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THE MONTH.

THE death of Dr. George Dawson, so many years of whose useful and busy life was devoted to faithful service to Canada in connection with the work of the Geological Survey, of which he was executive chief, is lamented not only by the scientific world, but by a host of warm, personal friends. The following verse is a tribute from one who was proud to thus number himself. In our opinion these lines of Mr. Phillips-Wolley are among the strongest he has ever written. They worthily "epitomize the life and pronounce an authentic epitaph" on a truly good and great man:

TO "DR. GEORGE."*

BY CLIVE PHILLIPS-WOLLEY.

Grey and ghostly willow fringes, flame to crimson at the tips,
Where a sun that has some heart in, through the waking forest slips.
High above us, on Mount Sicker, I can hear the blue grouse hoot;
Birds are calling, rivers glitter; buds are bursting, grasses shoot.

On the pine stump, by our shanty, Dawson's tattered map lies spread,
And my partner with his finger, marks the footsteps of the dead.
"Spring!" he says, mate, time to quit it, for the barren lands and hoar,
Where the Earth's heart freezes solid and the mighty bull moose roar:
Where through silent spaces, silent, reckless bands of hardfists hold,
By this here map and the compass, their course to the northern gold,
With a laugh and a curse at the danger, while down the Arctic Slope
Are two of the best ahead of the boys, Doctor George and Hope—

* * * * *

Hope she has fooled us often, but we follow her Spring call yet,
And we'd risk our lives on his say so and steer the course he set,
Down the Dease and the lonely Liard, from Yukon to Stikine,
There's always a point to swear by, where the little doctor's been
Who made no show of his learning, but Lord! what he didn't know
Hadn't the worth of country rock; the substance of summer snow—
I guess had he chosen, may be, he'd have quit the noise and fuss
Of cities and high palavers to throw in his lot with us.
He'd crept so close to Nature, he could hear what the Big Things say,
Our Arctic Nights, and our Northern Lights, our winds and pines at play.
He loved his work and his workmates, and all as he took for wage
Was the name his brave feet traced him, on Northlands newest page—
That, and the hearts of the hardfists, though I reckon for work well done,
He who set the stars for guide lights, will keep him the place he won,
Will lead him safe through the Passes and over The Last Divide,
To the Camp of Honest Workers, of men who never lied—
And tell him the boys he worked for, say, judging as best they can,
That in lands which try manhood hardest, he was tested and proved A Man.

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IT is somewhat unfortunate that owing partly to the difficulty Mr. Robertson, the provincial mineralogist, experienced in obtaining returns from some few mine-owners in the Sloecan and Nelson districts, and partly to the strain on the capacity of the Government Printing Department, by reason of special sessional work, the report of the Minister of Mines for last year will not be issued until well towards the close of April. It is unfortunate, because the showing made by the mining industry in 1900 was exceptionally good, and the sooner the details are officially published, the better.

THE MINERAL OUTPUT.

Last December, however, the provincial mineralogist gave to the local press an advance estimate of the mineral production of the Province for the year 1900, the corrected returns having been laid before the Legislature the early part of the present month. It is interesting to compare the estimate with the actual figures in the following table:

| | Placer Gold, \$. | Lode Gold, \$. | Silver, oz. | Copper, lbs. | Lead lbs. |
|------------------------|------------------|----------------|-------------|--------------|-------------|
| Mr. Robertson's estim. | 1,500,000 | 3,500,000 | 3,800,000 | 10,000,000 | 45,000,000 |
| Actual figures..... | 1,278,721 | 3,453,381 | 3,958,175 | 9,967,080 | 63,358,621 |
| Error | +221,276 | +46,619 | -158,175 | +22,920 | -18,358,621 |
| Error in per cent..... | +17.3% | 1.3% | -3.9% | +0.2% | -28.9% |

It will be seen from the foregoing that the at all serious discrepancies were those in reference to the estimation of the placer gold yield, and of the lead output, while the computation of the copper production was so close that in view of the impossibility under our present system of obtaining accurate and complete statistics at regular intervals from the mining districts, it can only be regarded as remarkable. An over-estimation of the placer gold output was excusable, as the falling off of the production from the Atlin district could have been hardly anticipated; and though a large increase was looked for in the lead output, such a gain as 206 per cent. was certainly not expected by the most sanguine.

Turning to the corrected returns, as printed in the summary, we find that in 1900 the total production, inclusive of coal, building material, etc., is valued at \$16,407,645, or an increase of nearly 33 per cent. over the 1899 returns. The metalliferous output alone, however, shows an increased value of approximately 40 per cent.; as the placer gold production fell off 5 per cent., the advance was all on the side of the lode mines, from which, consequently, the returns are still more gratifying. Meanwhile, it is to be noted that the percentage of increase is divided as follows: Lode gold, 21; silver, 38; copper, 19.5, and lead, 206. The gain in gold may be ascribed to the greater tonnage put out last year from Rossland, although the ratio of increase, owing to the fact that the improvement in economic conditions allowed lower grade ores to be mined and treated is necessarily in the direction of tonnage, as against values; and to the development of the mines of the Boundary district and of the Coast. The same remarks apply as regards the in-

creased copper production, though in the future Rossland will probably take quite third place as one of the copper producing centres of the country, for even now the copper output from the comparatively few developed mines on the Coast approaches, if it does not equal, that of the former district. Boundary district will undoubtedly take first place. The large increase in the production of lead and silver is, of course, attributable to the opening up of one or two rich mines in East Kootenay, and also to the better conditions which prevailed in the Sloecan district last year. Perhaps, however, the most satisfactory intelligence contained in the summary before us, is that the aggregate tonnage of ore raised in the Province last year, exceeded that of 1899 by no less than 93 per cent., and that the number of shipping mines was also materially added to. This means that the conditions of mining—the reduction in the cost of treatment and better transportation facilities—have improved during the past twelve months, that developed mines in the older districts have been able to mine ore of a grade previously unprofitable, and that by the construction of railways to districts until last year unprovided with adequate communication advantages, the productive area has been considerably augmented.

Another pleasing feature in this report is the evidence of a further expansion of our coal trade, the output from the collieries of Vancouver Island and East Kootenay having shown a gain of 25 per cent. in the past year. The development of the coal areas in the Crow's Nest Pass and the favourable market conditions on the Pacific sea-board are alike responsible for this improvement.

British Columbia may now be said to have entered another epoch in the history of her mining development. She is to-day in much the same position as was Colorado some years ago, when the smelting industry was first established in that State. The total mineral production of Colorado in 1880 was valued at fifteen millions; by 1890 it had increased to fifty-two millions, and in 1900 to over six hundred millions. That is to say, for the last ten years it has averaged in value over fifty-five million dollars annually. The mineral area in Colorado is very much less than it is in British Columbia.

