospectus, less than 2,000 feet of development work have been done, and from which it appears that only five tons of ore have been shipped, while the stated expenditure in development and plant is less than $100,000? The question is not here raised as to what is a legitimate value to place on the six groups of claims the new company is to acquire, for that may be a matter of very diverse opinion. But since the public have been invited to subscribe for the 100,000 shares of stock offered for sale they should certainly be informed whether the company proposes to pay $1,400,000 in stock for the 21 claims? If not, what is to become of the shares not applied in purchase of these claims? Is any portion of the shares not so applied to be reserved for treasury purposes? In brief, how much stock are the promoters receiving in this transaction? Prospective buyers of the shares lately offered for sale must determine for themselves how far the $100,000 (possibly less promotion expenses) will go towards enabling the company to carry out the announced intention "to actively develop all these valuable properties." Further, they must draw their own conclusions as to whether it is a business proposition to ask the public to subscribe all the cash capital—far too limited in amount, by the way, for a company having so many claims to equip with plant and develop—and yet to have practically no voice in its expenditure and no effective voting power in the election of directors. If the position be as here suggested the public should realize it at once, but if not it is due to the promoters that the country should be shown, so that it may be plainly seen that their position in this respect is one to which exception can not reasonably be taken. The company starts otherwise under such favourable auspices that it would be most regrettable were it to at the outset mar a promising career by preventable mistakes.

THE PROVINCIAL MINERALOGIST AND POPLAR CREEK.

COMMON justice to Mr. Wm. Fleet Robertson, Provincial Mineralogist for British Columbia, demands that notice be taken of the persistent and bitter attacks recently made upon him in a portion of the Provincial press for certain statements relative to the Poplar Creek mining camp attributed to him by the Victoria *Times*, published by that newspaper on October 14th as his "Impressions of the New Gold Fields." Now at the outset we wish to be clearly understood that in the comment that follows we have no intention of depreciating the value of the surface showings at Poplar Creek. Last October in commenting upon the information supplied to us by our own representative after his visit to the camp, we remarked that "As was to be expected, he characterizes as ridiculous exaggerations many of the sensational statements that have appeared in the Kootenay newspapers, the like of which continue to be published by them. It is gratifying, though, to have his assurance that apart from these picturesque, but unfortunately inaccurate stories there are in the Lower Lardeau surface showings of unusual excellence and great promise." Next, we wish it to be made equally clear that we hold no brief in the defence of the Provincial Mineralogist, nor have we discussed with him the subject under notice.

That there may be no uncertainty as to what the *Times* actually did publish as the impressions of Mr. Robertson regarding Poplar Creek we quote from that journal as follows:—

"The Provincial Mineralogist made a very careful survey of the Poplar Creek country. There have, he says, been exaggerated reports circulated as to the richness of the district. Men are taking advantage of the recent rich finds there to boom properties which have not showing to warrant it. This, of course, is only what might be expected in view of the showing which has been made in some instances. Throughout a very wide area there are, however, strong quartz veins, carrying gold. The great area which is mineralized is a strong point in favour of the territory.

"Mr. Robertson does not for a moment doubt that the veins have good depth and extent enough to satisfy any miner. Ore of most exceptional value has been found in many places, but there is need for a considerable amount of development work before a rule could be established as to the general value of the country as a gold producer.

"On the Lucky Jack and the Swede only has any considerable work beeen done.

"The main body of the ore vein is comparatively low grade in character but there occurs at intervals exceptional richness.

"Work alone will tell whether these phenomenally rich places are to occur frequently enough to give the properties remarkable values.

"With some further development work done the average value of the general ore in the veins could be proved and the commercial importance of the district more fully valued. Pending this the Provincial Mineralogist does not care to express himself too strongly. There is little question that Mr. Robertson is very favourably impressed with the country. The vast extent intersected by strong, well marked quartz veins and the general conformation all impressed him as most favourable to the making of a thriving camp.

"Easy of access, the country has been over-run with prospectors. Every foot of ground in the vicinity has been staked and nothing remains to the new-comer now. Being within a very short distance of the railway, the cost of mining will be greatly reduced. The value as a placer ground is being proved and they are now sinking to bedrock."

A fortnight later Mr. W. B. Pool who, with characteristic effrontery, made it appear that he represented "the prospectors, claim owners and promoters of the Lardeau district," wrote to the Nelson *Daily News*, in part, as under:

"The interview states, among other things, that the rich gold strikes at Poplar Creek have been exaggerated; that the Provincial Mineralogist at the time of his recent hurried visit made a very careful survey of the scene of said strikes, and that certain parties are booming properties on the strength of the phenomenal discoveries.

"Two groups—the Lucky Jack and the Swede group—are mentioned in the interview. These two properties are owned by the Great Northern Mines, Ltd., of which I am the promoter.

"I take emphatic exception to the interview, if the Provincial Mineralogist has been correctly reported, on the following grounds:

"First, because Mr. Robertson being in the employ of the Government and sent by that Government to examine Poplar Creek, had no right, to give out in advance of his official report, any information regarding the camp. Information too that he must have known was grossly misleading and capable of doing irretrievable injury to that section of the Lardeau.

"Secondly, because Mr. Robertson, as stated in the interview, did not 'make a careful survey of the strikes,' as he alleges, but on the contrary visited only a few claims, and is therefore in no position to give an intelligent opinion of the section he was sent to report upon.

"Thirdly, that he can point to no mining engineer, prospector, or other person versed in the veriest rudiments of mining, who having visited the scene of the strikes who has not freely stated that their phenomenally rich surface showings were not exaggerated in any way.

"And fourthly, that by reason of the said strikes Poplar and other creeks were being boomed unworthily to attract capital for legitimate mining investment.

* * * * * * * * *

"Mr. Robertson is reported as saying: 'The vast extent intersected by strong, well-marked quartz veins * * * impressed him as most favourable to the making of a thriving camp.' and further, 'Every foot of ground in the vicinity has been staked and nothing remains for the new-comer.' This from the Provincial Mineralogist, who states he 'made a very careful survey.' What absolute ignorance of the country. Here we have a known mineralized belt 100 miles in length by three to six miles in width, only one-third of which I venture to state has been traversed by those who delve into the hills for the riches old mother earth has so carefully hidden away. It is my opinion, and I speak from an experience of thirteen years as a practical prospector, one of the richest diversified mineral belts in the whole Province.

"The riches and wealth of Poplar, Tenderfoot and other creeks, in fact the numerous camps of the entire Lardeau district have not been overestimated. I challenge Mr. Robertson, in his official report, and not in personal interviews to the press, to tell the truth, and the whole truth of what he saw in the brief period he spent at the scene of the strikes, and I venture to predict that he will say that the surface showings of gold quartz ore ranked with anything of a similar character yet found in the entire Province."

Now, we shall not follow Mr. Pool through his several misquotations of what the *Times* published as Mr. Robertson's impressions, for these are patent to any careful reader. But since Mr. Pool has challenged the Provincial Mineralogist "to tell the truth and the whole truth of what he saw," thereby questioning the veracity of that official, we take this opportunity, the first open to us, of stating our earnest conviction that such a reflection is entirely unwarranted. We do not always agree with the attitude of the Provincial Mineralogist in dealing with mining camps more or less in the prospect stage, but in this instance we think that his "impressions"—assuming them to be his—as published in the *Times*, were fully as favourable as the then condition of Poplar Creek camp justified any responsible man in giving. If the conclusions of the Provincial Mineralogist, in his official capacity, are to have weight, they must be well-founded, which they certainly can not be if he is to take his cue from the standpoint of self-interested company promoters, rather than from that of a plain statement of the position as he finds it.

A CATCH-PENNY POLICY.

Mr. W. B. Pool has in print taken "emphatic exception" to certain information regarding Poplar Creek camp the Provincial Mineralogist is alleged to have given out and which, according to Mr. Pool, "he must have known was grossly misleading." Now the Trout Lake *Topic* newspaper, published right in the heart of the Lardeau district, which has Mr. Pool's particular attention, last month issued as a supplement a six-column sheet, the whole of one side and about one fourth of the other side of which was taken up by a prospectus of a company in the promotion of which Mr. Pool has acknowledged he is interested, and to which he has referred as "my company." The remaining three-fourths of the second page of this sheet were filled with selections (containing sensational and picturesque descriptions, by the way, of gold discoveries on some of the very mining claims Mr. Pool has during the past three months been persistently booming) from other newspapers, as follows: Vancouver *Daily Ledger* of August 15, Rossland *Miner* of September 13, Vancouver correspondence in Victoria *Colonist* of September 15, Winnipeg *Tribune* (no date), and Vancouver *Province* of September 15. From this aggregation of sensationalism we give herewith half a dozen quotations: "The last I saw of Pool, the man who bought the Lucky Jack for $200,000, money made right in the district * * * he was heading for the Canadian Territories with his grip full of nuggets to sell stock." "According to Pool, one of the owners, he considers that when he first looked at the mine, sizing up the proposition with a view to purchase, that there was certainly a million dollars staring him in the face. I think that the chances are there are three or four million dollars right above ground to stope." "We shall have a mill

on the ground as fast as circumstances will permit. Two months after the plant is in operation I conservatively estimate that we shall have pounded out something like a quarter of a million dollars worth of gold." "Gold in nuggets and chunks and strings and hollows in the rocks hemmed with gold. Gold far in the crevices where it could not be seen, but could be felt at arms' length. Gold lying on the ground and guarded with rifles * * * Gold galore. Gold to dream of and wonder at; great fortunes plastered on the rocks for the world to look at. I never hoped to see so much gold and now I have seen the richest surface showing in the world." "The specimens shown to favoured strangers by the Lucky Jack proprietors stagger a man who has never seen such native gold. The first one rolled out is a big block of quartz weighing about 400 pounds. This chunk is in the shape of an immense plum pudding and the nuggets of gold which are literally speckled all over the rock resemble, in comparative size if not in colour, the plums in the plum pudding." "The quartz is the richest that any one in the country has ever seen. They have one piece of quartz of about 300 pounds which is studded all over with bunches of gold clustered in stringers as large as walnuts." As we once again read the foregoing we find ourselves asking: Did Mr. Pool really pay $200,000 *in money* for the Lucky Jack group? Was there a million dollars (not to say four millions) staring him in the face? Will they pound out $250,000 in two months after the plant is in operation? etc., etc. We have already referred to the descriptions above-quoted as picturesque; we will now go further and characterize them, to use Mr. Pool's own words, as "grossly misleading." Mr. Pool was quick to charge that the information the Provincial Mineralogist was alleged to have given about the camp was capable of doing "irretrievable injury to that section of the Lardeau," but what about the injury to those likely to be misled by such flights of imagination as those we have quoted? It is true that these highly-coloured rhapsodies were not incorporated in the prospectus of Mr. Pool's company; but that their being re-printed on the same sheet as that prospectus, seven to twelve weeks after they were first published, was accidental rather than with deliberate intention, few people will believe. To deserve public confidence Mr. Pool should have been as prompt to disclaim the appearance of having concurred in the catch-penny policy displayed in the publication of gross exaggerations in association with the prospectus of a company described as "a proposition which stands unique in the history of mining," as he was to resent the alleged conservatism of the Provincial Mineralogist.

THE HONEST MINING PROMOTER.

THE *Daily Mining Record*, of Denver, Colorado, lately published a lengthy and vigorous protest against what it described as the existing prejudice on the part of what might be characterized as the technical side against the investing side of mining. It remarked: "Students of conditions cannot fail to realize that such a prejudice exists, but it is opposed to the best interests of the industry. The prejudice exists particularly on the part of some mining engineers, some experts, some machinery men and some of the publications devoted to the scientific side of mining, against particularly the mining promoter. The honest mining promoter of legitimate and meritorious propositions is as necessary to the welfare of the industry as the enumerated factors which are opposed to him. There are some unscrupulous promoters and many more clean ones. The *Record* speaks for the latter class.

"The promoter renders valuable service to the industry. Even though his proposition be but a prospect, if the money he raises actually goes into the ground it means that one more prospect is nearer the shipping stage. It is a true saying that prospects are more easily found than the money to develop them. The prospector who first discovers the lead, while rich in prospect, oftentimes knows not where to look for a fresh supply of rude fare on which to exist. It takes money to develop even the most promising prospect, and without the necessary money the prospect is unproductive and comparatively valueless.

"The promoter's business is to interest the necessary capital. He does it usually by the organization of companies, thus uniting the subscriptions of many investors into one large development fund. He does more. By advertising the proposition he is floating he advertises the district in which it is located and thus indirectly benefits other owners of property there, as well as the district generally. In turn the entire industry is benefited.

"Such work is not only beneficial; it is legitimate and most necessary. It is a modern institution, and while the system is ideal in many respects it has been taken advantage of by unscrupulous men. The industry, as all know, is cursed by the floating of questionable schemes and doubtless always will be while suckers continue to be born. The supply is consequent to the demand. If there were no suckers there would be no fakirs. The only safeguard is to educate the public, and in this connection it is gratifying to note that giant strides are being made. A sharp stick must be kept for the bad ones, but their operations must not be condemned at the expense of legitimate and honest promoters and the industry generally.

* * * * * * * *

"The best ends of all concerned in the welfare of the industry can be served by all striving for the common good. Live and let live should be the policy of all. The mining engineer, the expert, the geologist, the mine superintendent, the mining attorney, the surveyor or the machinery man, the publisher of the technical mining paper, are all necessary factors. Without them mining would not have reached the high plane among the industries of to-day. To them is due the pre-eminent position of our magnificent mineral resources. To them is due the credit for the giant strides in the economical production and reduction of ores. All honor to their skill and excellence!

"But where should we be without the promoter? From where should we get the money to develop our mines if it were not for the hustling promoter, who diverts the flow of capital into the necessary channels? Who would present to the public the prospect discovered by the prospector? Who would create the interest and excitement in the newly-discovered fields which result in bringing the necessary attention of capitalists, who furnish the wherewithal for their development?

"It is wrong to denounce all promoters for the evil work of a few. The majority are honest. The business comprises men of splendid reputation, honest, responsible and reliable. It comprises firms some of which are long established and their ratings can be found in the publications of the commercial and mercantile agencies.

"The promoter is necessary and valuable. He is an important factor in the industry. So long as his work is clean the last people in the world to denounce him, or even hinder him, should be those so directly interested in the welfare of the industry as enumerated above."

Summed up, the promoter must be honest, his work must be clean, there must be no deception, his proposition must be legitimate and meritorious—here is the whole position in a nutshell.

ORE WORTH $1,000 PER SACK.

JUST before we go to press the Rossland *Miner* of November 22nd has been received. From it we learn that Mr. W. B. Pool, promoter of the Great Northern Mines, Ltd., and Messrs. E. M. Morgan and P. H. O'Connor, locators of the Lucky Jack mineral claim at Poplar Creek, had been visiting Rossland. The first-named received very flattering notice in the columns of the *Miner,* but with that fact we are not now concerned. We call particular attention, though, to some statements the *Miner* attributed to Mr. Morgan. The gist of what the *Miner* published in this latter connection was that the vein on the Swede group, one of the Poplar Creek properties of the Great Northern Mines, Ltd., averages six feet in width; that to date the average values had been found to be $470 in gold and 80 ozs. in silver; that twelve sacks of ore, each estimated to be worth not less than $1,000, had been taken from an exceptionally rich portion of the vein; and that, besides a considerable quantity of additional ore sacked for shipment, there are about 400 tons of high-grade ore on the dumps of the company's properties at Poplar Creek.

Taking first the average values given—allowing $16 an ounce for the gold, the $470 mentioned means that the ore in this vein had been found to run *on an average* nearly 30 ounces of gold to the ton, besides the 80 ounces of silver also claimed. Or, if fine gold were meant, it contained about 23 ounces to the ton. Is this the actual position, or is this assertion merely more of the "silly newspaper talk" so often ridiculed by well-informed men?

Then as to the twelve sacks, each containing ore "worth not less than $1,000." Assuming that these sacks contain 125 lbs. each, the aggregate weight would be three-quarters of a ton (of 2,000 lbs.). This would place the value of this ore at $16,000 per ton. Taking the gold and silver in like proportion to that above quoted as the average content of the vein we get, approximately, the following results: Gold, 900 ozs. per ton, at $16, equals $14,400; silver, 2,400 ozs. per ton, at 57 cents, equals $1,368; total, $15,768 per ton. Further, these twelve sacks of ore contain at the rate of 206 lbs. avoirdupois of gold and silver per ton; that is, more than one-tenth of the bulk of this selected ore is precious metal. If the weight of each sack be 150 lbs., the value is at the rate of about $13,300 per ton, or if the sacks weigh only 100 lbs. each the minimum value is $20,000 per ton, and the proportion of gold and silver varies accordingly.

The promoters claim that the Great Northern Mines, Ltd., is "a proposition which stands unique in the history of mining." The Rossland *Miner* states that it "is probably the richest group of mining interests ever gathered together in Canada." These are extreme claims to make, but ignoring them for the present, we take this position: If the Great Northern Mines has been organized on a reasonable basis in regard to the relative proportions of stock allotted to the promoters and sellers of claims to the company on the one side, and that available for legitimate development and production purposes on the other, and it can be proved that the company's mining properties can, with its available resources, be made to produce in considerable quantity ore that will return without undue delay even a moderate net profit to its stockholders, we shall give as much publicity as we possibly can to the fact that such is the case; but if it appear to us that it lack these essential elements of success, we shall certainly endeavour to make the position quite clear to the public, and thus do our share towards preventing the progress of the mining industry of British Columbia being hindered by the discouragement that must to a considerable extent result in the latter event.

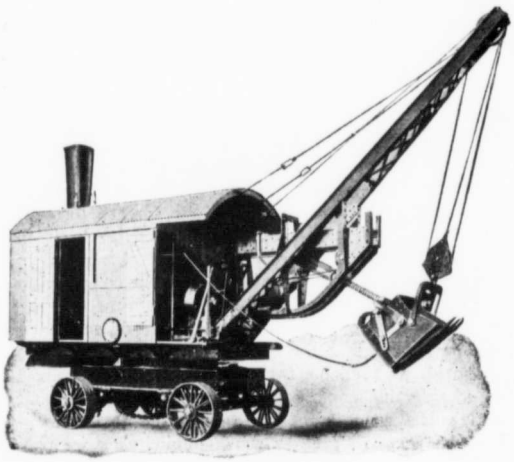
Since the references in earlier pages of this issue to the probable early commencement of payment of dividends by the Granby Company, and to the man Tanghe sentenced to imprisonment for failing to remove his placer claim stakes from the Lucky Jack mineral claim, were printed, later information relative to these matters has been received. A Montreal press despatch published last week announced the declaration of a one per cent. dividend by the Granby Company. It has also beeen reported in the press that an appeal to a higher court on behalf of Tanghe has resulted in his release being ordered. In regard to the former matter, the Granby Company is to be heartily congratulated on having at length reached a dividend-paying stage, and it is to be hoped, most earnestly, that this is but the beginning of a long career of similar, or better, results from its mining and smelting operations, to the benefit of its shareholders directly, and indirectly to that of the Boundary district, and, indeed, of the whole Province.

STEAM SHOVELS IN MINES.

THESE MACHINES AND THEIR WORK IN THE GRANBY COMPANY'S ORE QUARRIES AT PHOENIX, B.C.

(By George E. Cole.)

IT is now some seven months since the first steam shovel was put into operation in the open cuts of the Knob Hill mine at Phoenix. The open cut or quarrying system has long been a prominent feature of the work at this mine, but the innovation of the steam



Thew Automatic Co.'s Standard Type No. 1 Single Truck Steam Shovel.

shovel adds further facilities for the economic handling of low-grade ore.

The conditions for the handling of the ore in this way were excellent—the body large and easy of access. Before the advent of the steam shovel a vast amount of work had been done around the No. 1 tunnel of the Knob Hill. Ore had been broken down on both sides of the tunnel and gradually the cliff had been cut back more than 100 feet from the original entrance.

To the west side of this No. 1 tunnel in what is known as No. 1 pit west the first steam shovel introduced into this district for mining purposes was placed in operation. The shovel was made by the Thew Automatic Shovel Co., of Lorain, Ohio. It is a self-contained machine, the boiler, boom and engine, together with a small coal bunker and a water tank, each holding sufficient for half a day's work, being placed on a revolving platform. The boiler is of the upright tubular type. The engine is of the double reversing class, with cylinders 7 inches by 9 inches, and it runs all the time, and is controlled by an ordinary fly ball governor. The four operating levers for controlling the various motions are the throttle, another that handles the revolving mechanism both ways, a third that raises or lowers the dipper, and a fourth that moves the whole machine on the tracks. These levers are all located at the front end of the platform and are so arranged that the operator may manipulate them without moving from a position that is most advantageous for handling the shovel.

In an accompanying photo the shovel appears fitted with traction wheels. These were found to operate with difficulty in the loose muck and ordinary car wheels were substituted for them, so that the machine is now moved on heavy rails. The track, a 7-foot 4-inch gauge, is laid for some 150 feet from the pit, in order that, when blasting is to be done, the shovel may be moved in a few minutes. When run back to the pit and ready for operation, large clamps are fastened to the track to prevent the wheels from slipping. The shovel is placed right in the face of the muck pile, in order that it may work to advantage on either side as well as in front. The revolving platform permits of the dipper being worked at any position desired. A special feature of the Thew shovel is a horizontal movement of about eight feet given to the dipper. This allows the rock to be shovelled clean along a flat bottom. When the dipper is loading itself the construction of the dipper's arm permits of its turning or swivelling, when striking heavy obstructions, thereby relieving the machine of undue strain. The door of the dipper is so hung as to close at the least possible angle below a horizontal plane. When filled the dipper is hoisted and revolved with the boom, till directly over the ore car. Then the door is dropped by means of a rope pull. The dipper is constructed of steel plate and forgings with hardened steel chisel pointed teeth. It has a capacity of three-quarters of a cubic yard and

No. 1 Pit and Entrance to No. 1 Tunnel before Steam Shovel started work.

is rated to handle 500 to 750 cubic yards (650 tons) per shift of ten hours. The steam shovel is operated by an engineer and a fireman. Another man fixes and cleans the tracks besides releasing the dipper's door.

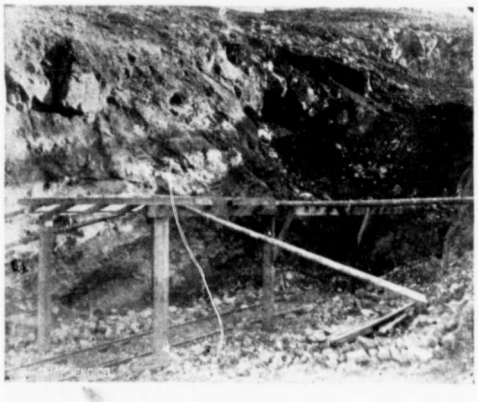
After the ore is loaded it is hauled to the crusher, which can accommodate rocks 30 inches by 42 inches. It often happens that in the shovelling, the large rocks encountered cannot be handled in the dipper itself. A

sort of grab hook, seen in the first large cut, is fastened to the rock and hung from the teeth of the dipper by a chain. The rock is then hoisted and loaded into the car, the hooks releasing when the chain is slack.

Steam Shovel at work in No. 1 Pit—Mouth of Tunnel hidden by loose rock.

The cars, which appear in the photo, are constructed of wood, are side-dumping and have a capacity of two and a half tons. Horses were used in hauling these to and from the crusher bins, which are about 500 feet away. Cars of this style were used with great success, as they could be hauled easily and the load quickly dumped into the bins. A locomotive has recently taken the place of horses. This has a 9-inch by 14-inch cylinder, weighs 14 tons and was made by the Davenport Locomotive Works, of Davenport, Iowa. The locomotive operates on a 36-inch gauge track and hauls cars of steel construction, bottom-dumping and 10-ton capacity. Ore from inside the tunnel is also hauled by this locomotive and crushed before being loaded into the C. P. R. ore cars.

The second shovel to be installed is the old familiar gravel pit digger, used in railroad work. It is being worked in the No. 2 pit which is 50 feet lower than No. 1. Under former conditions the C. P. R. ore cars were loaded directly from mine cars which were run on tracks placed on a trestle built over the railroad track. This trestle has disappeared and a steam shovel is now the intermediary for loading. The ore cars are switched in from the main Knob Hill track and the steam shovel operates on another track placed so as to permit of the dipper reaching the empty car. In this way the shovel loads directly and the ore is crushed at the smelter. This second shovel lacks the com-



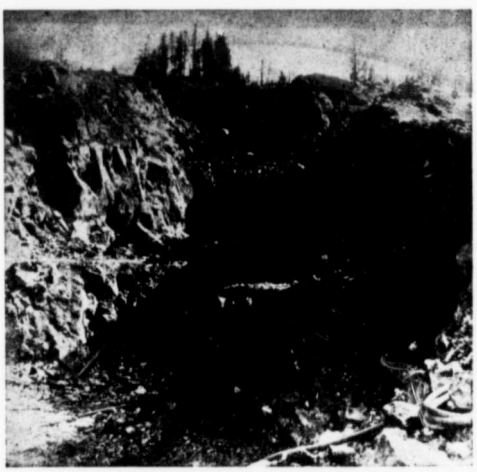
Railroad Cut in No. 2 Pit before Second Steam Shovel commenced work here.

plete rotary movement of the Thew machine and consequently can only load at the side. Further, it has not that horizontal movement which allows the dipper to clean a flat bottom. Nevertheless, though not specisame. In this arrangement each of the machines is at rest except when required to perform the particular duties for which it is intended. Waste of steam and unnecesary wear of parts are thus avoided. By means

Steam Shovel at work in No. 1 Pit—Loose rock cleared away from mouth of Tunnel.

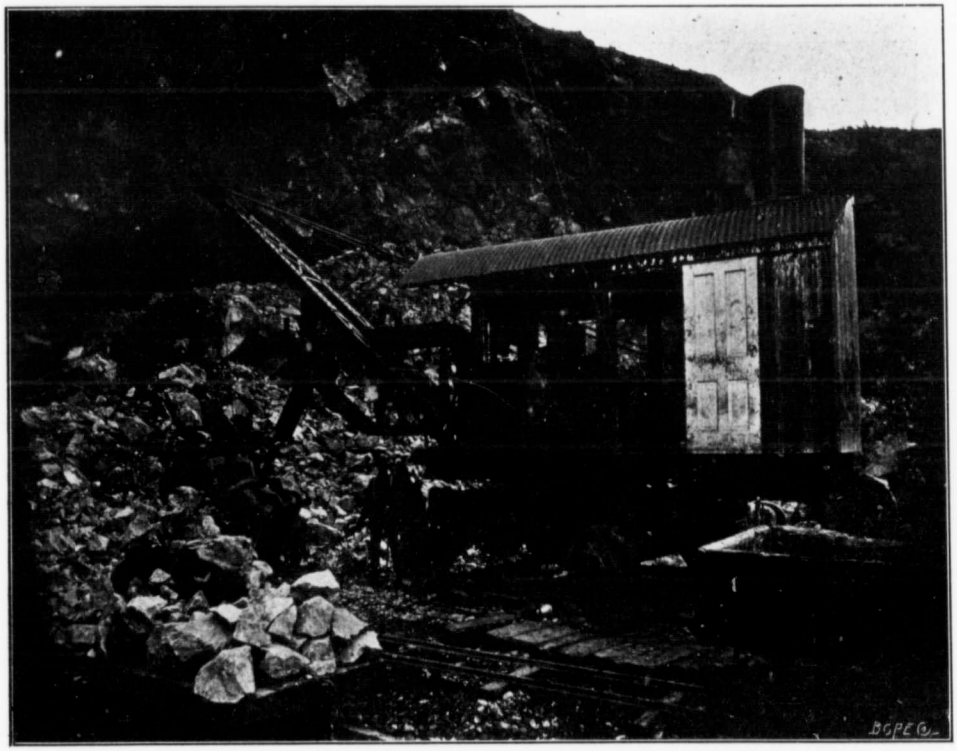
ally constructed for this work, it is operating satisfactorily. Tracks can be put down to the face of the pit, but as yet under conditions by no means the best; however, 300 tons of ore per day is being handled by a machine intended rather to cut into gravel pits, than for the work it is here doing. The dipper of this shovel has a capacity of one and a quarter cubic yards and with lots of muck, convenient tracks and no shortage of ore cars, the present tonnage from No. 2 pit could easily be quadrupled. This shovel is in charge of an engineer, craneman and fireman. Besides these, two men look after the moving of the cars as they are loaded.

The third shovel is a second order from the Thew Automatic Shovel Co. It is in operation at the east side of No. 1 pit and just beyond the tunnel from the first shovel. This machine is of much the same style as the first one but is constructed of heavier material. In it the hoisting, swinging and trolly motions is each operated by independent double reversing engines. By means of the operating levers the operator can instantly start all the machines in either direction or stop the



Open Pit at Higher Level than No. 1.

of these independent engines the speed of the trolly and, therefore, the manipulation of the scoop to secure the best cutting edge are absolutely within the control of the operator. The hoisting drum is controlled by a belt friction which can be closely adjusted by the operator. When this friction is properly set the speed of the hoisting engine can be so regulated by the operator as to suit the conditions, going slowly and carefully through the material which is being handled or moving the scoop very rapidly if so required. This shovel combines all the good features of the first machine with its own improvements. It has a dipper of one and a half cubic yards and will handle 1,000 to 1,500 tons per shift of ten hours. The ore shovelled by this machine is hauled to the crusher, the one locomotive doing the hauling for the first and third shovels. This shovel is in charge of an engineer and fireman, with two extra men to attend to other work.



Steam Shovel at Work—Dipper filling with rock.

The six furnaces now running at the Granby company's smelter at Grand Forks require nearly 2,000 tons of ore a day. This large tonnage is being successfully handled and the increase in the payroll is not nearly in proportion to the amount paid out when four furnaces were in blast.

The success of the steam shovel in these low-grade ore bodies will go a long way towards solving the problem of decreasing the cost and at the same time increasing the shipments. This experiment in the pits or quarries of the Knob Hill mine has placed their success in these open workings beyond a doubt. The question now before the management is, whether or not steam shovels can be used underground, in the large stopes of the Knob Hill and Old Ironsides mines.

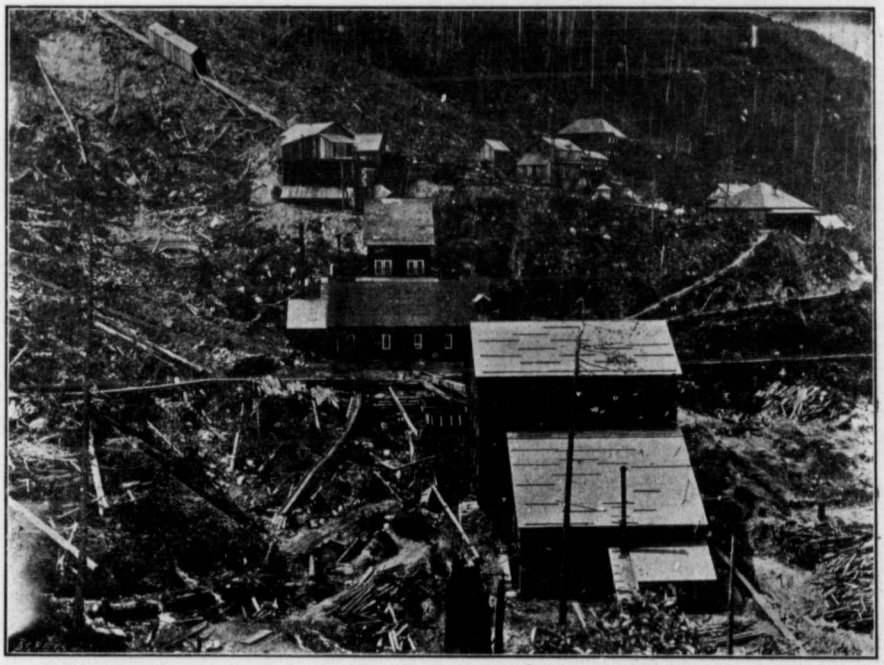
ATHABASCA-VENUS, LTD.

(By E. Jacobs.)

THE Athabasca-Venus, Ltd., is a Canadian company, organized in 1901, having its head office in Toronto, Ontario, and its British Columbia office at Nelson, with Mr. A. H. Gracey as manager. The company acquired the mining properties, situate on Morning Glory Mountain, near Nelson, of the Athabasca Gold Mine, Ltd., and the Venus Gold Mining Co., Ltd., each group containing several mineral claims. The first company to own the Athabasca group was one organized in New Westminster in 1896 and known as the Athabasca Gold Mining Company. In 1898 the British Columbia & New Find Gold Fields Corporation, Ltd., of London, England, purchased the Athabasca property and organized a company called the Athabasca Gold Mine, Ltd., which

company was active for a period, but eventually got into financial difficulties and ceased operations. The published reports for the years 1899 and 1900 showed that 10,404 tons of ore were milled, yielding a total value recovered of $275,123.97. The percentage of recovery in 1900 was 79.4 per cent. and the total value recovered per ton of ore milled $33.66. In 1901, after a period of inactivity, the property, together with that of the neighbouring Venus group, passed into the possession of the Athabasca-Venus Company, which is now steadily and successfully operating it.

THE ATHABASCA.—Altogether some 11,500 tons of ore, averaging about thirty dollars per ton, have been taken out of the Athabasca mine, the present outlook for which is considered to be better than that of any previous time in its history, chiefly for the reason that in the more recent development workings the vein has been found solid and unbroken instead of being split up as in most of the ground already worked. The average width of the quartz is about 12 inches; it varies from eight inches to two feet and has been found to widen to as much as four feet. In No. 1 tunnel driven west on the vein about 400 feet, the ground was much broken. At the end of this tunnel a winze was sunk 200 feet and levels were opened east and west at 100 feet down. The vein was also followed both east and west from the bottom of the winze, this working making what is known as No. 2 level. No material change in the conditions occurred in the west drift, but after the east drift had reached a point about 100 feet from the winze the vein was found to be solid and undisturbed, maintaining this marked improvement almost throughout the remaining 400 feet that had to be driven to give connection with the surface at 200 feet vertical depth below the entrance to No. 1 level. It is expected that below this No. 2 east level the best part of the mine will be found. The development outlined for the immediate future is the sinking of a shaft, starting from the hillside between the portals of the two tunnels, passing, at 90 feet depth, through No. 2 level, and continuing for 200 feet below it. Drifts will be run at 100 feet and 200 feet below No. 2. The 90-foot vertical connection between No. 2 and the surface has already been made and a station has been cut out for a steam hoisting engine. Since last July some 200 tons of ore have been taken from this mine in the course of development.



Athabasca-Venus Mill near Nelson.—Lower terminal of tramways, stamp mill and cyanide plant buildings, offices, etc.

THE VENUS.—The Venus has a total of nearly 5,000 lineal feet of work done in underground development. This mine is worked entirely from tunnel levels, of which there are five. No. 1 is 327 feet in length; No. 2, 650 feet; No. 3, 750 feet, and No. 4 600 feet. No. 5 was only recently started, and it will have to be driven about 1,300 feet to reach the boundary of the claim. The vertical depth between No. 1 and No. 5 is 452 feet. When the face of No. 5 shall be directly under the apex of the vein it will give a depth

of about 800 feet. The general character of the quartz is similar all through the Venus workings, which have opened up the ore shoot for quite 1,000 feet in length, whilst the adjoining Juno claim, farther back on the same mountain, shows at least 500 feet more, so that the ore is known to be continuous for fully 1,500 feet along the course of the vein. The ore from all the workings above No. 5 level can be handled by gravity, the upper terminal of the aerial tramway being below this level.

TRAMWAYS.—The ore is conveyed from the Athabasca mine to the mill on a three-rail gravity tramway having ore cars of a nominal capacity of two tons each. The length of the tramway is 2,150 feet, and the difference in the elevation between top and bottom is 1,120 feet. This tramway will lower about 75 tons per ten-hour shift. At the head of the tramway is a 50-ton ore bin, which is filled from a chute into which the mine cars dump the ore. The tram cars automatically discharge the ore into a 150-ton bin at the bottom of the tram, whence the ore is trammed to the stamp mill.

A two-cable aerial tramway—Riblet's patent automatic—about a mile and a half long, delivers the Venus ore to a 250-ton bin alongside that receiving the Athabasca ore. There are on this tram thirteen buckets, each having a capacity of 900 to 1,000 lbs., and these can deliver 65 to 70 tons of ore each ten-hour shift.