In 1880 Colorado metallurgists were confronted with problems as difficult of solution as any of those which the British Columbia smelters have been called upon to solve; and, as a result of the successful solution of those problems, may be traced the present pre-eminence of the mining industry in Colorado. In many respects the early history of the industry in the two countries bear a close resemblance. In both the discovery of rich placer fields was the beginning of mining activity and investigation; again, in both cases the exhaustion of the shallow diggings led to the prospecting for quartz, the subsequent discoveries of lode mines, unworkable at first, by means of the refractory nature of the ore, and the high costs of transportation and treatment; the gradual reduction of these costs by the establishment of local smelters and railways

might equally well be the outline of the early history of mining activity in either country, with the difference merely that Colorado has the advantage of a lead of perhaps ten years. But will it take British Columbia as long a period to occupy as good a position? Those capable of forming an opinion of the vast mineral resources of the country do not hesitate to reply that it will not; that in less than ten years British Columbia will become a dangerous rival to Colorado as a mineral producing area, even allowing that the annual rate of increase in the latter country is steadily maintained. But after all, this is not a question in which we are immediately concerned, and it is more important to consider the present position of the industry than to look so far into the future as even ten years. Judging from the activity displayed in all the mining districts of the Province; during the last three months, with the exception, perhaps, of the silver-lead camps of Sloean and Ainsworth, the mineral production of 1901 should show a proportionately larger increase than was the case in 1900. While last year the yield of placer gold was less than in 1899, this year it is to be expected that the position will be reversed. One mine in the Cariboo district alone will produce not far short of half the total value of the entire placer gold production of 1900, while in the Omineca and Cassiar districts, hydraulic properties which up to the present time have not been operated, pending the completion of their equipment, will also this year contribute to the gold yield, which will be further swelled by returns from the recently discovered and rich placers of Porcupine Creek in the North; better results are also looked for from Atlin, consequent upon the operation of the bench claims by hydraulic methods. Both the lode gold and copper production should also materially increase, the output of ore from Rossland having now reached the satisfactory aggregate of over nine thousand tons weekly, while the Boundary district's output is not far short of eight thousand tons a week. On the Coast the Mount Sicker and Van Anda mines are making a most creditable showing, while, if, as now seems practically certain, the Britannia mine, at Howe Sound, is acquired and operated this summer by British capitalists, the copper production for 1901 should be at least a hundred per cent. greater than it was in 1900. In silver and lead, however, we do not hope to see any immediate further gain—the advance last year having been exceptional—in view of the many drawbacks and difficulties against which this industry is forced to contend. Any great developments in the future must depend on the establishment of local smelting and refining works of sufficient capacity to treat the entire produce of the mines, and in the opening up of markets independent of the United States, in which to dispose of the surplus in metallic form.

To British Columbia's present productive mineral area will shortly be added, by the completion of the railway into the Lardeau, another territory of unquestionable richness. In East Kootenay the mineral resources of the Windermere and adjacent districts, though at present not far enough developed to affect

the annual production to any great extent, are undoubtedly potentially great; while probably the Upper and Lower Similkameen and the West Fork of Kettle River, when provided with adequate means of communication and transport facilities, will, in the near future, prove, judging from present indications, at least equally as productive of gold and copper and silver as any of the more advanced centres of mining activity in the Province. Nor does this begin to exhaust the list of available territory of which even now from preliminary exploration we have knowledge. There is hardly a section of the country between the international boundary line on the south and British Columbia's extreme northern limits, that is not more or less richly mineralized, and in due course these will be embraced in the gradually widening circle bounding the area of industrial and productive activity. The history of mining industry in the West, wherever resources have justified progress, may be likened to the rolling of a stone down a steep declivity. At first it moves slowly; its career is checked and its direction altered by every petty obstacle in its course; but it gains in momentum and force as it journeys, and the obstacles are swept aside by the irresistible energy of its onward course. The mining industry in British Columbia has but started on its career. The first difficulties have been overcome; there are others to be faced, but these will but momentarily hinder its advance.

The most important matters are not always those which are carried on with most contention. It was in a comparatively empty Legislature that the provisions of the Metalliferous Mines Inspection Act Amendment Act were discussed and adopted. Yet this act if carried out in the spirit in which it is framed, will have a most notable effect in keeping the progress of the mining industry in this Province before the eyes of the world. In the matter of mining statistics we shall no longer be groping the dark, but be able to supply the world with prompt and accurate information of what is being done. So far as the English investor is concerned, the conditions under which money is raised and interest maintained in a foreign mining field, make this imperative, and to all other investors it cannot but be advantageous. Through the Mining Record we have always consistently and persistently advocated this system of monthly bulletins of output now put in force. We have always taken the position that while continuous interference by authority with the affairs of mining companies was most vexatious, there was, nevertheless, certain information which had a public interest, namely, the gross output and value of the different metals produced from our mines. For instance, one of the most remarkable features of last year's progress was the extraordinary increase in the output of the silver-lead mines of the Province. Yet at the very time when this increase was taking place we had in a speech from the Throne a pessimistic reference to the condition of this very industry. And at the end of the year the estimate of lead production

by the most competent authority, showed an error of 28 per cent. When the acute nature of the problem raised by our increasing output of silver and lead is considered, the necessity of providing local smelters and refineries, and of opening up a market independently of the United States, such a condition of public ignorance could not but have a most prejudicial influence upon the industrial situation. As originally drafted, the bill was modeled upon the system of returns in vogue in Western Australia. The returns demanded contained many unessential matters, and the act was properly trimmed down to require only what is essential and nothing more. As it stands, it will be of the greatest possible public benefit without working any private injury. The adoption of this system of monthly bulletins is to some extent due to the unremitting efforts of Mr. D. B. Bogle. The advantages of it were first brought to his mind by the benefit to the Rosland camp of the publication weekly of the tonnage of the Trail Creek mines. In 1896 he was one of a deputation from Rosland to the Dominion government to urge the adoption of a comprehensive system of returns for advertising purposes to embrace the whole of Canada. Later he endeavoured to have the quarterly trade and commerce returns extended and detailed so as in some measure to provide the necessary information. Upon the accession of the Dunsmuir government to power in British Columbia, he was employed by the Minister of Mines to collect information and make a report on the subject and the necessity of legislation was made apparent. The matter has also been taken up from time to time by the Boards of Trade of the mining districts, and by the mining and financial press interested in British Columbia. Practical unanimity on the question has been the result. The only difference of opinion arose as to the extent of the information to be extracted, without unnecessarily interfering with private interests. This has been satisfactorily resolved by the legislature.

Commenting on the position of mining in the Slo-can, and the action of the smelter trust has had on the industry, our special correspondent, who is not disposed generally to look on the gloomy side of things, speaks very despondently. After referring to the recent "closing down" of several of the more important mines at Sandon, Whitewater and Ainsworth, he remarks that the public is being gradually educated to the necessity of agitating vigorously for government assistance in the establishment of additional local smelters and a refinery, if we are not to be left entirely at the mercy of alien monopolists more interested in the development of the United States smelters than the B. C. mining industry, and the first tangible result is observed in the appointment of delegates from the various towns to proceed at once to Ottawa to lay the matter before the federal authorities. The most gratifying feature perhaps in connection with this scheme is the unanimity of feeling displayed by the Mine Owners' Association and the Miners' Union, both organizations having decided to act in concert in what they consider to be a matter of prime importance and

mutual interest. Just what the results may be it is difficult to conjecture, but everyone having the welfare of the mining industry and the Slo-can at heart will trust that they meet with a most favorable reception. Meanwhile, at a meeting of the Nelson Board of Trade this month, the following resolution, drawn up by a committee of such practical and well informed men as Messrs. Holt, Crossdale, S. S. Taylor, J. J. Campbell and Fowler, was unanimously carried:

"Whereas lead mining in British Columbia has grown into a most important industry, giving employment to a large number of men at high wages, supporting the population of an extensive area in the Kootenay districts, and adding much to the general prosperity of the country; and

"Whereas, the increase and development of the industry are certain under favorable conditions, which conditions mainly depend on the miners being able to get their ore smelted at a reasonable charge for freight and treatment; and

"Whereas, the demand for these lead ores by smelters in the United States has almost ceased, and the capacity of the smelters now operating in British Columbia is totally inadequate to treat the output of these mines, some of which have already lessened their output and others have closed down on account of this difficulty; and

"Whereas, no means of refining base bullion exists in Canada to-day, thereby necessitating the shipment to United States refineries of the lead product of the Canadian smelters, and a much higher rate for refining lead than formerly is now being demanded by the American Smelting & Refining trust; and

"Whereas, there is no tendency observable to increase the smelting capacity in the districts now suffering, while the danger of having to pay excessive rates for refining continues; and

"Whereas, the establishment of a lead refinery readily accessible to the smelters in the lead producing districts would undoubtedly lead to the erection of more furnaces, and thus afford the lead mining industry the relief it now urgently stands in need of;

"Therefore, be it resolved, That in the opinion of this board the establishment of a lead refinery in an accessible position in Canada is the surest and best means of fostering and encouraging the lead mining industry of British Columbia, and the board respectfully urge on the Dominion government that to aid this important purpose, and to assist this new industry until fully established, that a bounty be granted for five years of \$5.00 per ton of pig lead, the product from ores mined, smelted and refined in Canada.

"The board would also respectfully point out that in British Columbia fuel is cheap and of excellent quality; that it is an undoubted advantage to have a refinery near the smelters, and that pig lead refined in British Columbia would compete in the markets of the Orient, which would not be the case with lead refined farther East.

"The board would also suggest that if a bounty be granted, the government should retain the power of interfering in case more than fair and profitable rates were charged."

This, we think, is a very fair presentation of the case, and it is to be hoped that it will receive the attention it deserves at the hands of the Dominion government. The industry of lead and silver refining is one which can now be carried on profitably in Canada. The increase in the charges made by the American Smelting & Refining Company for treatment is quite an arbitrary one, and is designed to restrict the production of silver and lead in the interests of a company which not only does the smelting and refining, but aims to control the market price of the metals. All metallurgical processes have tended to decrease in actual cost of late years. It is certain that the smelting and refining of silver and lead have not increased in cost. There is a difference in freight rates, a difference in fuel cost, a difference in tariff, as well as this arbitrary increase in the smelting trust's rates for treatment, now operating in favor of British Columbia as against the United States. As the United States has become a lead exporting country, the price of lead in the United States can only be the world's market price plus the tariff which British Columbia

ores have to pay in any case. Therefore, the manufacture of this commodity should be a most profitable venture in British Columbia. The more the American Smelting & Refining Co. influences prices the more profitable it will be to compete with them. At the same time, to induce the necessary capital to enter this field of enterprise by means of a bonus for a short time would be a most beneficial action on the part of the government of the country. It is quite within the power of the local government, even without unduly trenching upon the income of the Province, to afford sufficient inducements to enable this industry to be established in the Province, and render this growing and most important industry independent of the manipulations of the American Smelting & Refining Company.

In last month's issue we suggested that the collection of mineral specimens sent from British Columbia to the Paris Exposition, and which are to be again exhibited this year at the Glasgow Exhibition, might be very advantageously augmented by the addition of models of the gold ingots produced last year from the clean-ups of the Consolidated Cariboo hydraulic mine, at Bullion. We are glad to learn from an authoritative source that the government has since, after taking the matter under consideration, made arrangements with the Cariboo company to forward to Glasgow, not only models of last year's ingots, but, in addition, an actual block of solid gold to weigh in the neighborhood of half a ton, and which will be recovered from the first wash-ups of this season's operations at the mine. Meanwhile the only expense to which the Province will be put in the matter, is the cost of transportation and insurance on this unique and valuable freight from either New York or Montreal to its destination. The appearance of this ingot at Glasgow cannot fail to attract a great deal of attention, and no better way of advertising the mineral wealth of the country could be possibly devised. The Consolidated Cariboo Hydraulic Company's public spirited and generous action in the matter is to be strongly commended, and we have also to congratulate the Hon. the Minister of Mines for having effected so excellent an arrangement.

The announcement that the royalty on gold mined in the Yukon has been reduced by the Federal authorities from ten to five per cent., will be received with general satisfaction. The alleged reason for this reduction having been made is that the direct revenue of the Territory is adequate to meet the expenditure on administration, but we are also inclined to the view that the representations of Mr. Ogilvie and others, who have had special opportunities of studying the conditions in this field have not been weightless in bringing about the desired change. The incidence of the tax is, however, still quite as unfair as before, for it is indiscriminately levied on gross output, and, therefore, must bear more hardly on some individuals, whose claims are more difficult or expensive to work,

than on others, and we hope ere long to see a considerable modification of, if not a radical departure from, the present method of compelling the mines of the Yukon districts to contribute the proportionate share of the revenue required for the proper administration of the Territory. During the past three and a half years the sum of \$2,040,000 has been realized from the imposition of the ten per cent. royalty tax on gold production, but there is every reason to expect that by the reduction of the impost to five per cent., and taking also into consideration the facts that by improved means of communication, reduction of freight rates, the completion of a telegraph system to Dawson, and the consequent decreased cost of living and labour, the actual annual revenue from the mines, instead of being less in the future, will show a substantial advance, as a result of the opening up of new territory, and the working of ground which, under previous conditions, could not be profitably operated. Meanwhile, the government, after affording some relief to the placer miner, seemingly desires to prohibit the exploitation of quartz mines, for an order in council has been passed this month, placing a tax on mining of this nature in the Yukon and Northwest, in the form of a royalty, which "shall not exceed five per cent." It is needless to say that while it is possible that lode mining might be carried on in the Yukon under very favorable circumstances, taxation is not likely to stimulate or encourage such undertakings.

Has not the time come for the division under various heads of the now generalized "other mineral products" of the Province, and for the obtaining of fuller details of their annual yield and value? The very most of such outputs is made in the Ontario mineral returns, and it certainly now seems that such items as marble and building stone, lime, iron, and clay and brick might well be separated from bulk, and classified, instead of being generalized, as hitherto. The values now being got from the quarries in marble and building stone and lime—especially in West Kootenay—must be rising very considerably, and there are evident good hopes of a greatly increased output of iron ore. There is some reason to believe that latterly the returns of bulk and values of these miscellaneous returns have scarcely done full justice to this branch of industry.

During the month of March according to a dispatch from our own correspondent (in which two days' shipments only are estimated) the Trail Creek mines shipped 39,000 tons of ore. This is 11,168 tons more than was shipped during any one month of 1900, and 38,721 tons more than was shipped during the corresponding month of last year, when, it is true, the mines were practically completely closed down. The comparative figures for the first quarter of last year are equally startling. During the first quarter of last year the Trail Creek mines shipped 32,172 tons, or less than the shipments of the month of March this

year by 6,828 tons, and less than the tonnage for the first quarter of this year by 62,523 tons. During the first three months of this year 22,824 tons have been shipped more than were shipped during the first six months of last year. During the last quarter of 1900, the period of by far the heaviest shipments the Rossland camp ever knew, 70,846 tons were shipped, which the succeeding quarter has seen increased to 94,695 tons of ore. It is quite unnecessary to elaborate upon these figures. They portend an increase of 100 per cent. in the output this year over last, unless some unforeseen accident occurs. They certainly bear out the contention made during last year that even with an output of 200,000 tons a year, the Rossland mines were only in the development and not the fully productive stage.