STAMP MILL.—The Athabasca stamp mill consists of two batteries of five stamps each, made by Fraser & Chalmers, the stamps each weighing 930 lbs. The mill was put in by the Athabasca Gold Mine, Ltd. The company now owning it resumed operations with it about twelve months ago and have since run it without interruption. The ore trammed from the ore bins at the bottom of the tramways is dumped on a 4-foot by 10-foot grizzly, between the bars of which the fine ore drops into a 50-ton bin below. The larger ore passes through a 7-inch by 10-inch Blake crusher into the same bin, and thence to the hoppers of two automatic Challenge feeders which deliver it to the stamps at a regulated rate. The electro-plated copper plates of the amalgamating tables are sub-divided into stepped sections, to secure a more even movement of the pulp over them, these having been subsituted for the single 65-inch by 120-inch plates formerly used. A Spitzkasten separator and four Frue vanners—three with plain 6-foot belts for the finer grades of pulp, and a Morse corrugated 4-foot belt for the coarse material—are also included in the mill equipment. The machinery is operated by two Tuthill impact water wheels, working under a pressure head of 398 feet. The water is conveyed from a dam on Give-out Creek in a 24-in. by 20-in. wood flume 2,350 feet long to a 6-ft. by 6-ft. by 12-ft. penstock and thence through 850 feet of 10-inch steel pipe to a 16-inch receiver from which offsets supply the nozzles. The larger water wheel is 24 inches in diameter, equal to developing 58½ horsepower, this driving the battery, the crusher and a 6-kilowatt Edison dynamo for electric lighting. The smaller is a 12-inch wheel, developing between 11 and 12 horsepower and running the vanners only, thus giving them a motion independent of the rest of the mill.

About 66 per cent. of the values in the ore is recovered on the amalgamating plates, and 22 to 23 per cent. is saved by cyaniding. It is proposed to put in a slimes plant, experiments made having shown that with this added the total extraction could be increased to 95 or 96 per cent. of the values in the ore.

CYANIDE PLANT.—The cyanide plant is housed in a separate wood building. It is a very complete and effective plant, with a capacity sufficient to treat 35 tons daily, which, though not large, is in excess of present needs. It embraces (1) settling tanks, (2) straight percolation, assisted by vacuum; (3) deposition on zinc shavings, and (4) acid treatment for refining the product. The plant consists of: One stock solution tank, diameter 4 feet, stave 6 feet; two solution tanks, diameter 10 feet, stave 6 feet; two settling tanks, diameter 14 feet, stave 10 feet; five leaching tanks, diameter 18 feet, stave 4 feet; two gold solution tanks, diameter 10 feet, stave 6 feet; 24 zinc boxes; one clean-up tank, diameter 6 feet, stave 27 inches; one clean-up tank, diameter 4 feet, stave 6 feet; one vacuum filter box; one Hampton zinc lathe; one solution pump and one vacuum pump. The settling tanks are provided with automatic distributors, annular launders for overflow, and three side discharge doors each. The leaching tanks are fitted with filters and centre discharge doors, and the excavation was made in such a manner as to allow of the tailings being sluiced out through the bottoms of the tanks. The zinc boxes are square sheet-iron buckets, each having a capacity of one cubic foot of zinc shavings; each one is independent of the other and can be handled by an iron bail. The centrifugal pump and the lathe are worked by means of an endless single rope drive from one of the shafts in the mill, the drive covering a distance of 142 feet. The building is 100 feet long, 62 feet wide, and 73 feet high; its principal retaining wall is 12 feet thick, 23 feet 6 inches high and 82 feet long. It is heated when necessary by steam from a 15-horsepower Jenckes upright boiler through 3,000 feet of 1-inch pipe. It is situated immediately below the mill, and the bulk of the tailings is conveyed directly to the settling tanks without passing over the vanners. Outside the building a tank has been built of sufficient capacity to hold two days' supply of tailings in case of accident to the cyanide plant or other cause of stoppage.

AIR COMPRESSOR.—The air compressor plant, operated by water flowing from the mill wheels and other sources, is placed lower down the gulch about 1,000 feet from the mill. The plant consists of a Rand duplex class D air compressor having cylinders 14x22 and a 10-foot grooved fly-wheel connected by an 8-rope Dodge drive to a 4-foot Pelton wheel working under a pressure head of 300 feet, the water passing to the wheel from a 6-foot by 6-foot by 8-foot penstock, through 750 feet of 10-inch pipe. Compressed air is delivered to a 42-inch by 10-foot receiver and taken thence through 4,800 feet of 5-inch pipe to the mine

at a pressure sufficient to run half a dozen machine drills, hoist, pump and two forges. Pipe is being delivered for a 6,000-foot extension of the air-pipe line to the Venus mine, in which it is intended to substitute baby machine drills for hand drills as far as practicable.

BUILDINGS, ETC.—The assay office is equipped with everything needful for assay purposes for mines, mill and cyanide works. Ample building accommodation is also provided at the mill for office, quarters for manager and other officials, bunk and boarding houses, cottages for married employees, and other buildings. There are as well separate groups of buildings at the Athabasca and Venus mines, these being some distance from each other and from the mill. A telephone system affords a means of speedy communication between the several parts of the property and with the town of Nelson. At about a mile and a half from Nelson a waggon road branches off from the Hall Mines waggon road and zig-zags up the mountain to the Athabasca mill, having a prevailing five per cent. grade along its length of 21,000 feet.

The Athabasca-Venus appears to have settled down to steady and continuous production on a profit-earning basis, and it has come to be regarded as one of the successful and permanent enterprises of the Nelson Mining Division.

THE B. C. STANDARD MINING CO.

LATE last year a syndicate of Nelson men, including several prominent in connection with mining and smelting enterprises in the district, known as the Standard Development Syndicate, secured under bond the Hunter V., Double Standard, and other mineral claims, situate about five miles southeast of Ymir and on the divide between Hidden Creek and Porcupine Creek, tributaries of the Salmon River. These claims had previously been held by a syndicate represented locally by Mr. Wm. Davis, who did a deal of prospecting on them, opening up a limestone formation containing ore carrying values chiefly in silver and in sufficient quantity to return a good profit above cost of mining, freight and treatment. Recently the B. C. Standard Mining Company was organized with a capital of $200,000 in $1 shares. The directorate consists of Messrs. Jas. Johnstone, president; J. J. Campbell, managing director and secretary-treasurer; Norman Carmichael, Wm. Davis and J. Laing Stocks, all local men. The group of mineral claims acquired by the company consists of the Hunter V., Double Standard, Mercia Fraction, Tugela, Silver Bullion, Aurora, and Vulgar Fraction. For development purposes 40,000 shares have been sold at par.

The limestone formation is nearly surrounded by granitic rock. The ore deposits occur in the limestone and contain grey copper, a little galena, blende, and silver, occurrences of native silver being frequent. The mineral zone is of considerable extent, in places 60 to 80 feet in width and outcropping on the company's claims over a distance of about 2,000 feet. The principal development has been done on the Hunter V. and Double Standard. It includes a shaft on the former, sunk 40 feet, with drifts about 25 feet down and from the bottom, each about 30 feet in length; and on the latter, a shaft 60 feet in depth, with one drift in 45 feet at the 25-foot level, and another being run from the bottom of the shaft. There is also on the Double Standard an adit started about 50 feet from the shaft and run in the hill about 40 feet. All these workings are in ore. The shafts are some 1,400 feet apart, and the one is about 400 feet, vertical depth, lower than the other. Most of this work was done last winter. During the summer of this year much surface prospecting was done, this disclosing the occurrence of several deposits of ore between the shafts, and others lower down the hill on the Double Standard.

During last winter fifteen men were employed breaking ore from different parts of the then known deposits, and, in order to thoroughly test the value of the ore on a commercial scale, some 400 tons were raw-hided down to the Nelson & Fort Sheppard Railway, a distance of about five miles by trail, and shipped thence to the Hall Mining & Smelting Company's smelter at Nelson. The smelter returns gave values in bulk of silver from 19 ozs. to 44 ozs., and in some instances gold from $2 to $3 to the ton. The entire shipment returned a fraction under $10 per ton after deduction of freight and treatment charges. These results were so encouraging and satisfactory that the erection of permanent mine buildings has been proceeded with, and a contract entered into with Mr. B. C. Riblet for the construction of an aerial tramway, about 13,000 feet in length, to connect the mines with the railway at a point about a mile south of Ymir, the intention of the company being to ship ore on a large scale as soon as practicable.

The upper terminal of the aerial tramway is below the workings on both the Hunter V. and the Double Standard, so that the ore can be run down from the "glory holes" or quarries over a two-bucket gravity tram to the aerial tram. Incline adits are being run in the hill, passing under the shafts which will be opened out funnel-shaped, as in the big ore quarries in the Boundary district, so that the ore can be loaded on to the tram cars in the adits below without further handling.

A party of Great Northern railway officials recently visited the locality to look into the matter of shipping facilities, and as a result a spur is to be put in long enough to accommodate a considerable number of cars, in anticipation of the output of the mine being an extensive one before long.

The Standard Company's ore containing, as it does, 30 to 40 per cent. lime and about 25 per cent. silica, is a highly desirable one for fluxing purposes, consequently it is given a very low treatment rate by the smelters, which find it to their advantage to obtain it instead of going to the expense of getting barren lime flux. Further, the ore deposits are so large that, to a considerable extent, quarrying methods at a compara-

tively low cost can be followed. These unusually favourable conditions combine to the advantage of the company, the operations of which should consequently be continuous and profitable.

THE PORTO RICO MINE.

THE Porto Rico mine, in the Ymir district, is situated on the divide between the East Fork of the North Fork of Salmon River and Barrett Creek. It is distant from Ymir between seven and eight miles in an air line, and its elevation is about 6,000 feet above sea level. A waggon road from Porto Rico siding, on the Nelson & Fort Sheppard Railway, provides a means of access to the property.

The claims constituting the Porto Rico group were located in the autumn of 1896. Shortly afterwards they were acquired by an English company, the Canadian Pacific Exploration, Ltd., which at once entered upon an active policy of development. Later it installed a stamp mill and constructed an aerial tramway between the mine and the mill. It is stated that this company expended on the property about $150,000 in development, construction and equipment.

The Porto Rico lead occurs in a diorite formation. It was originally a greenstone dyke, and it is very little altered except where replaced by quartz. Its strike is north-east and it dips to the north at an angle of about 40 degrees. The vein varies in width from three to six feet between walls, and it has a paystreak of about 18 inches of solid quartz. This is mineralized chiefly with pyrrhotite, but iron and copper pyrites occur in it. The values are practically all in gold, the ore from the paystreak ranging from $30 to $40 per ton, the average being nearer the higher figures. Of the values from 70 to 80 per cent. can be saved on the amalgamating plates, the concentrates not carrying much of the gold.

Porto Rico Stamp Mill, Ymir District.

The main workings consist of three adits driven on the pitch of the vein, these together including between 1,000 and 2,000 lineal feet of development work. The lowest adit is in some 600 feet to where the vein faults. A raise from this No. 3 level was made through to No. 2, a height of about 135 feet

The tramway is a Riblet's automatic, two-cable tram, with buckets having a carrying capacity of about 1,000 lbs. each The difference between terminels is 2,150 feet and the difference in elevation about 600

feet. The upper terminal is below the level of No. 3 tunnel, so that ore from all three levels can be conveyed to it without hoisting.

The mill has been idle since 1899. It is a 10-stamp mill with 1,000-lb. stamps, and the equipment also includes a Blake crusher, automatic classifiers, and three Frue vanners. The machinery is operated by a 40-horsepower high-speed engine, steam for which is supplied by two boilers, one 50 and the other 60-horsepower. There is also on the property a 7-drill Rand air compressor.

The Porto Rico is under lease to Mr. Geo. H. Barnhart, formerly superintendent of the Ymir Company's property, which was regarded as one of the most important gold mines in British Columbia. Mr. Barnhart commenced work on the Porto Rico last August. Since then he has been further developing the mine and taking out ore on which he now has the mill running. It is stated that in 1899 this mine yielded gold at the rate of about $20,000 a month. With a mill capacity of 25 to 30 tons each 24 hours, and with ore of a value of $30 to $40 per ton, such a result was, no doubt, easily attainable. Mr. Barnhart may not work the mine on a similar scale to that of the Canadian Pacific Exploration Company, but even if he maintain only a much smaller output than did that company, his enterprise will merit the successful issue his experience in gold mining in the district should enable him to bring about.

CANADIAN GEOLOGICAL SURVEY.

A COPY of the Summary Report on the operations of the Geological Survey of Canada for the calendar year 1902 was received early last month. Dr. Robert Bell, Acting Deputy Head and Director of the Survey, in reviewing the work of the Department, makes the following, among other, comments:—

"The report contains a statement of the work carried on in all branches of the department, both in the office and museum and in the field. It will be seen that a large amount of original research has been accomplished and that the results of much labour and expenditure of previous years have been made available for the use of the public.

"With the exception of the natural history work of the Survey, including palæontology and botany, the whole force of the department has been devoted during the past year to economic geology, with a view to promoting the development of the mineral resources of the Dominion. This applies to the chemical, mineralogical, petrological, topographical, cartological statistical and educational work, as well as to the field operations.

"An erroneous impression prevails among many persons who have never had occasion to inform themselves, as to the nature of the work performed by this department. They imagine that the geologists devote themselves largely to 'theoretical and purely scientific' geology, instead of giving their attention, as they do, entirely to practical work, looking to the development of our various mineral resources.

"The Geological Survey of Canada was first provided for and organized in 1842 and field work was begun in 1843, so that we are now in the 61st year of our existence. Our present organization and the system of work followed by the department have been evolved out of an actual experience of sixty years and in addition to this experience, the officers of the Survey have had a full knowledge of the methods practised by similar Surveys in other countries and have always been ready to consider any suggestion or new departure which might be of advantage in this country. Its present efficient condition is therefore due to the efforts and thoughtful consideration of a very large number of officers of proved ability and devotion, who have successfully laboured and passed away during this long period, as well as to the present staff. Every year the Survey is the object of numerous encomiums from practical scientists, both at home and abroad, who observe and appreciate its work."

After quoting from an editorial article in the Bulletin of the Geographical Society of Paris appreciative of the efficiency of the Survey, of the practical utility of its work in mapping the geological and topographical features of the Dominion, bringing out and making known its great resources, and of the great help afforded both the agricultural and mining communities by giving accurate information as to the value of the land and the probable mineral wealth of the areas explored, Dr. Bell briefly directs attention to the vast amount of good topographical work which has been performed, at a comparatively small cost, by the officers of the department during the sixty years of its existence, which service, although only incidental to the geological work, is, he remarks, worth more to the country than the whole cost of the Survey from the beginning. The work of the several departments of the Survey is next shortly reviewed, and then follow the reports of a number of individual members of the Survey on the work done by themselves and assistants. Space limitations prevent these being noticed here in detail, but the following is the Director's review of those that cover the field work done in the West:—

"The most northerly expedition was that of Mr. R. G. McConnell, who, with Mr. Joseph Keele as assistant, made an instrumental topographical survey and a geological reconnaissance of the McMillan River which falls into the Pelly from the east, a short distance above the point where the latter joins the Lewes to form the Yukon. On reaching the forks of the McMillan the instrumental survey was discontinued and Mr. McConnell explored the northern branch, while Mr. Keele traced the southern. In addition to the work done along the main river and its branches, the hills and mountains on either side were ascended at frequent intervals for the purpose of examining the rocks. It was found that from the mouth of the river to the highest points reached, the main stream and both its branches flowed over crystalline rocks, mostly altered sediments. Samples were collected from a number of quartz veins and it was hoped that

some of these would be found to contain gold, but on assay in the laboratory of the Survey, none was found. The results of the above-described work are, therefore, valuable principally on account of the new topography and geology acquired, as well as the general information in regard to the nature of the country through which the McMillan River flows.

"Up to the past season, no examination had been made by the Geological Survey of the outer or south-western coast of Vancouver Island, except for a few miles at the north-western extremity. As it had become important to obtain information in regard to the rocks and possible economic minerals of this coast, it was decided to send a party to work there. For this service ,Mr. Arthur Webster, a former member of the staff, and Professor Ernest Haycock, of Acadia College, Wolfville, Nova Scotia, were selected. The coast, being bold and exposed to the sweep of the Pacific Ocean, was found difficult to examine by means of a small boat. Still, these gentlemen succeeded in exploring it from the Straits of Fuca to within a short distance of the north-western extremity of the Island. From their reports it will be seen that along the whole coast granites and basic eruptives are largely developed, and unaltered sedimentary rocks are frequently found resting upon them. Ores of copper occur in several places and in some instances they appear to exist in promising quantities.

"Dr. R. A. Daly continued the work begun the previous year along the international boundary between British Columbia and the State of Washington and to a distance of ten miles to the northward of it. The rocks examined in the field consist mostly of altered sediments and eruptives. Dr. Daly is now making a petrographic study of these rocks and of the structural and physiographic geology of the ground he worked over.

"Mr. James M. Macoun was employed as naturalist near the international boundary in the same region as Dr. Daly. Besides studying the *fauna* and *flora* on the ground, he made valuable collections of mammals, birds and plants.

"Mr. R. W. Brock and Mr. W. H. Boyd investigated a mining area of about fifteen miles around the town of Greenwood, in the Boundary District in British Columbia. The latter attended to the topographical work, whilst the former traced out the limits of the various rock masses and studied their petrography. A map of this area is being prepared to show the geology and the hill-features by means of contour lines.

"In the region between the Slave and Peace Rivers of the great Mackenzie basin, Mr. C. Camsell worked in the district to the westward of Fort Smith, which is situated about midway from Athabasca to Great Slave Lakes. He made a track survey of a canoe route between the Slave and Peace Rivers, but his principal work consisted of an investigation as to the occurrence of salt and gypsum in the Devonian rocks of this country. He went by the Athabasca River and returned by way of the Peace.

"Among the Rocky Mountains and along their eastern flanks, coal of a good quality occurs in great quantities in Cretaceous rocks for a long distance northward from the international boundary. In the Crow's Nest Pass coal field, which is being developed on the line of the Canadian Pacific Railway, in a total section of 4,736 feet there are 22 seams with an aggregate thickness of 216 feet of coal, of which more than 100 feet are workable under present conditions. Coal basins run, with some interruptions, for hundreds of miles northwards from the Crow's Nest Pass. In the foothills on the east side of the Rocky Mountains the coal seams are repeated, and they are traversed by the southern branch of the Canadian Pacific Railway, in the district of Alberta. During the past season the geology of a considerable area of the coal belt in the vicinity of Blairmore was investigated by Mr. W. W. Leach. A map of this area, by Mr. Leach, accompanies his report, in which much valuable information is given as to these coal-bearing rocks. Coal crops out in many places and is probably widely distributed in our Prairie region east of the Rocky Mountains. This abundance of good fuel will add greatly to the value of these agricultural lands."