It is a matter for regret that the Chamber of Mines tentatively established at Rossland, has been abandoned. A Chamber of Mines covers a field of co-operative effort on the part of those anxious to bring capital into the country and develop its resources, which no other association can overtake. It might be a good idea if a literary bureau were established by the government in connection with the Department of Mines, particularly now that monthly returns of output are to be published. Again, it might not. It would all depend on the competence of the individual at the head of such a bureau. The trouble is, in this matter, that it is very hard to get rid of a government's appointee if he turns out to be unsuitable, whereas a corporation like a Chamber of Mines, can eliminate a useless or incompetent official without any difficulty or compunction whatever.

The Granby smelter has, since it was first blown, been a complete and wonderful success. More ore than its nominal capacity has been steadily smelted there, with a corresponding reduction in the cost of treating the ore. The record made by the Granby smelter has now been broken by the B. C. Copper Co.'s smelter at Anaconda. During one period of 24 hours, the furnace successfully treated a charge of 420 tons of ore, coke and flux, of which 373 tons were ore. The nominal daily capacity of the furnace is 225 tons. Mr. Paul Johnson is quoted as saying: "For a furnace of the size used, 42x150 inches at tuyeres, the day's run of 420 tons probably establishes a world's record for blast furnace smelting."

The ores of the Boundary country have fully demonstrated their admirable smelting qualities, and it is quite evident that the mines of that section will mark a new epoch in the cost of reducing copper ore.

It is exceedingly gratifying that the Lardeau country has a practical assurance of a railway being in operation before the beginning of next year. This assurance, coupled with active work, commenced on the line, will stimulate development during the coming summer to an unprecedented degree. It is refreshing to look forward to the Lardeau as one of the largely productive districts of the Province within twelve months' time.

A circular has been issued this month by the Board of Trustees of the Waterloo Mining & Milling Co., (Camp McKinney) to shareholders, in which it is stated that while the mine is in a satisfactory condition, and that there are at present available over 300 tons of "good ore" to run through the mill, the company's funds, after the March pay-roll has been met, will be exhausted. There is, moreover, an indebtedness of about \$2,000 which matures next October. The shareholders are consequently asked to come to the rescue, and the appeal is made as follows:

"We ask each shareholder to voluntarily agree to pay to the company an assessment of one cent per share, to be paid in four payments, one payment on or before April 1st, 1901, and the others the first of May, June and July, 1901. And if a shareholder sells stock thus voluntarily subjected to the assessment, he should see that the purchaser assumes the remaining payments. The company will issue to each person agreeing to this, when he makes his payments, a paper agreeing to repay the amounts so advanced from the first net profits of the mine, with six per cent. interest, after the indebtedness of the company is paid off. We thus consider it no more than a loan to tie the company over its present difficulties. This is better and cheaper than any attempt to reorganize the company upon an assessable basis. Unless this plan is adopted, and at once, the mine will be shut down, as the board will incur no new indebtedness. With \$10,000 the property can be made a dividend payer. This is our confident belief."

From information in our possession we have reason to believe that the Waterloo is a promising, though an inconsiderable property, and it would seem worth the while of shareholders to contribute the relatively small sum of money required to place the mine on a profit earning basis; that is, if the statements in the circular are to be relied on. The difficulty is that too many properties in Camp McKinney were acquired by paper and wild-cat concerns operating from Spokane at the time of the McKinney boom, for so it can almost be described, of a year or so ago, and a number of small investors were badly bitten in consequence. The result is that Camp McKinney is now in disfavor and the Waterloo, which is not a "wild-cat" though it confessedly was started on its career with an inadequate capital, may have to pay the penalty of unpopularity.

The Klondike Consols, Limited, is one of the few London organized Yukon undertakings that have yielded even fair dividends. It distributed last year a dividend of £37,500, or 15 per cent. on its capital, and carried forward a balance of £13,767. Considering, however, the imperatively short average life of such gold producing properties as those owned by the company, a fifteen per cent. dividend is only a very moderate return after all. The reduction of the Yukon royalty ought to benefit the operations of the company to an appreciable extent this season.

There is naturally much satisfaction in the Atlin country over a deal just made by Mr. Jaune de Lamare, representing Parisian interests, which will interest in the development of Boulder Creek hydraulic gold properties, a large amount of French capital. M. de Lamare booms his purchase—as also his syndicate's other Atlin undertakings—for at least all that

they are worth, in his Klondyke Revue, a financial journal that he publishes in Paris. In this and other respects he shows that he has nothing to learn of the ordinary British promoter, as regards the lavish advertisement of his various mining projects and their attendant possibilities.

It is to be hoped that the further experiments that are about to be made by Mr. Laird this season in the use of compressed air as a motor in developing the alluvial gold properties on Willow Creek, Cariboo, may prove successful, and result in a good output. Mr. Laird and those associated with him have sunk much capital and spent several seasons of persistent labor on this property, and it is to be hoped will reap in return, substantial results.

It is understood that certain land purchases, lately made by New Westminster men, in that part of Burnaby which, lying near the Brunette River, adjoins the Sapperton District of New Westminster, are based on an expectation that the areas include coal deposits. Old timers of the Royal City have long believed this, and there are certain outcroppings in the district in question which suggest that there is, underlying it, either coal or lignite. Expert local geologists are not, however, so sanguine as the land purchasers, that profitable marketable coal will be found in sufficient quantities so near New Westminster, and believe that the indications found point only to deposits of lignite, in extent and otherwise unlikely to lead to profitable working. It is, however, probable that boring tests will shortly be made in the land in question.

It is clear that the use in California of almost crude native mineral oil as an industrial fuel is to an appreciable extent limiting, and will, for some time, limit

the demand of that United States market for the Vancouver Island coal. The effect will, however, be less prejudicial than it would be, were it not that the cost of getting the oil is not greatly lower—taking the proportionate fuel values of the output—than that of mining coal on Vancouver Island. The effective competition of the California oil producer is consequently due mainly to two causes, one, the duty on imported coal, about 67 cents a ton; the other, the cost of transport. California oil cannot be carried to points in the State at any very great distance from its source,

without the attendant result of levelling up its price to that of British Columbia coal. Moreover, the oil springs of the chief present producing districts of California—those about Los Angeles—show signs that their large production will not be permanent, the flow having already diminished in many cases after a short period of use. It is, however, certain that a very considerable supply of the oil will be available for several years yet. Hence, for some seasons, it is to be expected that the California demand for Nanaimo coal will to some extent diminish. This may, and indeed would in part be compensated, if there be brought about, as hoped, a large development of mining and successful establishment of ore smelting on a considerable scale in connection with the copper properties in Mount Sicker, about

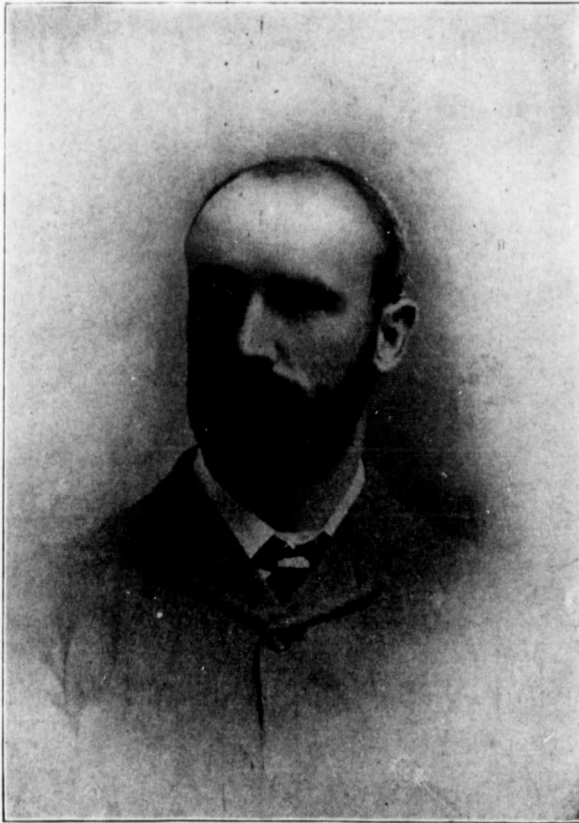
Alberni, and at various Coast points within easy reach of the Island coal districts.