Looking through Dr. G. C. Hoffman's report of the work done in the Chemistry and Mineralogy branches of the Survey's operations for references to British Columbia we find that the Province does not appear to have to any considerable extent availed itself of the advantages these departments offer. Among numerous analyses made were some of coal and lignitic coal from the head of Kettle River, in Yale district; of iron ore from Port Kells on the Fraser River, New Westminster district; of pyrrhotite, in regard to nickel content, from a mountain distant about six miles from the forks of Ice and Beaverfoot Rivers, East Kootenay, from the Thompson near Lytton, and from Shuswap Lake, Yale district; of mineral waters from springs in Lillooet and Cariboo districts, respectively; of a variety of chromite, or chromic iron, from Lillooet district; of clay from Arrow Lake and Texada Island, and of graphite from Rivers Inlet. Examinations were made of minerals not previously met with in the localities named, viz., of several varieties of copper ore from the King Solomon mine, of tremolite from the Morrison mine, and of bismuthinite from the Blue Bell mine, all in the Boundary district; also assays of samples for gold and silver from East and West Kootenay, Yale, Lillooet, New Westminster, Cassiar, and Vancouver Island. The department's mineralogical museum did not receive many additions from British Columbia that year. Mr. R. W. Brock sent in some copper and other specimens; Mr. W. W. Leach sent coal from some of the Crow's Nest Pass coal fields; Mr. C. Hungerford-Pollen contributed a specimen of crystallized hematite from near Fort Steele, and Mr. W. D. Mitchell some silver ores from the Slocan district. Seemingly British Columbia did not send any minerals for inclusion in collections for distribution among the higher educational institutions of the Dominion and elsewhere, nor did the Province take a prominent place among those to whom named collections of minerals were sent. For instance, collections were sent to nineteen educational institutions in Quebec, fourteen in Ontario, eleven in Nova Scotia, nine

in New Brunswick, and only six in British Columbia. This comparatively small number to what we are wont to designate the "mineral Province" of the Dominion does not suggest any considerable interest in the study of minerals in its advanced schools, though possibly some of these institutions have been supplied in earlier years or from other sources.

It is noteworthy that Mr. E. D. Ingall, in his report of the Mines Section, draws attention to the considerably less favourable conditions under which this department does its work in comparison with those that enable the corresponding branch of the United States Geological Survey to attain results that in extent show to much greater advantage. This division of the United States Survey has at its disposal an annual grant of $50,000, and engages in its work a staff of some thirteen members, besides outsiders who write up special industries, whereas the Canadian Mines Section receives about $5,000 and its staff numbers from two to four only. The objects of both branches are practically the same, viz., to study and report upon the economic mineral resources of their respective countries, and upon the mineral industries resulting from their exploitation. After reviewing the position, necessarily under the circumstances less favourable to Canada than to the United States, Mr. Ingall remarks: "In view, therefore, of these facts and of the present needs of the public interested in our mineral resources and industries, it would seem that the time is quite ripe for the reinforcement of the Mines Section, so that it may more vigorously and completely carry out the policy inaugurated in the past, but largely held in abeyance so far by want of means." Turning to the tables of mineral production, it is seen that there was increased production of copper, nickel and arsenic, among the metallic minerals, and of all the non-metallic minerals tabled excepting petroleum. There was a decrease in gold, silver, lead and pig iron. The falling off in total value of all mineral production during the year was, however, only 2.61 per cent. We regret the absence of a table showing the production of the provinces and territories separately, since such a statement would serve to give prominence to the larger production of gold, silver and lead of British Columbia and the Yukon than that of the much larger area of the Dominion situate east of the Rocky Mountains. The large tonnage of metalliferous ores mined in British Columbia is shown, but not in effective comparison with that of other parts of the Dominion.

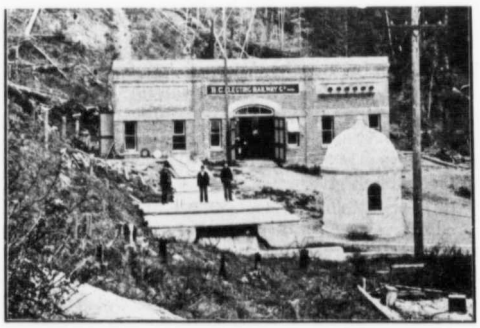
Mr. C. O. Senecal's report on the mapping and engraving department gives a summary of the valuable work done here. That particularly connected with British Columbia includes geological and topographical maps, received from the printer, of Atlin and East Kootenay districts and the Crow's Nest Pass coal fields, respectively, whilst work was in progress on maps connected with Mr. Brock's surveys in West Kootenay and Boundary districts.

Having before them the practical and useful results achieved by the Geological Survey Department, particularly valuable to this Province when the work done has been from the Prairies westward, it is to be hoped that our representatives in the House of Commons will actively support a more liberal appropriation for the use of the Survey, and will urge that its excellent work be continued and enlarged in this Province especially, where abundant and enormous mineral resources are available for utilization and are awaiting development.

GOLDSTREAM-VICTORIA WATER POWER AND ELECTRICAL TRANSMISSION.

(By E. Jacobs.)

THE British Columbia Electric Railway Company has for the past five years operated its electric railway system in Victoria and suburbs by electricity generated by a water power obtained at Goldstream, a stream taking its rise in the hills northwest of the Capital and flowing into Saanich Arm. The water is obtained from the head of Goldstream where, at a distance of about 17 miles from the city, there are three lakes. The Esquimalt Water Works Company, which holds the water right, some years ago built substantial dams to make these lakes suitable for water storage purposes. From these dams the water flows along the bed of Goldstream two and a half



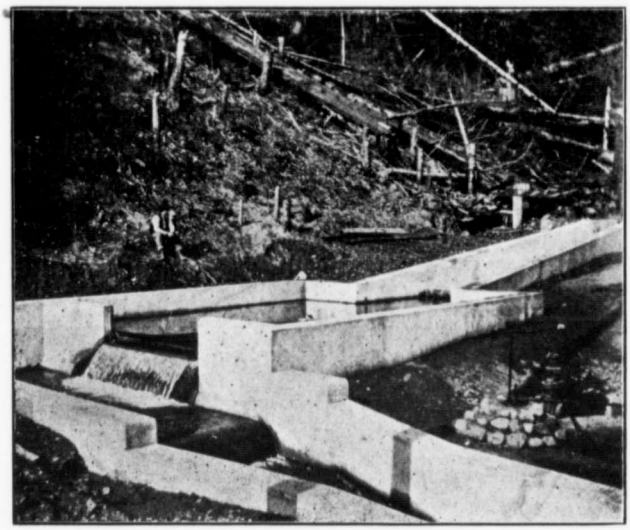
Exterior of Power House, Goldstream.

miles to the balancing reservoir, which has a holding capacity of 220,000,000 gallons and is situate at an altitude of 655 feet above that of the power house. The supply pipe-line is 7,920 feet in length. It is of rivetted sheet steel, and for the first part of its length is 33 inches in diameter and afterwards of 30 inches. The water is delivered at the generating station at a pressure of 285 lbs. per square inch.

The power house is a fire-proof structure, with walls of brick and concrete and roof of tar and gravel. Its dimensions are, length, 56 feet; width, 42 feet, and height, 24 feet, and it is sub-divided into three compartments, viz., a water wheel room, a generator room and a transformer room. The plant installed in it consists of two 38-inch Pelton iron-mounted type impulse water wheels, each developing 600-horsepower, and one 54-inch fitted with Dodd buckets and developing 900-horsepower. Lombard automatic hydraulic governors are used in connection with all these wheels. The speed of the large wheel is controlled

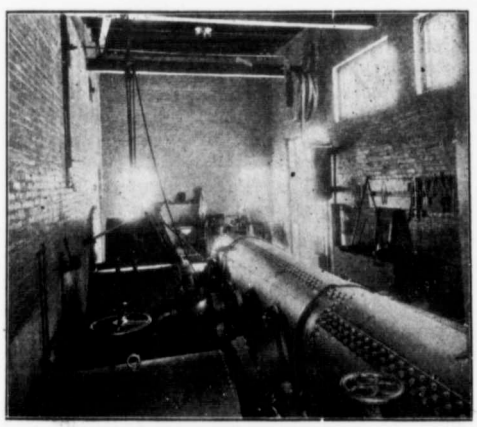
by a needle valve and deflecting nozzle, that of one of the smaller wheels by a deflecting hood, and that of the other by a cut-off hood.

The water wheels are direct-connected to Canadian machines, and the larger to a 500-kilowatt revolving-field alternator. The 12½ kilowatt exciters for the



Tail Race, Weir Basin and Spillway, at Power House.

General Electric 60-cycle three-phase generators, the two smaller to two 360-kilowatt rotating-armature

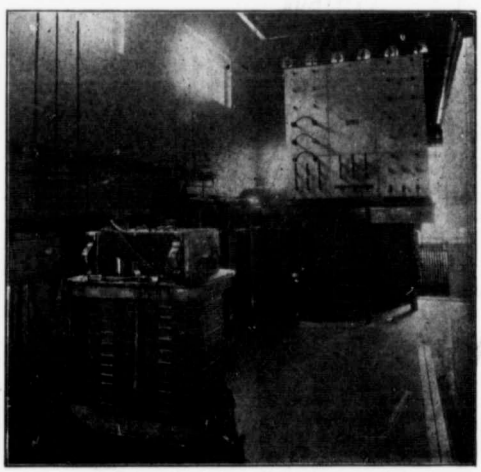


Pelton Water Wheels and Receiver.

smaller generators are belt-driven, whilst a 20-kilowatt exciter is direct-connected to the larger generator. The capacity of each exciter is sufficient to admit of its operating the whole plant and the switching arrangements are such as to provide for its doing so in case of need.

The current, after being generated at 700 volts

pressure, is led to a switchboard having five marble panels—three for the generators, one synchronizing, and one total output—and thence to three sets of step-up transformers, which raise the voltage to 17,300 volts, at which pressure it is delivered to the transmission lines. The high-pressure side of these trans-

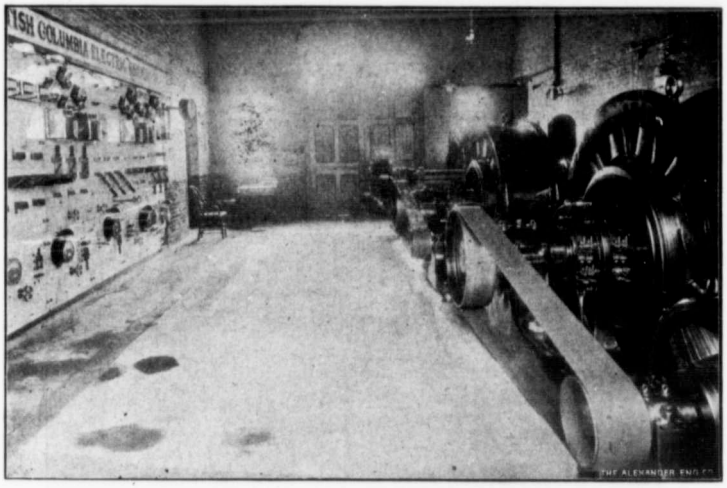


Step-up Transformers and High Pressure Switchboard.

formers is connected Y, with the neutral point grounded at the generating station only. An air blast is supplied to the transformers by two Buffalo blowers, one 50-inch and one 80-inch, driven by direct current motors of 4-horsepower and 8-horsepower, respectively.

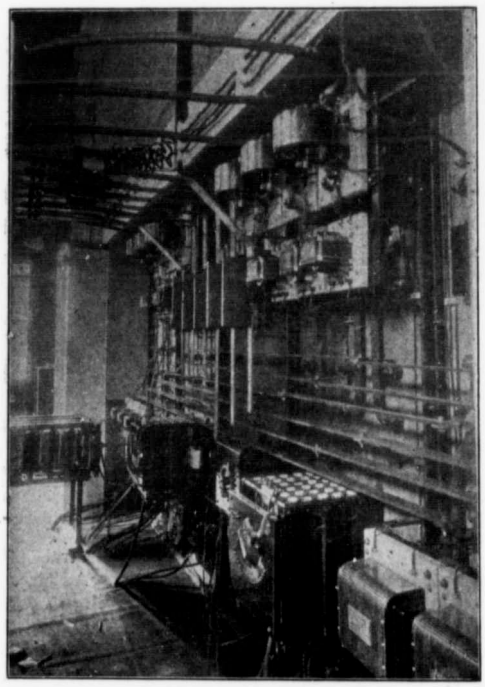
The transmission line is 13 miles in length. It con-

sists of two three-phase circuits of No. 4 B. & S. copper wires mounted on 22,000-volt insulators. Both are strung on the same pole line. For the first mile



Generators and Five-Panel Switchboard.

the line passes through rough, timbered country, to the Esquimalt & Nanaimo Railway, along the right-of-way of which it runs eight miles, and then four miles to Victoria. Owing to there being many high trees along the route of the line the right-of-way has been cleared where necessary to a width of 600 feet, to guard against interruptions to the service from falling trees. The difference in elevation between the generating station and the city is about 475 feet.



Back of Low Pressure Switchboard.

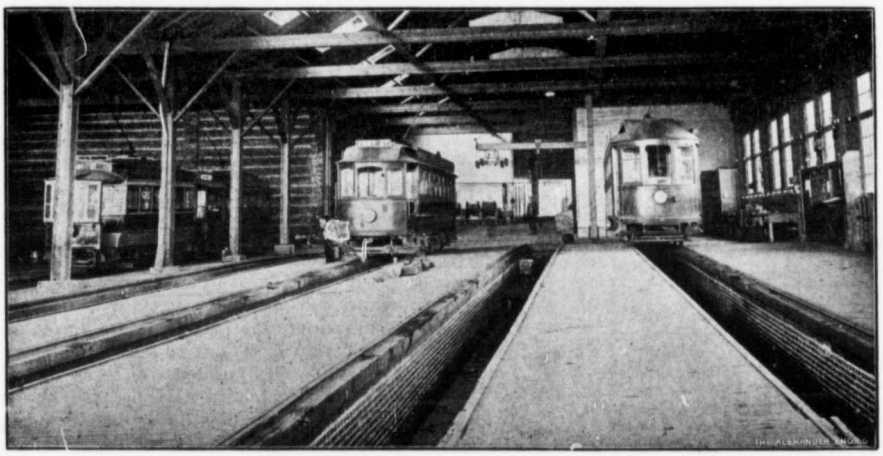
The sub-station in Victoria is a commodious brick building, formerly the power house when steam was used for generating the electric current. The steam-power plant, consisting of six horizontal return tubular boilers, a cross-compound Corliss engine and a high-speed Ball automatic engine, together with an electric equipment including alternating generators with a total capacity of 400 kilowatts, for lighting, and 360-kilowatt 500-volt direct current machines, for railway purposes, switchboard and other requisite electrical appliances, is kept here in reserve in case of accident to the water-developed power.

The conductors are led into the sub-station from the front of the building through 12-inch glazed tile pipes, set at an angle of 45 degrees as a protection against bad weather. They are taken thence through a separate wire well to lightning arresters and reactance coils, situate in the basement, where there are high potential switches so arranged that any set of transformers may be connected to either of the two transmission lines. There are six 125-kilowatt transformers which lower the pressure from that at which it is received to 1,040 volts, for lighting purposes; also six 125-kilowatt transformers reducing the voltage to 350 volts, the secondaries of these being led to two three-phase, 300-kilowatt, 60-cycle, rotary converters, these supplying the direct current for the electric railways and for other purposes, there being about 100 motors of various sizes in use in the city.

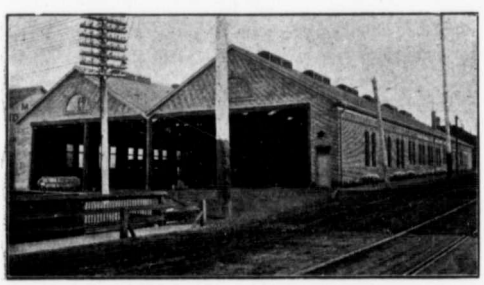
In connection with its lighting system the company

has some 40,000 incandescent, 200 Nernst, and 50 commercial arc lamps. In Victoria the company's patronage is chiefly for commercial and residential lighting, the Corporation of Victoria having its own electric lighting system for lighting the streets of the city. The company also has an extensive suburban lighting connection.

The local electric railway system comprises some fifteen miles of track, including the lines from the City to Esquimalt; Douglas Street to Outer Wharf, and to Beacon Hill and Spring Ridge; Fort Street to Oak Bay and Fort Street to Willows (Exhibition Grounds), respectively. There are 23 cars in all for use on these several lines. The car barn in the city is a comparatively new brick building with fire-proof roof (of P. & B. ready roofing). Its dimensions are 160 feet by 240 feet, and it is large enough to house 40 cars. Its arrangements are modern and all necessary conveniences are provided.



Interior of Car Barn, Victoria.



Exterior of Car Barn, Victoria.

The British Columbia Electric Company, Ltd., is an English organization, with head office in London. Its operations cover electric railways and lighting in Vancouver as well as Victoria, and railways in and to New Westminster from Vancouver. The Vancouver branch of the company's enterprise is by far the most important. The directorate consists of Messrs. R. M. Horne-Payne (chairman), F. S. Barnard, E. L. Evan-Thomas, Hon. M. R. Gifford, C.M.G.; G. P. Norton and R. K. Sperling. Mr. Francis Hope is secretary . The chief officers of the company are, at Vancouver: Messrs. J. Buntzen, general manager; R. H. Sperling, general superintendent; W. F. Gitchell, comptroller; B. W. Slocum, chief engineer, and J. B. Kannie, superintendent of traffic; at Victoria: A. T. Goward, local manager, G. M. Tripp, superintendent, and H. Gibson, superintendent of traffic; and at New Westminster: F. R. Glover, local manager.

THE BOUNTY ON LEAD.

MR. JOHN KEEN has prepared an interesting table showing the price realized by lead producers under the operation of the bounty system as affected by the fluctuations of the London market, upon which settlement is now based.

Lead is worth in London to-day, a little over £11 per long ton. The equivalent to £11 per long ton is, as shown by the table, $2.38 per cental. Assuming that the deduction of $1 per cental, now made by the Canadian smelters, to cover the average cost of marketing pig-lead in the available selling markets, is continued, the net London price to the miner is to-day $1.38 per cental. Add to this price the bonus of 75 cents per cental and the miner receives to-day $2.13 per cental.