In announcing through the medium of a circular to shareholders the contemplated calling up of the remaining levy of a shilling per share, with a view chiefly to effecting a saving in bank interest, and to facilitate the purchases of lead ores, the directors of the Hall Mining & Smelting Company have taken advantage of this opportunity to submit a statement



MR. GEO. S. WATERLOW, OF LONDON, CHAIRMAN OF THE BRITISH COLUMBIA (R. & S.) SYNDICATE, LIMITED.

concerning the progress that has been made at the company's mine and smelter since the re-organization in June last. This report states that the ore in the levels above the main tunnel (No. 5) having become exhausted, it was necessary to provide additional machinery for operating at lower levels, and, in consequence, an adequate plant, consisting of a new hoist, boilers, pumps, etc., was installed at the mine at a cost of about £3,000. Meanwhile, as a result of work done on the 6th and 7th levels, an ore body has been located and blocked out, which, is estimated, will yield some 16,350, as saying on the average, 10 ozs. silver and 5 per cent. copper. It is not proposed to commence stopping at present, but to continue the work of development and proving the ore bodies, until such time as reserves of payable ore have been located sufficient to keep a furnace continually running on copper ore. In adverting to the business of the smelter, it is remarked with satisfaction that the surplus from the operation of the works has, during the past two months, materially assisted in meeting the expenses at the mine; and in consequence of satisfactory contracts, have been made both for an ample supply of lead ores and iron for fluxing purposes, the roasting capacity has been increased at a cost of about £5,000 by the addition of a new mechanical roaster and briquetting plant. Commenting on this expenditure, the circular states: "Before entering upon such a large outlay for plant, the board satisfied themselves that there was a reasonable prospect of a sufficient supply of lead ore always being obtainable; and, when it is added that the favorable results, so far achieved, as indicated by the paragraph above in reference to the returns from the smelter, have been attained under the old conditions, and that this new plant, which is now complete, will very materially reduce the cost of smelting. Shareholders will readily understand that, apart from the



MR. ANTHONY J. McMILLAN, MANAGING DIRECTOR OF THE BRITISH COLUMBIA (R. & S.) SYNDICATE, LIMITED.

mine—which is developing most promisingly—we are on the threshold of a very favorable period at the smelter."

In addition to the expenditure for new plant, £10,550 has been applied to the redemption of £25,440 debentures in the hands of the bankers (now cancelled), and a further sum of about £10,450 in liquidation of the old company's liabilities. With the call paid, a balance of about £20,000 will be available. Since this circular was issued other important discoveries are reported as having been made in the Silver King mine, and altogether the outlook for the shareholders of the company has of late vastly improved.

Our readers will be glad to learn that Mr. J. D. Kendall has added another valuable paper to those already written by him on the subject of the mineral resources of Southern British Columbia. The latest paper, entitled "The Auriferous Quartz Deposits of Southern British Columbia," which has been specially contributed to the Mining Record, will be published in full in our next issue. The other papers which have appeared in these columns from the pen of the same author, are: "Southern British Columbia as It Appeals to and Affects, the Prospector and Miner, the Speculator and Investor," "The Silver-Lead Deposits of the

Slocan District," "The Auriferous Alluvium of the Fraser River and its Tributaries," and "The Auriferous Copper Ores of Southern British Columbia," embodied in volume form, these papers, including the latest, would form the best account obtainable of the conditions of the mining industry in the southern portion of the Province to date.

The Tesla system of electrical power transmission is founded on the use of the alternating current, as distinguished from the direct or continuous current. The alternating current is regarded as preferable for long-distance transmission.

THE MINES OF BOUNDARY DISTRICT.

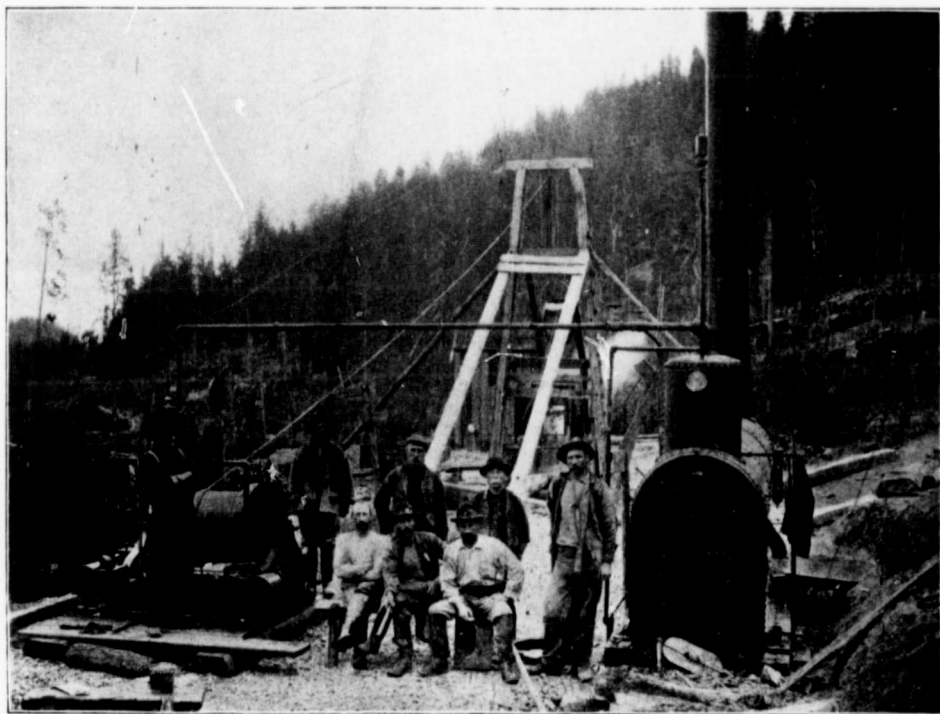
No. V.

THE SNOWSHOE MINE, PHOENIX CAMP.

(By Our Special Commissioner.)