The table shows how the amount per cental, paid to the miner, increases with the London price, till that price reaches £12 10s.—its average for the past twenty years—and how, after the London price reaches its average, the sum paid to the miner will remain

stationary at $2.50 per cental until the London price, without the aid of the bonus, affords the equivalent to this amount.

It will be seen that if, during the life of the bonus, the price of lead in London does not rise above £12 10s. per long ton, any increase in the annual production above 33,333 tons will proportionately decrease the amount of bonus payable per ton, but as the amount available per annum is always $500,000, any decrease in the amount of bonus per ton caused by an increase above the average in the London price will permit of the production of a proportionately increased tonnage. Thus, with the London lead at £14 the bonus is 46 cents per cental or $9.20 per ton of 2,000 pounds. At $9.20 per ton $500,000 permits of a production of 54,347 tons per annum. The following is the table:

London Price	Cental	Deduct	Net	Bounty	Total
£ 9 0s	$1.95	$1.00	$ .95	$.75	$1.70
9 5s	2.00	1.00	1.00	.75	1.75
9 10s	2.06	1.00	1.06	.75	1.81
9 15s	2.11	1.00	1.11	.75	1.86
10 0s	2.17	1.00	1.17	.75	1.92
10 5s	2.22	1.00	1.22	.75	1.97
10 10s	2.28	1.00	1.28	.75	2.03
10 15s	2.32	1.00	1.32	.75	2.07
11 0s	2.38	1.00	1.38	.75	2.13
11 5s	2.43	1.00	1.43	.75	2.18
11 10s	2.49	1.00	1.49	.75	2.24
11 15s	2.54	1.00	1.54	.75	2.29
12 0s	2.60	1.00	1.60	.75	2.35
12 5s	2.66	1.00	1.66	.75	2.41
12 10s	2.71	1.00	1.71	.72	2.46
12 15s	2.76	1.00	1.76	.74	2.50
13 0s	2.82	1.00	1.82	.68	2.50
13 5s	2.87	1.00	1.87	.63	2.50
13 10s	2.93	1.00	1.93	.57	2.50
13 15s	2.98	1.00	1.98	.52	2.50
14 0s	3.04	1.00	2.04	.46	2.50
14 5s	3.09	1.00	2.09	.41	2.50
14 10s	3.15	1.00	2.15	.35	2.50
14 15s	3.20	1.00	2.20	.30	2.50
15 0s	3.26	1.00	2.26	.24	2.50
15 5s	3.31	1.00	2.31	.19	2.50
15 10s	3.37	1.00	2.37	.13	2.50
15 15s	3.42	1.00	2.42	.08	2.50
16 0s	3.47	1.00	2.47	.03	2.50

THE ELECTRICAL SMELTING OF COPPER.

THE *Engineering Magazine*, New York, gives in its November number an interesting synopsis of a paper recently presented before the Society of Civil Engineers of France, and published in the *Memoires* of that society, in which M. Ch. Vattier gives an account of the work which has been done at Grenoble with the Keller and Leleux furnace for the electrical smelting of copper.

M. Vattier relates how, in the course of a visit to Chili, he obtained a quantity of ores of copper, iron, and manganese, for purposes of experiment. These he brought to France, and after some preliminary trials at the works at La Praz, he made a careful trial with the furnace at Livet, near Grenoble. The result of these trials was so encouraging that proper modifications in the furnaces were made and plans for the further reduction of copper ores by electricity were arranged.

M. Vattier gives in his paper a report of a test made in the presence of a number of eminent English and French metallurgists, showing that 8,000 kilogrammes, or 8 metric tons, of ore were treated in the electric furnace and fully reduced to a matte in eight hours by the expenditure of 500 kilowatts of electrical energy. This ore contained about 7 per cent. of metallic copper, and the resulting matte showed 43 per cent. of metallic copper, while but 0.1 per cent. of metallic copper was found in the slag. The consumption of the carbon electrodes during the operation amounted to 6 to 7 kilogrammes per ton of ore treated, but by the use of electrodes of artificial graphite this consumption may be reduced to 5 kilogrammes per ton.

The furnace used is of a double type, there being an upper crucible in which the ore is fused in the arc formed between two electrodes, and a lower portion into which the fused material flows, this latter being provided with movable carbon electrodes which may be plunged into the molten bath or raised above the surface. By this arrangement the fusion is fully effected in the first crucible and the reduction finally effected in the second portion, the latter operation being capable of close regulation, the slag being drawn off above and the fused matte by separate openings lower down. The results of numerous experiments with this apparatus have shown that 100 tons of ore can be treated in 24 hours by the expenditure of 3,000 horse-power, so that the cost of the operation may be determined by the cost of power in the locality where the work is done.

M. Vattier goes somewhat into detail in the matter of cost of smelting the same ores in Chili, and shows that the question of the economical employment of electrical energy for smelting over the use of coke furnaces is worthy of consideration in that locality. Thus, at the foot of the Cordilleras, where is situate the "Volcan" mine from which the ores above referred to were taken, coke costs at least 100 francs per metric ton, while ample and uniform hydraulic power is readily and cheaply obtainable. The coke furnaces there in use consume 3,200 kilogrammes of coke per ton of copper produced in the form of matte, so there is a cost of 320 francs per ton on the fuel account. The cost of electrical energy is estimated by M. Vattier as 30 francs per kilowatt year, or at 1.25 kilowatt per ton of copper produced, gives 38 francs for the cost of the current. The cost of electrodes is put at 45 francs, or a total of 83 francs as against 320 francs for the older process, all other charges being assumed to remain unchanged. The advantages of electrical smelting appear, but in a lesser degree, for poorer ores, and in any case the cost should be worked out according to the quantity of ore to be treated and the local canditions under which the work is done.

THE PROVINCIAL MINING ASSOCIATION.

THE Executive of the Provincial Mining Association convened at Kamloops on Monday, the 23rd of November, and continued in session till the following Thursday evening. Those attending were the President, Mr. John Keen, the 1st Vice-President, Mr. J. B. Hobson, the Hon. Secretary, Mr. Mortimer-Lamb, and Messrs. Kirby, Galt, Howse, Leslie Hill and Brown. Mr. A. N. Jones, Secretary to the President, acted as secretary to the meeting.

Discussion on Monday and Tuesday was confined generally to matters dealing with the business administration and working of the organization. The accounts show a considerable deficit, amounting to approximately $1,700, and means must be found to obtain funds to meet not only the existing liabilities, but also to provide for the expense which will necessarily be incurred in carrying out the arrangements for the Convention in February next. The local branches will be asked to subscribe proportionate amounts of the total sum. If the call is properly responded to, the Association will be free from debt, while the tax on each individual is merely nominal. It has also been decided to issue a report of the next Convention proceedings, and such arrangements have been made as to permit, it is hoped, of the publication being printed and bound and in the hands of delegates before they leave for their homes. The Committee also took in hand the revision of the Constitution and By-Laws, and as a result of their labours, have suggested several important amendments and alterations to be submitted for the consideration of the Convention. Among the changes proposed one or two of special importance may be mentioned, namely the nomination of the local branches in each electoral division of members to serve on the Executive Committee, thus insuring fair and equal representation for all sections, while in addition classes and interests will be represented as at present, but the selection of individuals in this case will be placed in the hands of the President. By this plan, the Committee will comprise sixty or more members, instead of thirty, and in consequence less difficulty will be experienced in getting a reasonably large representative attendance at Executive meetings, no matter what part or section of the Province they may be held. Moreover, by the proposed method of selecting committeemen, much confusion will be avoided, and time saved the Convention. It is further suggested that the appointment and dismissal of all salaried officers should rest with the Executive Committee. The wisdom of this suggestion should be quite obvious. A third noteworthy recommendation is that no discrimination should be exercised in respect to the subscription to be paid by wholesale or retail traders or other business men, or organizations, but that instead the annual subscription for all members shall be one dollar, and in the case of mining companies only, ten dollars.

Mr. Goodell, of Boundary, having left the Province, creating a vacancy on the Board, Mr. J. A. Macdonald, of Rossland, was elected a member of the Committee.

On Wednesday two matters of great moment were taken up, the one dealing with the question of taxation and the other with the present inefficiency of the Bureau of Mines. Mr. Kirby, in introducing his motion, which in amended form follows, recommending the investigation by the Government of the system generally in vogue in the Australasian colonies, pointed out that the economic advantage of this system was that it levied on natural resources and not on industry. Mr. Hobson, who moved the amendment to the original resolution, did so on the grounds that other systems of taxation, notably that practised in California, might have equally as much to recommend them, and consequently might also repay due investigation with a view to their adoption in British Columbia, where existing fiscal methods had proved so inadequate. The resolution as unanimously passed reads as follows:—

"In view of the embarrassed state of the finances of the Province, and the objections which have been raised upon this ground towards measures for the relief of the mining industry, and the fact that all demands for such relief during the past two years have been met by a counter demand on the part of the Government then in power for a substitute whereby the revenues of the Province would not suffer loss.

"Be it therefore resolved that this Association desires to re-assert that it has no wish to be relieved at the expense of other industries, but, on the contrary, is now, and has always been, ready to pay its fair and equitable share of the taxation necessary for the economical and business-like conduct of Provincial affairs.

"In the opinion of this Association, natural resources of the Province and not industry, should bear the chief burden of taxation. The enormous areas of valuable land now held under a taxation which is practically insignificant should be made to pay its proper share of the burden and thus relieve the industry.

"The Association therefore respectfully recommends to the Government the advisability of enquiring into and adopting the Australasian or some other equitable and uniform taxation on land, including mining lands, that will tend to increase the revenue, foster the settlement of the lands of the Province, and encourage the development of its great mineral and other resources.

"In view of the vast areas of land held in this Province, it is believed that the revenues from such a system of taxation will more than meet the annual deficit of the Province, and will enable it to materially relieve the mining industry."

The other resolution to which reference has been made, requires little comment. The MINING RECORD has repeatedly called attention to the mediocre and inefficient service rendered the industry of the Province by the Department and Bureau of Mines. It is surely time some change in the direction of reform were brought about. This may be accomplished in many ways, but most important and necessary of all is the introduction of a system providing for the prompt and regular dissemination of information relating to new discoveries of mineral areas, as well as reports of progress and development in established mining centres. It is to be hoped that the recommendation will receive from the Government the attention it merits. The following is the text of the resolution:

"Whereas, there has long been an increasing dissatisfaction with the relation of the Provincial Bureau of Mines to the mining industry, the complaints most prevalent being to the effect that the conditions and resources of various districts have not been fairly or properly presented, and that all efforts made hitherto by mining men towards the betterment of mining conditions have met with opposition instead of assistance from this office. And that moreover, it is complained that the work of the Bureau has apparently been restricted to the collection of statistics, while the industry has not received that assistance in the way of expert scientific study and reports on mineral districts which was expected from the office and which was the main object of its creation, as set out in Section 7 of the 'Bureau of Mines Act, 1895.'

"And whereas it appears to this Association that the co-operation which should exist between the Bureau and the mining community is now entirely wanting, and that the main objects of its creation has been thus defeated:

"Be it therefore resolved that in the opinion of this Association a radical change should be effected in the constitution and conduct of the said Bureau."

At this meeting a well-deserved tribute was paid to the excellent and assiduous service rendered the Association by the President, whose energy and devotion to the interests of the organization may well serve as an example to those less zealously inclined. It is due almost entirely to the President that the administration of the affairs of the Association is now being conducted on such economical and business-like lines, and the committee in expressing their appreciation of these facts, did, we are assured, but express the sentiments of the Association as a body. In this connection, we should also congratulate Mr. Keen and the Association in having secured the services of so indefatigable and zealous a secretary as Mr. Jones. The expeditious and consummate manner in which he performed his duties at Kamloops was greatly appreciated and admired by the members of the committee in attendance there.

The committee also were much gratified by the generous hospitality extended them during their stay by the residents of Kamloops, and the vote of thanks tendered the Mayor and City Council, and to Mr. Ashley and the other officers of the local organization but feebly indicated the gratitude felt by every member of the Executive for courtesy quite embarrassing in its kindness.

THE DRY ORE BELT—NOVEMBER NOTES.

(By W. D. McGregor.)

INTEREST in this camp for the current month would seem to be divided between the proposed Hendryx, or "Parks" electro-cyanide method of treating our gold-silver ores and the improvement in the various working properties.

With regard to the first, there seems little doubt that it will form at least a valuable adjunct to a plant for treating the ores from any mine or group of mines in the belt, and the Arlington people who have been experimenting on these lines for years, give out that they are satisfied and will erect a mill in the spring to handle all their product. With anything like the results given, the process should come into very general use, probably as forming the final feature of a more or less elaborate plant established on good water-power and handling the ores from a series of mines above. In any event the large proportion of low-grade ore now being cut in development of the various mines is the best assurance we can have that some method of working this at a profit will be devised. As for the mines, they speak for themselves.

On Ten-Mile Creek, the Enterprise, given up by the London & B. C. people, has been re-opened under lease by a couple of practical men without much capital but with common sense, who have been able to make the mine pay its way and to pay the royalty. They have secured a three years' lease on the mine and are now completing buildings to take the place of those carried away last spring and expect to work some 75 men, and they have the ore in sight to warrant this; in fact, old-timers there say the mine looks better than at any previous time.

The Ottawa, in spite of their misfortune in not finding their second vein, have cut the big shoot in No. 4 level on the original vein, and are driving along it. It seems larger and quite as rich as in the upper level. The rich band is continuous and the vein practically filled with low-grade ore. A shipment from above ran over the 1,000 ounce mark, every foot cut means quite a little money.

The Black Prince is in the hands of leaseholders who are driving the drifts on No. 2 level and upraising to No. 1 for the ore they cut in the work, and very well satisfied they are with their bargain, as they have ore enough out to put them on velvet for the winter.

The Myrtle owners, after being drowned out of the workings, owing to the abnormal rainfall, have started a 400-foot cross-cut which will give them some 50 feet more depth on the vein and allow them to intercept the surface water in the drifts above this level. They have already shown one of the largest low-grade bodies cut in the camp and hope for a continuance of the high-grade shoot which gives them 200 ozs., smelter returns.

There are numbers of other reports almost without exception encouraging. There are more prospects being opened in a small way by their owners than at any previous period. Shipments are light, owing to the cessation of the Arlington, etc. Still they amount to 1,100 tons from seventeen properties.

RECENT MINING AND METALLURGICAL PATENTS

WE are indebted to Mr. Rowland Brittain, patent attorney of Vancouver for the following report:—

U. S. patent No. 741,712—Process for Treating Refractory Ores. Edwin C. Pohle and Stuart Croasdaile, Denver, Colo., assignors to Metal Volatilization Co., Philadelphia, Pa., issued October 20, 1903.

CLAIMS.

1. The process which consists in effecting a mixture containing the ore, sulphur and a haloid of an alkaline or alkaline-earth metal, the relative proportions of the materials being substantially those quantitatively requisite to produce, when heated in the presence of oxygen, a haloid of the metal or metals to be extracted from the ore and a sulphate of the alkaline or alkaline-earth metal; roasting the mixture with free access of air and agitation at a temperature sufficient to effect the reaction mentioned; and volatilizing and recovering the metal values as haloids or oxyhaloids, substantially as described.

2. The process which consists in preparing a charge containing the ore, sulphur and a chloride of an alkaline or alkaline-earth metal, the relative proportions of the materials being substantially those quantitatively requisite to produce, when heated in the presence of oxygen, chloride of the metals to be extracted from the ore, and a sulphate of the alkaline or alkaline-earth metals; roasting the charge with free access of air and agitation at a temperature sufficient to effect the reaction mentioned; and volatilizing and recovering the metal values as chlorides or oxychlorides, substantially as described.

3. The process which consists in preparing a charge containing the ore, sulphur and a chloride of an alkaline or alkaline-earth metal, the relative proportions of the metals being substantially those quantitatively requisite to produce when heated in the presence of oxygen, a chloride of the metal or metals to be extracted from the ore, and a sulphate of the alkaline or alkaline-earth metal; roasting the mixture with free access of air and agitation at a temperature sufficient to effect the reaction mentioned; and volatilizing and recovering the metallic values as chlorides and oxychlorides from the fumes liberated, by subjecting them to the action of water, substantially as described.

4. The process which consists in preparing a charge containing the ore, sulphur and a chloride of an alkaline or alkaline-earth metal, the relative proportions of the materials being substantially those quantitatively requisite to produce when heated in the presence of oxygen, a chloride of the metal or metals to be extracted from the ore and a sulphate of the alkaline or alkaline-earth metal; roasting the mixture with free access of air and agitation at a temperature sufficient to effect the reaction mentioned; and volatilizing and recovering the metallic values as chlorides or oxychlorides from the fumes liberated by subjecting them to filtration and to the action of water, substantially as described.

5. The process which consists in preparing a charge containing the ore, sulphur and a chloride of an alkaline or alkaline-earth metal, the relative proportions of the materials being substantially those quanitatively requisite to produce, when heated in the presence of oxygen, a chloride of the metal or metals to be extracted from the ore and a sulphate of the alkaline or alkaline-earth metal; roasting the mixture with free access of air and agitation at a temperature above 900 degrees centigrade; and volatilizing and recovering the metallic values as chlorides and oxychlorides from the fumes liberated, substantially as described.

CENTRE STAR MINING CO., LTD.

THE annual general meeting of shareholders in the Centre Star Mining Co., whose Centre Star is one of the most important of the Rossland mines, was held in Toronto, Ontario, on November 24th. Appended is the report of the general manager, Mr. Edmund B. Kirby:

MANAGER'S REPORT.

Developments up to date show that the Centre Star mine has experienced the same general change in the character of its ore deposits which has occurred in all other productive mines of the Rossland district, and which is the general rule throughout the world. This is the transition from the occur-

rence of high-grade bonanza ore bodies, capable of profit under the expensive process of smelting, to masses of lower grade, requiring a cheaper treatment by milling.

As the bodies of smelting ore in the vein become less frequent and their average size diminishes the proportion of this ore to the increasing quantity of development or dead work required to expose it rapidly lessens to a point where its profit is consumed by the cost of the dead work. The relief to be derived from milling will therefore be not only in the direct saving of cost expected, but also in the increased proportion of pay ore to development work, while the stoping of low grade blocks will assist the exploration work in disclosing the unknown bodies of smelting ore contained within their limits.

ORE VALUES AND RESERVES.

The ore sales during the year have been 88,387 tons, averagiing $10.58, smelter's assay value. (Explanatory Note: The values given are based upon the price of 12 cents for copper instead of 16.25 cents, as in previous reports. It is the usual practice of mines in pricing and recording ore to use the "full assay value" instead of the "smelter's gross assay value," which is less. While this plan is often preferable, it has so far been more convenient at the Centre Star mine to use the latter value, which as shown by the accompanying table, has on shipping grades ranged from $2.47 to $3.93 less than the full assay value.) The average assay contents were: gold, 0.50 oz.; silver, 0.40 oz.; copper, 0.99 per cent. The net profit in excess of all expenditures was in round figures $265,000, which has covered the indebtedness of the company and left a surplus of, in round figures, $70,000 in the treasury.

The reserves of smelting ore at the present moment are not large, and are of such shape that their dimensions cannot be accurately estimated.

The development work of the year has continued to add to the great masses of ore too low in grade for smelting but rich enough to afford a profit to successful milling. Now that the mill of the Rossland Power Company assures an outlet for these ores within a few months, their contents will soon be available. It is impossible to present any reliable estimate of their quantity or precise value, because their limits have not been defined, and until milling begins they cannot be exposed and sampled accurately without excessive expense. They occur in extensive bodies 15 to 30 feet in width, and exposed very imperfectly by the mine workings, since these have in the past been directed to the exposure of smelting ore bodies only.

DETAILS OF DEVELOPMENT.

Fourth level—(431 feet in depth measured on the vein.) The fourth level east has been extended to a point 690 feet from the shaft. From the 340 to the 400-foot point, no values. At the 400-foot point a cross-cut shows the ore to be 10 feet in width, averaging $3.45 smelter's gross assay value. From the 400 to the 470-foot point the ore averaged $4.40, smelter's grass assay value. From the 470 to the 500-foot point the ore averaged $14.70 smelter's gross assay value. From the 500 to the 680-foot point the average is $6.20 smelter's gross assay value. At the 500-foot point the ore is 35 feet wide, averaging $5.00 smelter's gross assay value.

Fifth level—(608 feet in depth measured on the vein.) In the fifth level west at a point 65 feet west of the shaft cross-cut winze No. 583 has been sunk 65 feet on the vein, in ore.

Eighth level—(1,077 feet in depth measured on the vein.) The main level west has reached a point 285 feet from the shaft cross-cut. The vein is heavily mineralized but of no value except from the 27 to the 64-foot point, where it averaged $14.80 smelter's gross assay value.

The main level east has reached a point 425 feet from the shaft cross-cut. The vein is heavily mineralized, but of no value.

Ninth level—(1,222 feet in depth measured on the vein.) At the point of intersection by the shaft cross-cut the vein is heavily mineralized and 47 feet in width, but of low grade.

The ninth level west on the hanging side of the vein has reached a point 109 feet from the shaft cross-cut, no values. A heading on the footwall side advanced 17½ feet through heavily mineralized ore, averaging $3.95 smelter's gross assay values.

Ninth level east on hanging side of the vein advanced 114 feet, exposing heavy sulphides of no value. On the footwall side a heading has been driven 20 feet through ore averaging $3.65 smelter's gross assay value.

NECESSITY FOR MILLING.

The necessity for milling has long been foreseen, but although every effort has been made towards the desired end, there has been unexpected delay, owing to unusual difficulties and obstacles. The technical problem presented by the nature of the ore has been a serious one, and the business arrangements necessary for success have also taken time. A satisfactory method of treatment was devised some time ago, while the question of location, water supply, land, freight rates, market for product, and the financing of the milling enterprise were finally settled last August.

A preliminary mill of 200 tons daily capacity, but designed for prompt enlargement to 400 tons, is now being built by the Rossland Power Company, Limited, and is located upon the line of the Canadian Pacific Railway near the town of Trail. It is expected to begin operations by early spring, affording the desired outlet for the milling ores of the Centre Star and War Eagle mines.

THE MINERAL TAX.

The serious obstacle presented to large scale milling by the so-called two per cent. tax imposed by the British Columbia Government upon the gross product of mines has not yet been removed. This tax has the peculiar effect of exacting an increasing proportion of the net profits as the grade of ore lowers. For instance, on the milling grades of the Centre Star and other Rossland mines it will take anywhere from 10 to 20 per cent. of the net profits, which greatly increases the difficulty of securing capital for milling operations. The disastrous effect of this tax in repressing the mining and milling of low-grade ores throughout the Province has forced the mining communities to join in active measures for its repeal, and the matter is being steadily pressed by the Provincial Mining Association. It is believed that the new Legislature will not longer delay the relief so urgently demanded by popular sentiment.

COSTS OF MINING.

It is proper to call special attention to the reduction effected during the last year in the costs of mining, which have lowered all previous records. The figures are as follows:—

Winzes	$38.77 per foot
Raises	29.97 per foot
Drifts	17.09 per foot
Mining ore from stopes	2.07 per ton

The entire cost of mining and delivering ore, including *pro rata* of general expenses, was $2.07 per ton of ore from the stopes, and during several months ranged between $1.93 and $1.96.

Including the additional ore broken by development headings, the average for the year was $1.97 (see table of costs). These figures would be satisfactory in most mining districts of the West, but in view of the extreme toughness of this ore and rock, the moderate rate of output and the severe conditions of mining here,. they are very exceptional.

We have been fortunate in retaining an able staff, the chiefs of departments being Mr. Carl R. Davis, E.M., superintendent, and Mr. Charles V. Jenkins, in charge of the purchasing and accounting. The credit for these results is due to the efficiency of the force, the unusual skill and energy of this staff, and particularly to the superintendent, Mr. Davis, for his management of the mining operations.

CENTRE STAR MINE.

Comparative Statement of Work Done and its Cost, General Expenses Included, per Foot or Ton, to Sept. 30, 1903.

	October 1, 1899 to Sept. 30, 1900.			October 1, 1900 to Sept. 30, 1901.			October 1, 1901 to Sept. 30, 1902.			October 1, 1902 to Sept. 30, 1903.		
	Work done, Feet or tons.	Total Cost.	Cost per Foot or ton	Work done, Feet or tons.	Total Cost.	Cost per Foot or ton	Work done, Feet or tons.	Total Cost.	Cost per Foot or ton	Work done, Feet or tons.	Total Cost.	Cost per Foot or ton
DEVELOPMENT WORK—												
General work, stations, re-timbering, machinery and equipment repairs, maintenance, etc.	.....	$ 15,216.59	.....	.....	$ 15,663.36	.....	.....	$ 13,517.06	.....	.....	$ 3,057.62	.....
Sinking main shaft	228.5	28,250.81	123.63	337.	33,415.68	99.16	362.	34,445.82	95.15	.....	.....	.....
Sinking small shafts or winzes	103.5	6,107.39	59.01	50.5	2,268.93	44.93	50.5	2,283.67	45.22	79	3,062.47	$ 38.77
Raising	903.5	50,606.61	56.01	324.5	10,099.31	31.12	153.	5,081.80	33.21	186.	5,577.43	29.97
Drifting	2421.	64,942.85	26.82	2,107.	42,927.22	20.37	3,997.5	87,664.29	21.93	2,903.5	49,621.49	17.09
Total development work	3656.5	165,124.25	.....	2,819.0	104,374.50	.....	4,563.0	142,992.64	.....	3,168.5	61,319.06	.....
ORE PRODUCTIoN—												
Ore from development work, sold tons	4034.94	.....	.....	4,522.	.....	.....	1,018.	.....	.....	3,934.	.....	.....
Ore from dumps, storage, etc., sold tons	.....	.....	.....	7,774.	2,291.80	0.29	.....	.....	.....	.....	.....	.....
Stoped ore sold	20489.95	73,591.27	3.59	68,123.	151,682.92	2.23	10,069.	29,559.82	2.93	84,453.	174,425.78	2.07
Total ore sold	24524.89	73,591.27	3.00	80,419.0	153,974.73	1.91	11,087.	29,559.82	2.67	88,387.	174,425.78	1.97
SUMMARY—												
Expense of development, per ton of ore sold	24524.89	165,124.25	6.73	80,419.	104,374.50	1.30	11,087.	142,992.64	12.89	88,387.	61,319.06	.70
Expense of production, per ton of ore sold	24524.89	73,591.27	3.00	80,419.	153,974.73	1.91	11,087.	29,559.82	2.67	88,387.	174,425.78	1.97
Total expenditure, per ton of ore sold	24524.89	$ 238,715.52	9.73	80,419.0	$ 258,349.23	$ 3.21	11,087.	$ 172,552.46	$ 15.56	88,387.	$235,744.84	$ 2.67

Product of the Centre Star Mine.

Statement Showing Values and Smelter Charges per Annum, to Sept. 30, 1903.

FOR FISCAL YEAR ENDING	NET TONNAGE	Real or full Assay value. Total Metallic Contents at full N.Y. quota'ns.	Indirect Smelting charge. Difference between N.Y. quotations and smelter price for the metals.	Direct Smelting charge, including freight from the mine.	Total Smelting charge direct and indirect.	Smelter's Gross Assay Value, deducting indirect charges only.	Smelter's Net Value, after deducting both indirect and direct charg's from the real assay value.
Production prior to Oct. 1, 1898 approximate 1898	2,550.00						$ 29,600.00
September 30th, 1899	6,596.56	$ 150,629.33	$ 25,915.84	$ 39,579.08	$ 65,494.92	$ 124,713.49	$ 85,134.41
September 30th, 1900	24,524.89	493,894.13	87,655.60	147,130.34	234,785.94	406,238.53	259,108.19
September 30th, 1901	80,419.24	1,457,479.57	280,320.20	482,515.66	762,835.86	1,177,159.37	694,643.71
September 30th, 1902	11,087.65	180,104.99	32,498.13	57,853.89	90,352.02	147,606.86	89,752.97
September 30th, 1903	88,387.07	1,153,930.66	218,521.56	404,633.37	623,154.93	935,409.10	530,775.73
	211,015.41	$3,436,038.68	$644,911.33	$1,131,712.34	$1,776,623.67	$2,791,127.35	$1,659,415.01

CENTRE STAR MINE—Table of Mine Costs.
For Twelve Months Ending September 30th, 1903.

	DEVELOPMENT WORK			ORE EXTRACTION.
	Sinking Small Shafts.	Raising	Drifting	
Total advance, feet	79.	186.	2903.5	
Ore stoped, tons				84,453
	COST PER FOOT.			Cost Per Ton
1. Drilling	6.10	7.31	4.53	.405
2. Blasting	2.48	2.40	1.08	.03
3. Explosives	3.13	3.72	2.72	.145
4. General Mine Supplies	.51	.64	.43	.04
5. Mine Lighting—Candles	.26	.19	.14	.015
6. Mine Lighting—Electric	.30	.22	.13	.01
7. Smithing	1.00	1.14	.72	.065
8. Tramming and Shovelling, direct	5.51	.65	1.21	.24
9. Tramming and Shovelling, apportioned	.64	.35	.42	.085
10. Timbering—Labour	1.81	3.08	.02	.19
11. Timbering—Material	.33	.57	.01	.11
12. Machine Drill Fittings and Repairs	.86	.94	.60	.055
13. General Mine Labour	1.57	1.18	.84	.09
14. Hoisting—Underground	4.79	....	....	....
15. Hoisting—Main Shaft	1.48	.89	.94	.19
16. Compressed Air	1.74	2.08	1.07	.12
17. Mine Ventilation	.23	.17	.13	.015
18. Pumping	1.71	1.09	.34	.035
19. Assaying	.55	.47	.14	.03
20. Surveying	.20	.17	.11	.01
21. General Expense	3.57	2.71	1.51	.185
	38.77	29.97	17.09	2.065

SOME NOTES FROM THE MINING CAMPS.

THE COAST.

AFTER a temporary suspension, due to shortage of coke, the Crofton smelter has resumed operations, a supply of fuel having been obtained from Fernie. Ore is being steadily shipped from the Lenora, the average copper values being 5.97 per cent. A new ore-body is said to have been uncovered at the 100-foot level, and a new strike is reported to have been made to the southwest of the present workings on the surface. The situation at the mine has of late considerably improved. The Tyee continues to make a most satisfactory showing, the returns for October giving a return of $42,197.

A Van Anda correspondent writes: The Marble Bay shaft has been carried down another 100 feet, and the ore-body is being explored from that point. The waste dump purchased by the Crofton smelter, is being shipped rapidly to Crofton. There is so much lime in the waste that it has been found available for fluxing. The Cornell mine is making regular shipments to Ladysmith. Drifting is continuing on the 560-foot level. The Copper Queen winze, on the 500-foot level, is down eighty feet. It is in solid ore from the collar down. Drifts will be run from the winze to prove the size of the ore body. The tunnel on the Puget Sound Iron mine property to tap the bottom of the shaft is in 100 feet. The work is being done with a steam drill. The tunnel will be about 400 feet long to the shaft, and give a depth of 150 feet at the shaft. The tunnel and the drift already run from the shaft give a depth of more than 300 feet of high-grade ore. Work on the copper lead on the Puget Sound Iron mine property is continuing, and ore is being quarried off the surface. A tunnel is being driven from the Paxton iron mine which, if continued, will tap the copper at a depth of about 250 feet. The Silver Crown which was staked early in the summer, is giving promise of a good prospect. A trial shipment of ore from the Nutcracker recently has proved satisfactory. A good grade of copper ore is being taken from the Golden Slipper. Arrangements have been completed for the shipment of ore from the Gribble Island mines to the Ladysmith smelter. Development operations have been resumed at the Yreka, Quatsino Sound.

LYTTON.

At Lytton another large steel dredge is being built and this and a dredge previously in use will be operated on the Fraser River at Lytton next spring. It is stated that the lowest returns obtained from prospecting work on the Lytton Company's leases, were 11½ cents per cubic yard, while at twelve feet from the surface in mid-stream, the gravel ran as high as $1.87 per cubic yard.

KAMLOOPS.

There is every reason to suppose that the report of the engineer sent by the Ashanti Lands, an English company, to inspect the Iron Mask mine, will be a favourable one, an order having already been placed with the Vancouver Engineering Co. to supply machinery for a concentrator plant, which is to be installed on the flat at the foot of the hill near the mine. Regular shipments of ore are now being made from the Copper King to the Crofton smelter at the rate of about three carloads a week.

CARIBOO.

At Barkerville the country is already well covered with snow, and all placer mining operations have been suspended. Pumping work is, however, in progress at the deep level mines at Willow River and Slough Creek. The shaft at the Cariboo Consolidated mine is now down 150 feet and it is proposed to commence driving under the creek immediately. At La Fontaine work has commenced on a long drift from the bottom of the shaft. Surveys are about completed at the Consolidated Hydraulic mine, Bullion, for the extension of the company's water system. Estimates of the

cost of the proposed work will shortly be placed before the directors by the manager, Mr. Hobson. It is reported that Morehead Lake is now two feet higher than it was last spring when the water was turned on in the pits. This being so, it is not unreasonable to hope for a fair supply of water, at least, for next season's operations. The Thistle Gold Mine at Eight-Mile Lake is said to have made a final clean-up for the season of $50,000.

LARDEAU.

Several instances of claim-jumping are reported from Poplar Creek. One case was summarily dealt with, a man named Tanghe, the locator of a placer claim over the Lucky Jack ground, having disregarded an order to move his stakes, being committed to serve three months' imprisonment with hard labour. It is reported that several small shipments of high-grade ore from the Gold Park, Lucky Jack and other claims will be made shortly. Several properties, including the Spyglass, have been bonded in the past few weeks. A rich strike of free gold is reported to have been made on the Silver Dollar on Mohawk Creek, while a good lead of high-grade silver-lead ore was encountered last week on the Mammoth group on Goat Mountain. The Northwestern Development Syndicate has been re-constructed and it is stated sufficient additional capital has been provided to pay off the liabilities and place the company on a sound footing. Operations will probably be resumed before the end of the year. The Nettie L. near Ferguson has been closed down, pending the completion of the new Silver Cup combination mill, the London directors concluding that there was no necessity to increase the present accumulation of ore on the dumps and in the stopes. The mill will probably not be completed under two months.

SLOCAN.

It is reported that a new ore body three feet wide has been encountered in the No. 6 tunnel at the Last Chance mine, assays from which have given 170 ozs. silver and 60 per cent. lead. A promising strike is also reported to have been made on the Ivanhoe in No. 8 tunnel. At this property forty-five men are at present employed, but the working force is shortly to be increased. It is also proposed to install machine drills. There are said to be altogether some four hundred and fifty men employed in the mines about Sandon. During the year about 1,800 tons of zinc ore have been ready for shipment which will probably be sent out before February. This supply will be principally drawn from the Payne, Ruth, Ivanhoe, Wakefield, and one or two others. In the Slocan City division the Bachelor group, on Carpenter Creek, has been bonded to Chicago men for $55,000.

Both the Arlington and Howard Fraction mines were closed down this month, the former for the reason that sufficient ore has been developed to maintain a three years' mill supply. A mill to treat this ore is to be built at the property during the winter. Mr. Koch, who has had a lease of the upper workings of the Enterprise mine for the past six months, has secured leasehold rights over the property for a further period of three years. The mine is the property of the Enterprise Mine, Ltd., of London, under whose auspices it proved unprofitable.

At the Ottawa a big ore shoot has been encountered in the long tunnel, the easterly vein having widened out at depth to fourteen inches, showing much native silver. During the year 1,400 feet of development work has been done on this property. The Bachelor group at Three Forks has been bonded on working terms.

The important announcement is made that negotiations have been completed for the early establishment of a smelter at Kaslo.

YMIR.

Development on a large scale has recently been started at the Wilcox to locate the rich Fourth of July vein at depth. The No. 2 tunnel on the Wilcox claim proper, already in on the No. 2 Wilcox vein about 400 feet is being run further in such a direction as to tap the Fourth of July vein some 300 feet below the present workings, the distance to be driven being less than 400 feet. A body of high-grade ore, averaging over $60 to the ton, has recently been encountered. The monthly mill returns since the beginning of the year have shown consistent and continuous improvement.

In October the Wilcox mine produced a gold brick weighing 325 ozs., concentrates having a net value of $500, and two and a half carloads of galena, the net value of which was $2.500. The net profits for the month were $5,000.

A small test mill of two stamps has been set up on the Gold Cup group and a first shipment of ore will be made this week.

A promising ore body has been opened up on the Tamarac, upon which property development work was resumed three months ago.

The returns from the Ymir mine for September are unsatisfactory, but it is officially intimated, however, that increased working costs are merely of a temporary character, caused by repairs.