IN previous articles in this series dealing with the more important or rather, better developed mines since attention has been drawn to the enormous ore of this most promising mining section of the Pro-deposits in what is known as Phoenix Camp. We have already described in detail two of the large mines in this vicinity—the Knob Hill and Ironsides, from which the present output is between 600 and 700 tons

most promising properties in the country, yet a word or two with regard to the Syndicate and those connected with it may be of interest. The capital of the British Columbia (Rossland and Slocan) Syndicate, Limited, is £100,000. Mr. G. S. Waterlow, (a son of Sir Sidney Waterlow, Bart., an ex-Mayor of London) is the chairman of the company. Mr. Waterlow is also one of the directors of the well known city house of Waterlow & Sons, Limited—a firm employing some 5,000 hands. He is not, therefore, a mere figurehead, the chairman of the syndicate, but a man of affairs and of proved business capacity, as his colleagues will tell you. Mr. Waterlow has paid several visits to British Columbia. Last



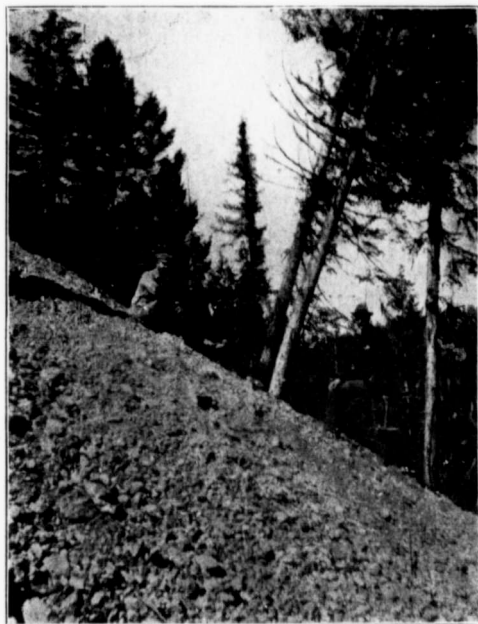
EARLY DAYS—INSTALLING THE FIRST MACHINERY ON SNOWSHOE MINE.

daily, and we propose here to refer more particularly to an adjoining property—the Snowshoe mine—which is being developed very successfully by a London company,—the British Columbia (Rossland and Slocan) Syndicate, Limited.

Very little has been heard of this company in the past, for the simple reason that while it has invested a large amount of money and has for several years past done much solid work in the province, it has studiously avoided anything resembling the employment of “boom” methods. During a recent visit to London, the editor of this periodical heard a great deal about the Rossland and Slocan Syndicate and the men who are interested in it, and while the principal object of this article is to give information about one of the

autumn he spent five or six weeks in Rossland and the Boundary district, and resided for some time at the Snowshoe mine, thoroughly investigating all that was going on there, and making himself acquainted with the practical details of the work. It would not be a bad thing if some of the guinea pig directors of companies in London were compelled to emulate this example. Mr. Waterlow is an enthusiastic and an eminently successful amateur photographer, and we have to thank him for most of the excellent views of the “Snowshoe” accompanying this article.

The managing director of the syndicate is Mr. Anthony J. McMillan, of Rossland, a gentleman who for many years acted in England as Agent-General for



A DUMP OF ORE AT THE SNOWSHOE.

Manitoba, and who is widely known throughout Canada, especially in the West.

The Snowshoe group consists of four claims, viz: the Snowshoe, Pheasant, Alma-Fraction, and Fair-play-Fraction, which, together, form a compact group covering an area of about 120 acres. The property is in close proximity to the well known Knob Hill and Old Ironsides mines; and the ore bodies would appear to be of the same character and series.

The property was one of the first staked out in the district, and after passing through the hands of various prospectors and others, it eventually came into possession of the present owners. Among others, Patsy Clark, who was at one time the moving spirit in

the War Eagle mine of Rossland, and had some three or four years since, an option on the Snowshoe mine, which, owing to the lack of railway facilities at the time, he, however, reluctantly dropped, confining his attention to property which under the then existing



EARLY BUILDINGS AT THE SNOWSHOE.

conditions, could, it was thought, be more advantageously developed.

In 1899 the Waterlow Syndicate took an option on the property, which had previously been favorably reported upon by Mr. J. W. Astley, the well known mining engineer of Rossland, and by Mr. Reinze W. Macfarlane, A.R.S.M., who spent several months on the property. When the present owners took an option on the Snowshoe Mr. Astley was appointed consulting engineer, and under his directions work has since that time been continuously carried on, and, apparently, with the most gratifying results.

There are now nearly 3,000 feet of underground workings at the mine, in addition to 1,500 feet of sur-



GROUP AT SNOWSHOE OFFICE.



SOME OLD BUILDINGS.

face work, with the result that the property has been placed on a productive footing with a large tonnage of ore in sight. The principal work at the Snowshoe mine has been carried on upon what appears at the surface to be two distinct ore bodies, though it is

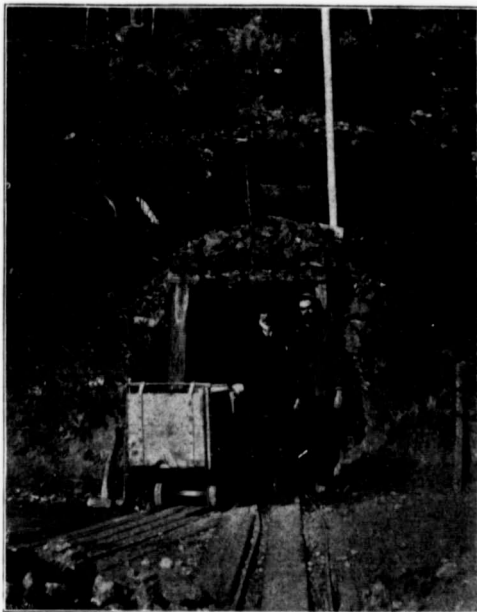


THE OLD LOG-CABIN OFFICE AT THE SNOWSHOE IN WINTER.

probable that at greater depth these may prove to be but outcrops of one very large body. At the northerly group of workings, which were commenced by the original owners of the property, there is a shaft about 200 feet deep, with numerous drifts, and cross-



LONG-DISTANCE TELEPHONE IN SNOWSHOE OFFICE.



THE MOUTH OF THE RAILROAD TUNNEL.

cuts, intersecting the ore body. There are also a number of surface open cuts on this part of the mine. At this point, and just alongside the wagon road from Greenwood to Grand Forks, which crosses the Snowshoe, there is a large deposit of decomposed ore aggregating several thousands of tons. This ore carries gold, silver and copper. Gold can be panned from almost any part of this particular deposit.

A few hundred feet farther south is what is known as the "Railroad Tunnel." It is so called owing to the fact that the body of ore opened up here was first



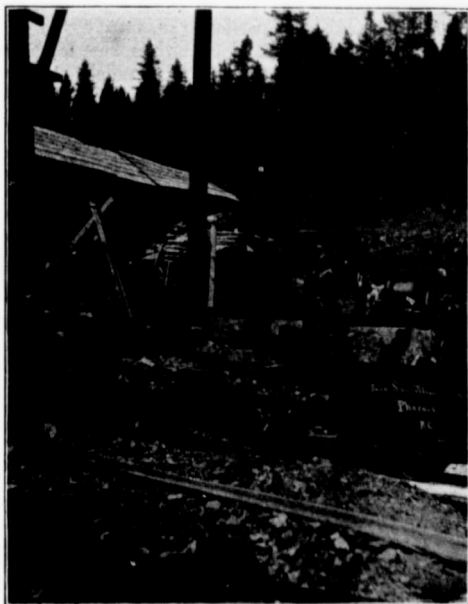
BODY OF ORE EXPOSED ON SNOWSHOE RAILWAY CUT.

exposed by the building of the Canadian Pacific Railway. The railroad, built only a few months since, runs right across the centre of the Snowshoe mine; and when construction was going on, the contractors in blasting to prepare the roadbed, disclosed a very large ore body only a few feet below the surface. This body of ore as shown up by the railway company can be seen by anyone going along the wagon road from Greenwood to Grand Forks. At a point lower



ON THE SNOWSHOE. ORE DUMP AND OFFICE IN DISTANCE.

down the hill the management of the mine last spring started a tunnel to undercut and exploit this ore deposit. Work has since been continuously carried on here, and an enormous tonnage of ore has been shown up.