The manager of the Arlington mine, Erie, sends the following report: During the month of October 130 tons of ore were shipped to the Hall Mines Smelter at Nelson. The net smelter returns were $5,395.98, and the expenses in British Columbia were $3,487.27, leaving a profit of $1,908.71.

At the Foghorn the long adit, which during the last three years has been driven about 1,200, the greater part of the way through hard rock, has at length cut at a depth of about 900 feet a vein of carbonate ore upon which a prospect shaft had previously been sunk in ore of excellent grade. Besides tapping this vein of high-grade ore the adit passed through, at about 600 feet in, a body of concentrating ore stated to be 46 feet in width. The success of the Golden Monarch Mining and Milling Co. in cutting this vein at depth on the Foghorn is encouraging owners of neighbouring claims to prepare to do similar development work.

NELSON.

The Gold Hill mine on Forty-nine Creek, has made a first shipment of free milling ore to the Hall Mines smelter for test purposes. The net returns on one lot of four tons gave $267.94, deducting freight, and treatment charges, and on another lot of five tons, $79.48. The owners propose to build a mill as soon as the extent of the ore body is proved.

ROSSLAND.

The Rossland representative of the Canadian Ore Concentration Company, writes to the MINING RECORD that the results obtained so far from the tests given to the Elmore process in that district have been so encouraging as to justify the assumption of its successful application to the treatment of Rossland ores, and adds that the company has just received an order for a 50-ton plant from War Eagle-Centre Star Companies, and expects that similar orders will ere long follow.

The Josie mine has resumed operations after a brief suspension caused by a temporary disability of the C. P. R. to haul the ore which is being shipped to the Greenwood smelter. The railway company has now provided against a recurrence of the difficulty. It is expected that shipments will also shortly be made from the No. 1, which has been closed down for several weeks past.

The Le Roi No. 2 concentrator is now being operated at its full capacity.

BOUNDARY.

The two new furnaces at the Granby Company's works have been blown-in. The company is taking active measures to provide its own fuel supply, through the International Coal and Coke Co. and a contract, it is reported, has just been let for the construction of a hundred and four coke ovens, at the Blairmore collieries.

The Bank of England claim near Phoenix has been leased and bonded. Work on the property has already been started. A test shipment of ore is to be made shortly. The Helen claim at Greenwood was also bonded last month. Returns

from the last shipment of 20 tons of ore from the Providence mine, gave values of 2.44 oz. gold, 327.80 oz. silver and 7.60 per cent. lead per ton. The net proceeds were $4,403.89, or rather over $220 per ton.

CAMP M'KINNEY.

It is stated that by practical experiment the Hendryx process has been found to be highly suitable to the treatment of ore from the Waterloo mine, a recovery of 87 per cent. of the values having been reported to have been made by the test mill at Spokane. The saving in handling the high-grade gold concentrates would be $13 a ton. The concentrates are now being hauled to the railway by a wagon for 28 miles at a cost of perhaps $5 a ton, and treatment at the Trail smelter brings the total costs up to about $11 a ton. The smelter only pays $19 an ounce for the gold, instead of $20.67. In the case of four-ounce gold ore this means a further reduction by the smelter of $0.50 on the gold, making actual costs of freight and smelter treatment $17.50.

The Hendryx process, in connection with the stamp mill at the Waterloo mine, will probably entail at the outside a direct cost of $2.50 a ton for milling. By saving 98 per cent. of the gold the indirect loss is only $1.05 a ton, and the maximum costs for treatment and losses in milling will amount to about $4 a ton, as against the present costs of $17.50 a ton.

The tests by the Hendryx process were conducted at Spokane by Mr. C. M. Fassett, who is reported to have made the following statements: "The ore ran 3.99 ounces in gold and 3.4 ounces in silver. We recovered 98 per cent. of the gold and practically all of the silver. In tests on the tailings from the plates before concentrating, the Hendryx tailings went only $1.65 a ton. The tailings, which are crushed in the stamps of 30-mesh, are re-crushed to 80-mesh at a cost perhaps of 50 or 60 cents a ton. We also tested the 30-mesh tailings from the concentrator without re-grinding. The feed assayed $6.41, and the result was a saving of 72 per cent. of the gold and practically all of the silver. The tailings from the Hendryx agitator assayed only $1.86 a ton. The solution on the tailings from the plates carried about one pound of cyanide to the ton. The tailings from the concentrator were treated with a half pound of cyanide to the ton. If the Waterloo company accept Dr. Hendryx's recommendations, they will crush in the stamps under a weak solution of cyanide and will then send the tailings from the plates to be re-ground to 80-mesh size. The pulp will then be run into settling tanks and the original solution will be pumped back to the stamps while the pulp will be fed into the Hendryx agitator. The agitator and the new crushing machinery will not cost more than $2,500."

EAST KOOTENAY.

Alluvial gold mining in East Kootenay is again beginning to assume important proportions, the returns obtained from the past summer's workings having proven most encouraging. It is ascertained that next year six companies will be engaged in hydraulicing on Wild Horse Creek alone, while Perry Creek, Bull River, Skookum Chuck Creek and Findlay Creek, are also to be extensively exploited.

The Gold Commissioner for the district thus summarizes progress made this year: "In metalliferous mining much has been done in the direction of opening up new properties, but ore shipments have been limited. A company is now building a big flume at Bull River, and proposes to work the bed for placer gold. On St. Mary's River extensive placer operations have been in progress, and to a lesser degree on Wild Horse."

The Crow's Nest Coal Co. distributed $147,856.90 in wages in September.

The North Star mine having completed its contract with the Hall Mines smelter, has decided to suspend shipping operations for the time being.

COMPANY NOTES.

HIGHLAND (KOOTENAY, B.C.) MINING CO., LTD.—Development has been energetically carried on at the Highland mine, Ainsworth, ever since the mine was started up last year under lease, and 45 to 50 men have been employed right along. This mine is the largest shipper of lead in the Province. Its product is a low-grade silver-lead ore, which is partially sorted at the mine, the clean ore being shipped direct to the Hall Mining & Smelting Co.'s smelter and the remainder concentrated at the Highland 150-ton concentrator. Shipments have been maintained at the rate of about 500 tons each month except for a short period when, owing to shortness of water, the concentrator could not be operated. Mr. Norman Carmichael, who was also engineer in charge of the Duncan United Mines Company's Poorman mine, supervises operations at the Highland.

YMIR.—The mine manager reports the return for the month of September, 1903, by cable, as follows:—60 stamps ran 27 days, and crushed 4,600 tons, (2,000 lbs.) of ore, producing 910 ozs. bullion. The estimated realizable value (gross) of the product is $10,000; 260 tons of concentrates, shipped, gross estimated value, $6,000; cyanide plant treated, 3,050 tons (2,000 lbs.) of tailings producing bullion having estimated gross value of $2,000; sundry revenue, $1,140; total, $19,140; working expenses, $20,000; loss, $860. There has been expended during the month on development, $5,000. Official note.—Cabled advices received from the manager state that increased working costs likely to be only temporary and are caused by repairs.

TYEE (Mt. Sicker).—During October the smelter ran 20 days; 2,805 tons of ore smelted, giving a return of $42,197, after deduction of refining charges and amount paid for custom ore.

B. C. STANDARD CO.—Late news from the B. C. Standard Company's Hunter V. mine near Ymir camp is that the tunnel has been connected with the shaft of the Double Standard claim, which is a part of the Hunter V. group. It is the intention to drop the ore through this shaft after it is taken from the main quarry. Work on the tramway is making good progress and it is expected that it will be finished and ready for operation some time in December. An auxiliary aerial tramway from the Hunter V. workings down to the upper terminal ore bins is being put in. It has a length of 1,800 feet. An incline tunnel from the surface to intersect the shaft of the Hunter V. is being driven so as to be ready when shipments begin, which will be on the completion of the tramway.

LE ROI (Rossland.—The following information has been cabled to England by the manager: "Shipped from the mine to the Northport smelter during the past month 13,825 tons of ore, containing 4,319 ozs. of gold, 4,150 ozs. of silver, and 230,656 lbs. copper. Has resulted in a loss of $20,500. Shipped from the dump to the Northport smelter during the past month 5,615 tons of ore, containing 1,250 ozs. of gold, 3,300 ozs. of silver, and $37,500 lbs. copper. Estimated profit on this ore, $2,750."

MINING RETURNS AND STATISTICS.

ROSSLAND.

Weekly average shipments of about 8,000 tons are being maintained. Production for the present year to the end of November approximate 340,000 tons.

BOUNDARY.

The Boundary district 1903 output has reached over 600,000 tons, and production is being made at the rate of nearly 19,000 tons a week.

SLOCAN.

Ore shipments from the Slocan and Slocan City divisions for the year to date aggregate approximately 13,500 tons.

YUKON.

Returns of gold shipments from Dawson for the past season's working are: May, $173,781; June, $3,824,480; July, $2,015,586; August, $1,442,286; September, $1,930,175; October, $1,250,000. Total, $10,137,308. These figures do not include shipments from White Horse and Forty Mile.

COAL MINING NOTES.

THE Provincial Government is pressing the enforcement of the law against the underground working of Chinese miners in the Vancouver Island collieries and Inspector Morgan has been ordered to Cumberland, and is now making another effort to take the Chinese out of the coal mines. The Government some time ago gave instructions to Inspector Morgan to enforce the Act, which provides that no Chinese shall be employed underground in coal mines. The Inspector instituted proceedings, and obtained a judgment against the Wellington Colliery Company. Mr. James Dunsmuir, however, gave notice of an appeal. The Minister of Mines states that the Government desires the matter of jurisdiction to be settled. The Government has, therefore, decided to give the Wellington Colliery Company notice that the appeal is to be prosecuted with all expedition, otherwise another action will be taken against the Company to compel it to exclude the Chinese. The Government is apparently determined to enforce the statute, unless proved *ultra vires*. Mr. Dunsmuir says that he does not know the reason for the delay. The matter is in the hands of his solicitors.

In the aggregate the October output of the Crow's Nest collieries amounted to 71,300 tons, of which 17,867 tons represented coke shipments. There are about 5,000 tons of coke stacked at the ovens awaiting shipment, the railway company being unable seemingly to provide at present a sufficient number of cars to keep pace with the requirements.

Coal and coke shipments from Fernie have been seriously restricted during November by the failure or inability of the C. P. R. to supply cars, and in consequence it is feared that the ovens may be banked and colliery operations in general largely curtailed. The ovens are meanwhile being operated at about a third the full production capacity.

Excellent reports have been received of the progress being made by the Western Fuel Company, of Nanaimo, in the development of the No. 1 mine, a ten-foot seam of good coal having recently been encountered in the south workings at Departure Bay. The Company is installing additional pumps and boilers.

The foreign coal shipments from the mines at Ladysmith for the month of October reached a total of 22,795 tons.

The foreign shipments of the Western Fuel Co. for the month of October aggregated 14,344 tons of coal.

MACHINERY NOTES.

A DREDGE, the largest of the kind in Canada, is being built by the Wm. Hamilton Manufacturing Co., Ltd., for the Iowa-Lillooet Mining Co., for operation on the Fraser River, near Lillooet. The dredge, which is of the New Zealand bucket type, has been so designed as to resist very severe strain, and all weak parts have been especially strengthened. The hull is 100 feet long and 34 feet in width, and is built of Douglas fir. The bow is sheeted with steel plate. The main gantry, which supports the ladder, is constructed of steel. The ladder, which is 72 feet in length, weighs 90,000 pounds, and has a continuous chain of buckets revolving around it. Each of these buckets is capable of carrying six cubic feet of gravel, and is made of steel plate with lips of 1x7 inch nickel steel. The bushing and pins connecting these buckets are made of the best manganese steel. There are four links to each bucket, and they are made of 2x6 inch steel, and bushed with manganese steel. The gravel is discharged from these buckets at the rate of 15 yards per minute into a revolving screen 5 inch by 4 inch, made of steel plate perforated with holes. The gravel in passing through this screen is washed, the water being discharged into the screen at the rate of 35,000 gallons per minute. All the small gravel and gold filters through the screen on to the tables, and the larger material passes through to the elevator or stocker, which delivers it 40 feet from the stern of the dredge and stacks it 25 feet above the water. The tables are so designed as to save all the gold, having a fanning motion. The gravel, after passing over the tables, passes through an undercurrent quick-silver trap. This dredge is operated by five engines, supplied by one large boiler. The main engine, which operates the buckets, screen and gold tables, is 116 horse-power marine. The pump engine is direct-connected and is 35 horse-power marine, the ladder engine, 30 horse-power horizontal. The engine running the dynamo is 6 horse-power. The line engine is marine type, 40 horse-power direct-connected to the winches. The winches handle four side lines of 1 inch steel cable, and two head lines of 1¼ inch steel cable; these lines are used for moving or holding the dredge in place. The total weight of the machinery in the dredge is 230 tons. According to to contract this dredge was to have been ready for operation by the 1st of November, 1903, but on account of the 'longshoremen's strike at Montreal, the manufacturers have been delayed, and it will be at least the middle of December before operations are commenced.

It is stated that the British America Dredging Co., operating on Pine Creek, Atlin, proposes to install two additional dredges on the property. The company this year built a six-mile pole line in connection with the electric lighting plant; two miles of ditch and flume, and eighteen hundred feet of 30-inch steel pipe were laid; one and a half miles of road was built, and altogether the company expended about $250,000 in Atlin.

Recent heavy snowfalls have somewhat retarded work on the Hunter V. tramway at Ymir, but it is hoped that the system will be completed before the end of the year.

It is understood that the initial equipment of the International Coal & Coke Company's colliery at Coleman, Alberta, providing for a production of 2,000 tons of coal daily will cost about $150,000. This will also include the erection of the initial battery of 104 coke ovens. The contract for the supply of the entire electrical equipment, including motors, generators, and electrical locomotives, has been awarded to the Westinghouse Electrical Company, of Pittsburg. The orders for the remainder of the plant were placed with other firms as follows: The chain car haul for conveying the coal from the mine to the tipple, the Link Belt Machinery Company, Chicago; crossover dump, the Mill & Mine Supply Company, Pittsburg; engines, the Phoenix Iron Works Company, Meadsville, Pa.; pumps, the Stilwell-Bierce & Smith-Vaile Company, of Dayton, Ohio; fan for ventilating purposes, the Clifford Company, Jeannette, Pa.; bin slide fixtures, the Connellsville Manufacturing & Mines Supply Company, Connellsville, Pa. In every instance delivery before March 1st, 1904, is guaranteed, and the boilers and some structural steel will be purchased in Canada, but the contracts have not yet been awarded.

The Granby Company has ordered from the Davenport Machine Works, of Davenport, Iowa, two locomotives, 9-in. cylinders, 14-in. stroke, for use in hauling ore in Nos.1 and 2 tunnels at the company's mines at Phœnix.

The Jas. Cooper Manufacturing Co., Ltd., a well-known Canadian machinery manufacturing firm, is in liquidation. A statement to October 31, issued by the provisional liquidator, Mr. G. A. Savage, of Montreal, Quebec, shows liabilities on open accounts, bills payable, loans, etc., to be $378,600.47, and on capital stock account (subscribed and fully paid) $198,000; total $576,600.47. The total assets are shown at a valuation of $562,882.58, this including factories (buildings and land), plant, stock on hand, book debts, etc.

Electricity for power and lighting is to be used at the Providence mine, Greenwood, operating hoist and the machine drills and lighting the mine workings and buildings. The electrical apparatus has been installed at the mine by Mr. E. G. Warren, manager of the Greenwood Electric Company.

The Joshua Hendy Company of San Francisco has issued a new catalogue on the Pender concentrator, which can be had free on application.

The Allis-Chalmers Company, Chicago, Ill., is distributing Catalogue No. 62. This gives a list of the foreign users of Corliss engines, pumping engines, hoisting engines, compressors and blowing engines. A number of half-tone illustrations

show typical installations of Reynolds engines of every description.

The Western Fuel Company, of Nanaimo, has placed an order with the Fairbanks Company, Vancouver, for a 400-horsepower Rand air compressor of modern design. The plant is to be large and up-to-date, and is, according to contract, to be completed and installed by January 15th, 1904. The closing of this contract, together with an order for a compressor plant of smaller size for the Imperial Gold Mining Company, of Okanagan, and a stamp mill for Skookumchuck River, is a source of gratification to the local firm, which only recently extended its operations to the mining machinery business.

PERSONALS.

Mr. Chris. Outhett has been appointed assayer to the Copper King mine, Kamloops.

Mr. E. P. Arthur has been appointed superintendent of the Wilcox mine, in the Ymir district.

Mr. Ferdinand Deitzsch has been appointed consulting engineer for the Giant mine, Rossland.

Mr. W. Fleet Robertson, Provincial Mineralogist, has lately been spending a vacation in the East.

Mr. J. D. Sword, M.E., recently returned from a visit of inspection of the mining camps on Prince of Wales Island.

Mr. Jas. Rutherford, M.E., has completed the examination for a Scotch syndicate of an extensive coal area at Cowley, Alberta.

Mr. P. White, formerly superintendent of the Wilcox mine, at Ymir, B.C., has gone to Carleton, Quebec, on a vacation.

Mr. E. E. Reynolds, of Wilkesbarre, Pa., has been engaged by the International Coal & Coke Co. as general superintendent.

Mr. R. T. Ward, manager of the Horsefly Gold Mining Company, is down from Harper's Camp on a visit to the Coast cities.

Mr. J. D. Graham, formerly Gold Commissioner for the Atlin district, has returned from a visit to France, and is now in Victoria.

Mr. Alexander Sharp, M.E., of Rossland, was last month reported as being a patient in the Calgary hospital, suffering from inflammation.

Mr. J. Hislop, of Fort Steele, has been gazetted Mining Recorder for the Fort Steele Mining Division, vice Mr. L. W. Patmore, resigned.

Mr. Smith Curtis, managing director of the Denoro Mines, Ltd., Boundary district, was in Victoria last week, going thence to Seattle.

Mr. W. Yolen Williams, superintendent of the Granby mines, has left Phoenix on a two-months' vacation to Minnesota and Michigan.

The Hon. Richard McBride, Premier of British Columbia, has resigned the portfolio of Lands and Works to assume ministerial charge of the Department of Mines.

Mr. Jas. A Baker, of Slocan City, district executive officer of the Western Federation of Miners, has gone to Denver, Colorado, to attend a meeting of the Executive Board.

Mr. Wm. Fowler, who opened up the Providence mine and afterwards sold it for $50,000 to the present owners, left Greenwood last month on a visit to his old home in Scotland.

Mr. Jos. Mackay, for some time past sub-recorder at Harper's Creek, Horsefly, Cariboo, has returned to the Coast, the sub-recording office he has had charge of having been closed.

Mr. J. B. Hobson, general manager of the Consolidated Cariboo Hydraulic Mining Company, is down from Bullion, and will shortly proceed to Toronto to meet the directors of the company.

Mr. Paul Johnson, E.M., has returned to Hadley, Prince of Wales Island, where the work of building the smelter for the Alaska Smelting & Refining Company is making steady progress.

Mr. H. T. Pemberton, business manager of the Montreal & Boston Copper Co., Boundary Falls, recently took a business trip to Montreal, Quebec, where is situate the company's head office.

Mr. H. B. Ferguson, accountant at the Consolidated Cariboo Hydraulic Mine, Bullion, B.C., is making a short visit to the Coast. During the winter he will be in charge of the company's properties.

Mr. M. K. Rodgers, manager of the company owning the Nickel Plate mine and group near Hedley, Similkameen, returned to Hedley early last month from a visit to Vancouver and other Coast points.

Mr. G. G. S. Lindsey, of Toronto, secretary of the Crow's Nest Pass Coal Company, was in Victoria several days last month. He was accompanied by Mr. Jas. McEvoy, the company's geologist and mining engineer.

Mr. Geo. S. Waterlow, deputy chairman of the Snowshoe Gold & Copper Mines, Ltd., and a director of the Le Roi Mining Company, Ltd., left British Columbia on November 3 on his return to his home in England.

Mr. D. Davies has been appointed comptroller of the Crow's Nest Pass Coal Company with office at Fernie, B. C. His duties include those of purchasing agent, and trade catalogues will be gladly received by him.

Mr. G. B. McMillan has returned to Nelson, B.C., from the iron properties on Gray's Creek, Crawford Bay. There is now five feet of snow at the mine, and it has been decided to suspend development work until spring.

Mr. Nicholas J. Tregear, manager of the Lenora mine, Mt. Sicker, is at Quatsino, V.I., where he is putting the Yreka mine on a shipping basis, the intention being to ship ore next month to the smelter at Crofton.

Mr. Richard H. Pascoe, formerly of Rossland and latterly one of the mine officials at Gem, Idaho, has been appointed to the superintendency of the Cornucopia mines in Oregon under the management of Mr. Bernard Macdonald.

Mr. A. L. Dean, formerly superintendent of the Canadian Smelting Works, at Trail, has left Victoria for Tasmania, having been appointed metallurgist at the Mt. Lyell Mining & Railway Co.'s smelter on the west coast of Tasmania.

Mr. John Lowles, M.P., England, whose death was announced last month, was a director of the New Gold Fields of British Columbia, owning the Velvet mine near Rossland. At one time he was associated with several Klondike companies.

Mr. A. H. Reeder has succeeded Mr. J. H. Tonkin as general manager of the Crow's Nest Coal Co. at Fernie. Mr. Reeder gained a large experience in coal mining in Virginia and Pennsylvania and lately has acted as coal expert for the C. P. R.

It is stated that the resignation of Mr. Albert I. Goodell as Superintendent of the Montreal & Boston Copper Co.'s smelter at Boundary Falls, tendered to the directors several months ago, has now taken effect. The name of Mr. Goodell's successor has not yet been announced.

Mr. Irving H. Reynolds will shortly retire from the Allis-Chalmers Company, and the duties of the Chief Engineer will be assumed by the engineers in charge of the various departments, these engineers availing themselves of the advice of Mr. Edwin Reynolds, consulting engineer of the company.

COMPANY MEETINGS AND REPORTS.

HALL MINING & SMELTING CO.

Mr. J. J. Campbell, the business manager, submits the following report for the year ending June 30th, 1903:—

Mining Department—I took over the property of the mining department from Mr. Gifford in July, 1902. Early in August the negotiations with Mr. Davys for the lease of the mine were completed, and, about the middle of that month, he began work with a small force, which he has gradually increased until now about 35 men are employed. He has not used power drills, and, as he has only been working above No. 5 tunnel, there has been neither hoisting nor pumping, and consequently the steam plant has not been in use. His first attempt to get through the caved ground to reach the good ore in the hanging wall vein was unsuccessful, but approach was then made from a different direction, and a considerable amount of ore of good grade extracted, and he estimates that he has there, above No. 4 level, more than 1,000 tons averaging 50 ounces of silver and 7 per cent. copper. The ore mined during the year was mostly taken from that place and from the main vein between winze "G" and winze "F" up to the surface, and from east of winze "G" on the No. 3 level in the main vein.

The tonnage of ore mined to June 30th was:—2,508 tons containing 72,614 ounces silver, or an average of 28.95 ozs. per ton, and 201,580 lbs. copper, or an average of 4.02 per cent. The gross value of this, on the basis of 95 per cent. of the silver, and 70 per cent. of the wet assay of the copper, was $48,336.89, or an average of $19.27. The royalty paid on this amounted to $3,324.16, or an average of 6.88 per cent of the gross value, of $1.32½ per ton.

Upon the termination of the first year of his lease, he exercised his option of renewal for another year, as no new ore body had been discovered. He proposes to carry on the following work in the immediate future: To continue stoping the ore from the hanging wall streak, and from the north vein in No. 5 tunnel; and, for the purpose of taking out the north vein above No. 3 tunnel, he is now putting in chutes, and expects to stope from there about 1,500 tons. He is putting 3-in. pipe in the old workings and will try to syphon the water down 20 feet below its present level. This would enable him to work down from the stope made by Mr. Gifford between No. 6 and No. 5, as there is some peacock copper showing, making towards the west. He also proposes to cross-cut No. 1 tunnel towards the hanging wall to locate the hanging wall vein.

On the American Flag, he has stripped the vein in three places north of the present workings on the Kootenay Bonanza, showing low-grade copper ore. South from No. 1 tunnel, on the top of the hill, he has opened up the south vein, also showing low-grade ore.

During the year, I have disposed of as much as possible of the supplies which were on hand; but as Mr. Davys feels confident that there is plenty of or still in the mine, and hopes to so develop it as to warrant the use of power again, the machinery and plant have been retained, as well as some supplies, for use in such cases.

Emma Mine (Fluxing Ore).—Early in July, 1902, I secured an option on a one-quarter interest in the Emma group, composed of the Emma, Jumbo, Minnie Moore and Mountain Rose, situated about two miles from Eholt on the branch of the C. P. R. from Eholt to Phoenix, and at once began work on the Emma claim on two different veins a few hundred feet apart. As the results were encouraging, a boiler and hoist were installed, steam drills used, and bins of 400 tons capacity and a railway siding were built, so that the ore might be mined and loaded as cheaply as possible. During the year 17,946 tons of ore were mined and shipped, of which quantity we smelted 8,163 tons, the remainder being shipped to other smelters. This ore was quarried from the smaller vein, 15 to 25 feet wide, as it was thought advisable, on account of the installation of plant, to concentrate our work at one point, and this vein seemed to promise a better grade of magnetite ore. Pits have been sunk at other points on the vein; an inclined drift carried 118 feet into the hill from the bottom of the face of the quarry and this has been connected with the surface by a shaft 100 feet in depth. A quarry will now be opened at this point on the surface, and the ore be dropped into the cars in the drift, and taken up the incline to the bins. Recent indications in the workings encourage the hope that we may be successful in finding copper ore of paying grade; and, in the meantime, the excess of iron in the ore makes it sufficiently valuable as a flux to enable me to dispose of it profitably. Work has also been resumed on the wide vein, and, if results warrant it, further development will be carried on. At present, its appearance is quite encouraging, and the vein appears to be about 70 feet wide. The workings on this are immediately beside the spur to the B. C. mine, but the ore is below the level of the railway, and must be raised to load.

Smelting Department.—The operations of this department have been seriously handicapped by the very great depression from which the silver-lead, and dry silver mines have been suffering, some particulars of which Mr. Hedley gives in his report. The total production of ores containing over 20 per cent. lead was 21,202 tons, and this was competed for by the Canadian Smelting Works of Trail, the Puget Sound Reduction Company of Everett, the Selby Smelting and Lead Company of San Francisco, the American Smelting and Refining Company (during part of the year), and ourselves— our receipts having been 6,356 tons.

At the beginning of 1902 we had reduced our rates as low as we thought possible, and at the beginning of 1903 we made a further reduction in lead ore rates by changing the zinc limit from 8 per cent. to 10 per cent. in the effort to stimulate the output. The prices of metals were so low, however, that the production continued to decrease, and we had to suffer from insufficient supplies as well as low rates. The ores available were not only insufficient in quantity, but the assortment was undesirable, requiring a large proportion of barren flux, thus increasing expense and decreasing the tonnage of ore smelted daily, and the earning power of the furnaces, and causing greater losses of metals. In September, the price of coke was advanced from $4 to $4.25, and later on to $4.50.

Mr. Hedley, the smelter manager, reports as follows:—The year ending the 30th June, 1903, was begun with very fair prospects, silver was quoted at 52 to 53 cents, and lead at £11 2s. 6d. We were receiving a very good assortment of ore from various mines, and had an excellent promise from others, with a hope that certain properties would produce in quantity a desirable ore that would greatly lessen our fluxing costs. These latter, however, disappointed us completely. In September the Whitewater ceased shipping; in October the Arlington; in December the Molly Gibson; and in December the Ymir product went elsewhere. Silver dropped to 46⅜ cents on October 14th, and lead to £10 11s. 3d. on December 12th. The end of December found us with practically clean bins, and very little ore of any class being received; and since that date we have had the greatest difficulty in procuring ore for one furnace.

During the last few days of December and first of January, we took advantage of the slackness of receipts to concentrate our stock of lead-copper matte to about 240 tons carrying about 33 per cent. copper, but finding it impossible to procure a favourable rate for treatment, held it till April and re-concentrated to 46 per cent. copper, when it was shipped to the Granby Consolidated Mining, Smelting and Power Company. In this re-concentration we smelted about 1,300 tons of Silver King ore.

Since January we have been practically dependent for dry ore on the low-grade quartz ores of the Republic camp in Washington State.

Extreme cold during February and March and extreme high-water during June, prevented the Highland mine from producing and forced us to be much idle and do much unprofitable work.

We have been in blast on lead smelting but two-thirds of the time for the past five months.

With all this disappointment, and through all these adverse conditions, we have to congratulate ourselves on two points: first, the possession of an excellent flux supply from the Emma, and second, the fact that our stock of coke tided us over the period when the Crow's Nest collieries were idle through accident and strike.

The large furnace was in blast 222 days, and the small one 165 days; and we smelted during the year, 7,510 tons of dry ore, 5,270 tons of lead ore, 4,000 tons roasting ore, and 6,100 tons of matte, besides other by-products. Our coke consumption averaged 14.3 per cent. of charge. We shipped 1,023,250 ounces of silver, 8,000 ounces of gold, 112 tons of copper, and 3,350 tons of lead.

Our roasting plant has been used to the best advantage, occasionally working both mechanical and hand roasters, and occasionally only mechanical or only hand roasters, according as it seemed most desirable from the work ac-

ward confidently to some action by the Dominion Government towards a change in tariff that would gradually improve our conditions and stimulate the industry of lead mining and smelting; instead of that, however, the Government saw fit to offer a bounty amounting to fifteen ($15.00) dollars per ton of lead. It was thought that this would have an immediate effect on the lead production of the country. For some reason, however, such has not been the case, and as yet we are lacking information regarding the details of this bounty, and apparently the owners of the large producers are not satisfied to output or increase their output till such detail is made known. We have, however, every reason to look forward to a busy year, and trust that rates will be such that busy times may mean a modicum of prosperity. There is every indication that the variety of our ores will be greater, and that means the possible blending of such ores to produce better results and more economical working.

PROFIT AND LOSS ACCOUNT.

MINE ACCOUNT.

To Expenditure	£	810	18	2	By Ore on Hand at June 30th, 1902—Amt. realized in excess of valuation at that date.	£ 224	1 11
To Balance, (Profit) (Carried to General Account.)		726	5	6	By royalty—On ore output of Mr. Davys (Tributer)	684	2 3
					By Interest	628	19 6
	£	1,537	3	8		£ 1,537	3 8

SMELTER ACCOUNT.

To purchase of Custom ores	£103,264	9	11	By Value of Matte and Bullion produced	£148,040	6	10
Add Frt. ext. and int.	10,118	1	3	Deduct expenses on same	438	7	5
To Administration Exp.	1,838	17	8		£147,601	19	5
To Smelting Exp.	29,522	8	4	By Sundry Receipts	24	3	10
To Outside Exp.	1,188	3	9				
To Balance, being profit (subject to a charge og £3,890 6s. 5d for maintenance and depreciation) (Carried to General Account.)	*1,694	2	4				
	£147,626	3	3		£147,626	3	3

* It is estimated that, of this £1,694, £380 is due to copper smelting and £1,314 is due to lead smelting.

GENERAL ACCOUNT.

To General Expenses	£	2,099	5	5	By Profit on Mine Account	£ 726	5 6
To Debenture Interest		1,473	12	0	By Profit on Smelter Account	1,694	2 4
To Exchange		13	16	9	By Sundry Receipts	308	14 8
					By Balance, being Loss (in addition to charge £3,890 6s. 5d. for maintenance and depreciation of smelter buildings, plant and machinery, and of £12 3s. for depreciation of office furniture in London)	857	14 2
	£	3,586	14	2		£ 3,586	14 2

complished and character of ore treated. The mechanical roaster has generally given very good satisfatcion during the year, though far from perfect in its product.

Our crushing and elevating plant has been overhauled and improved, resulting not in a lower working cost, but in practically eliminating the heavy item of plant maintenance.

We have somewhat improved our bin system, floored our coke shed, built a new and satisfactory dry house, and further equipped our mechanical department so that our bills for machinery parts have been considerably reduced. The electric power service has been eminently satisfactory; with the exception of stoppage through the line being destroyed by forest fires last fall, we have suffered no considerable inconvenience through stoppages of power.

Through the latter months of the year, we looked for-

CALUMET & BRITISH COLUMBIA GOLD MINES.

The annual general meeting was held in Nelson on November 17th. The general manager, Mr. J. F. Musselman, submitted the following report for the year ending September 30th:—

The company took possession of the Eva group of eight Crown-granted claims on October 12th, 1902. The year's underground work aggregates 746 feet, distributed as follows: No. 7 tunnel with drifts 350 feet; No. 3 tunnel 249 feet; No. 1 tunnel 31 feet, and raises 106 feet. The average cost of tunneling was $11.45 per foot and of raising $7.35 per foot.

We have now, blocked out and immediately available by means of No. 3 and No. 5 tunnels, approximately six months' supply of ore for the mill.

It is necessary that we facilitate in every way possible our underground development work. Our most pressing need in this respect, is for a compressor plant and power drills, by which we could not only make much greater headway during the time consumed, at the same time lessening our costs very materially, but could work three shifts of eight hours each, whereas we can now work but two shifts of eight hours each, on account of bad air. The question of ventilation will be a serious one until we have means, other than hand blowers, to provide for it.

With respect to recent underground developments, I am able to give you at this date, November 17th, a gratifying report from the No. 7 tunnel. Though still 180 feet from the ore shoot for which we are driving by means of the east drift, we now have in the face of that drift 12 inches of entirely free-milling ore that should mill $100 per ton.

LONDON & B. C. GOLDFIELDS.

The report of the London and British Columbia Goldfields, Limited, submitted at the statutory meeting on the 29th ult., stated that the total number of shares allotted is 109,164, all of which have been issued credited as paid up to extent of 16s. per share, in consideration of the property and assets of the London and British Columbia Goldfields, Limited (old company), acquired by this company, under agreement with the liquidator of the London and British Columbia Goldfields, Limited (old company), dated 23rd July, 1903. The total amount received by the company in respect of the said 109,164 shares is £9,623. The receipts to date have been as follows: On account of shares allotted, £9,623, and on account of assets belonging to old company realized, £512. The payments in London have been: On capital account—Payment on account of liabilities of old company, £7,547, and payments on account of registration expenses, etc., £572. The preliminary expenses are estimated at £1,300.

NORTHWESTERN DEVELOPMENT SYNDICATE.

At the shareholders' meeting held in Michigan, U. S. A., on the 26th inst., the proposal made by A. F. Rosenberger to re-organize the company, as placed before the shareholders at the meeting of the 15th, was rejected. A committee of stockholders then presented a new proposition, which was accepted. The plan by which it is hoped money will be raised to pay off the company's indebtedness and meet the final payment due on the Camborne group, which matures December 1st, is as follows:

The shareholders were asked to lend the company an amount equal to 15 cents per share on their holdings, the fund thus raised to be secured by a mortgage or trust deed on the Gold Finch and the interest in the Camborne group. In the event of sufficient money being raised in this way to pay the bond due on December 1st, the mortgage would then cover the whole property of the syndicate both real and personal. When the loan advanced by the shareholders is repaid, a bonus of two shares of Northern Development Syndicate's stock will be given for every dollar loaned. Since the shareholders' meeting at which this proposition was accepted, the committee appointed at the first meeting to devise a method of raising funds, have incorporated a company under the laws of the State of Michigan called the Northwestern Trustee Securities Company, Limited, with a capitalization of $54,000 divided into 360,000 shares of a par value of 15 cents each. "This company is formed for the purpose of receiving the money paid by the Northwestern Syndicate stockholders and to loan to the Northwestern Development Syndicate Company, Limited, and to receive and hold the mortgages and stock of the Northwestern Syndicate and to protect the interests of those who contribute to save the property of the syndicate. When the loan is repaid by the Syndicate, the bonus stock of the Syndicate will be delivered to the shareholders of this company at the rate of two shares of the Northwestern Syndicate stock for each dollar's worth of this stock at its par value."

SCOTTISH COLONIAL GOLDFIELDS.

At the annual general meeting last month of the Scottish

Colonial Goldfields, Ltd., owning the Idaho-Alamo mine at Alamo, the chairman stated that a company had been registered with a capital of £130,000 to take over the properties. The Idaho-Alamo comprises a group of twenty-five claims, and have yielded in the past profits aggregating $400,000. The mines have remained unworked for two years, but lately shipments have been resumed at the rate of two carloads a week.

B. C. ELECTRIC RAILWAY.

The seventh ordinary general meeting of the British Columbia Electric Railway Company, Limited, was held at Winchester House, London, last month. The chairman said that for the three months ended September last the earnings of the company showed an increase of £3,647, as compared with the corresponding period of last year.

The report recommended a dividend of 3 per cent. on the deferred ordinary stock, making a dividend for the year at the rate of 5 per cent., and this was adopted.