FIRST MACHINERY AT THE SNOWSHOE MINE



ORE DUMP AND BUILDINGS AT THE SNOWSHOE MINE.

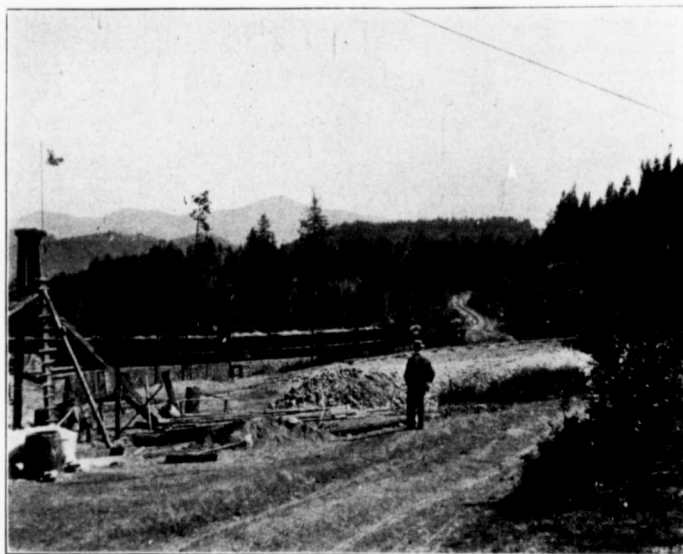
On the Snowshoe, as on the Knob Hill and Old Ironsides and other properties in this neighborhood, the ore bodies are of great size and appear to be in large irregular deposits, rather than in regularly defined veins. Some of the ore bodies on the Snowshoe are known to be from 100 to 120 feet wide. The ore consists of iron pyrites, chalcopyrite, and



RAILWAY CARS LOADING ORE AT THE SNOWSHOE MINE.

specular hematite in a gangue composed of quartz, calcite and some country rock. This appears to be the characteristic ore of this particular district. Gold, silver and copper are very evenly distributed throughout the ore, but the values are mainly in the gold and copper. While small bodies of high grade ore are met with assaying as high as \$40 and \$50 per ton, and

presence of lime in considerable quantities makes this ore specially desirable for smelting purposes, and the Snowshoe ore is practically self-fluxing, and can consequently be smelted at much less cost than most of the ores of British Columbia. Meanwhile we are informed that when conditions warrant the Snowshoe Syndicate will erect its own reduction works at the



TRAIN OF ORE FROM PHENIX FOR THE GRANBY SMELTER.

even as high as \$90 and \$100, yet the average, as at present shown up, will probably not exceed \$8 or \$10 per ton, and ore of this value will yield a very respectable profit, if the statement can be relied on that the ores from the Ironsides and Knob Hill, not averaging over \$6 in value can be profitably worked. The

mine, but *Festina Lente* is a good motto.

The managers of the Snowshoe while opening up the large ore bodies, are carrying out experiments in various quarters, with a view to deciding upon the best method of treatment. It is understood that Mr. T. A. Edison, of New York, is experimenting on these ores, and that he is hopeful of effecting great savings upon methods of treatment at present in use in the country.



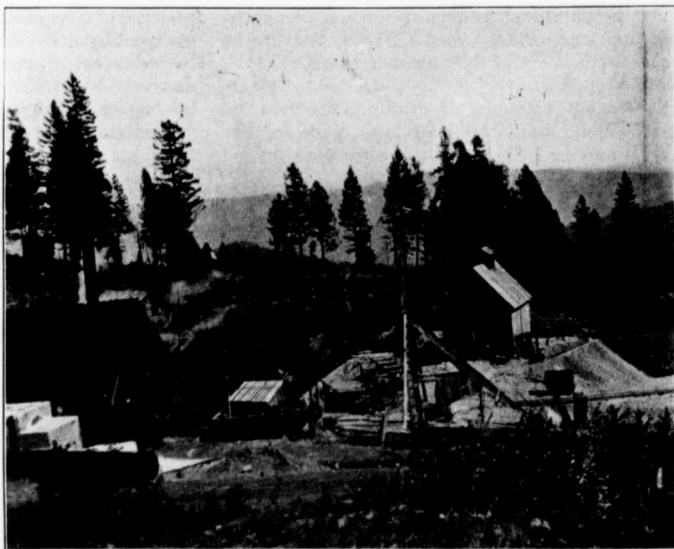
A WINTER SCENE AT THE SNOWSHOE.



GROUP OF MINERS AT THE SNOWSHOE.

During the year 1900 test shipments of a few hundred tons of Snowshoe ore were made to the Trail and Granby smelters, and these proved very satisfactory. While the Snowshoe could output at once a considerable tonnage of ore, it is hardly likely that it will do so until the mine is more fully developed, and the advice of Mr. Nelson Fell, who reported on the Snowshoe last November to the effect that while it would be possible to quarry from the surface and extract from the mine many thousands of tons of ore which could be sorted and handled at a profit, he would not recommend that plan being adopted at that time, will certainly be followed. The wisdom of this policy is very apparent, when one considers how many good properties in the country, having commenced shipping before their ore bodies were properly opened up, have later had to suspend shipments for months in order to get development sufficiently ahead to keep up a steady output of ore.

On the Snowshoe there are substantial buildings for carrying on the work of the mine, but there does not appear to have been any unnecessary extravagance, for Mr. McMillan believes, rightly, that in the early stages of mine development most of the

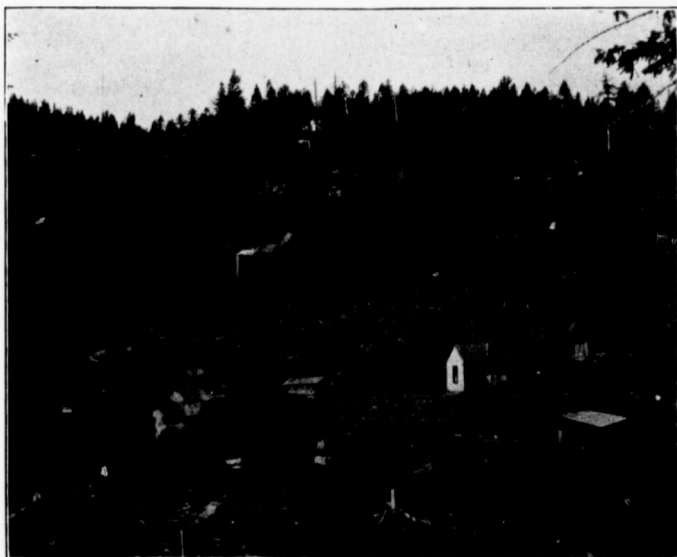


ENGINE HOUSE AND BLACKSMITH SHOP AT THE SNOWSHOE.

working capital should go into the ground, and that necessary expensive buildings should come at a later date. Many of the little buildings shown in the photographs are the log cabins of the original owners, which have been fitted up to suit present day requirements. Some of these are occupied by the foreman and workmen on the mine. There is, however, a very convenient and well arranged office, with sleeping accommodation, for the clerks. This office is under the immediate supervision of Mr. Philip King, who is well known in Vancouver and also in Cariboo, where for a time he acted as general office manager for one of the big hydraulic companies. There is also a very comfortable boarding house, and quite recently a new bunk house was erected for the accommodation of the men, whose numbers are gradually increasing, and for whom the old bunk house was no longer large enough.

An assay office, very completely equipped, was fitted up last December. The machinery at the mine at present consists of a 70 and a 40 horse-power boiler; and a 5-drill compressor plant, to which has just been added an 8-drill compressor. But a much larger plant is in contemplation.

In January a contract was

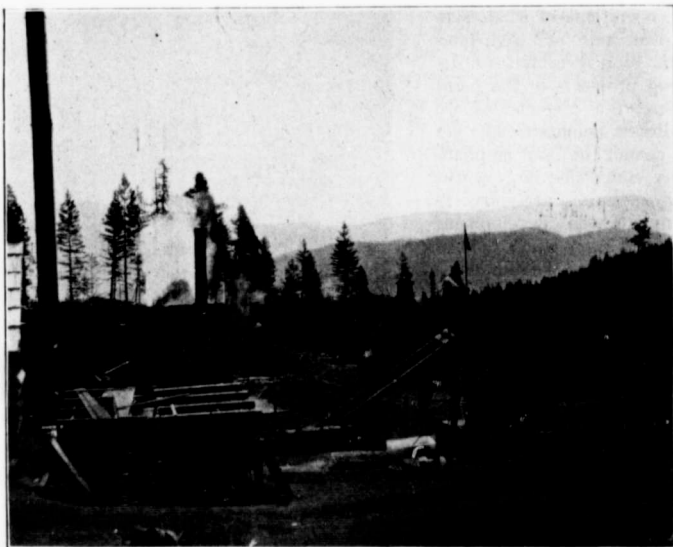


SOME OF THE SNOWSHOE BUILDINGS.

let to the Diamond Drill Co. of Spokane, to do some work on the property, with a view to prospecting the ground in advance of regular development work, and, as a result, further large bodies of ore have been shown up. During last year considerable prospecting work was done with the diamond drill on other mines in the Boundary country, and the system, though not extensively adopted in British Columbia, appears to have given satisfaction where tried.

As regards transportation facilities, the Snowshoe is very favorably situated, as the line of the C. & W. railway traversing the property, gives direct communication with not only the Granby smelter at Grand Forks, some twenty miles distant, but with the Canadian Pacific smelter at Trail, and the Hall Mines smelter at Nelson. In addition, the railway gives direct connection with the two new smelters in the Boundary, namely, the British Columbia Copper Co.'s smelter at Greenwood, and the Standard Pyritic smelter at Boundary Falls.

As in the near future electricity will probably play an important part in the development of British Columbia mines, it is interesting to notice that the right-of-way for the power line of the Cascade Power Co.



VIEW AT THE SNOWSHOE.

runs across the corner of the mine. This company proposes at an early date to furnish electric power to the mines in the district, and is spending a large sum of money in connection with the installation of the plant.

As regards fuel, the abundant supply of wood on the Snowshoe itself has thus far sufficed, but before long coal will, no doubt, be used. Crow's Nest coal can be easily obtained, and it is reported that extensive coal deposits lying much nearer, and only some 50 miles west of Greenwood, will shortly be opened up. Should this be done, it will do much to stimulate the development of the ore deposits all over the Boundary country.

Throughout Southern British Columbia the Snowshoe is looked upon as one of the great mines of the Province, and it is gratifying to know that it is in the hands of men who will be likely to make a success of it. Large mines such as this take time and money to develop, and this fact is apparently appreciated by the Snowshoe management. The non-recognition of this fact by other companies—the idea that a few thousand dollars will make a prospect into a mine—has involved many companies in disaster, both in Canada and in England. While there is scope for



TRAIN OF ORE PASSING THE SNOWSHOE OFFICE.

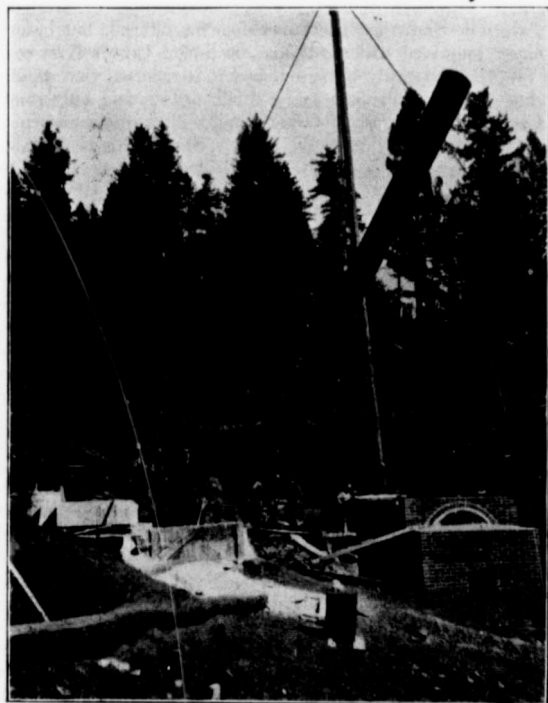
the operations of small syndicates and of companies with limited capital to develop prospects to the point where the presence of ore bodies is demonstrated, yet it cannot be too emphatically stated that large working capital is necessary to complete the development of these great mines in British Columbia, and to place them in a position where they can become steady producers of ore on a large scale. The amount of necessary working capital depends upon the character and position of the particular property, and upon the extent and plan of development undertaken, but it is known that sums varying from \$250,000 to \$500,000 have been spent upon the development of some of the larger properties. To those who are accustomed to deal with the smaller mines of certain parts of the United States, of Africa, and Australia, these figures may appear large. But so far as development has



ERECTING SIXTY-FOOT SMOKESTACK FOR BOILER.

gone, the results have been commensurate with the expenditure. There have been remarkably few failures in British Columbia mining where ample capital has been judiciously expended. In nearly every instance where companies with large actual, as distinguished from paper, capital, have come to grief, it has been owing to reckless mismanagement at headquarters, in the East, or in England. It is, of course, true, that many smaller companies commencing work with but limited working capital have had to suspend operations, not on account of bad management, but rather from lack of capital, and, as a result, there are to-day in the Province many good properties partially developed, and lying idle, which can be picked up upon advantageous terms by individuals or companies with stronger financial backing. We believe the Snowshoe itself was, in its earlier days, an illustration of the truth of the point we are trying to enforce. Before the Waterlow Syndicate took it in hand it was bonded to a London company whose capital was too small to carry to completion this and the various other enterprises upon which they embarked. The small company was voluntarily wound up. This sort of thing has happened in other cases throughout the Province, and amongst shareholders thus unfortunately situated, there is a tendency to blame British Columbia for results, or, rather, want of results, which in too many cases are directly attributable to want of proper financial management.

Meanwhile, much work is going on all over the Province, but the greatest activity this year is noticeable in the Boundary country,



INSTALLING NEW SEVENTY HORSE POWER BOILER, (AUGUST, 1900.)

where new properties are being opened up, and additional smelters are being erected. Many mining men express the opinion that the output of the mines near Phoenix itself—mines such as those owned by the Miner-Graves group of companies—the Dominion Copper Co.'s mines, and the Snowshoe, will very soon exceed the output of the Rossland mines, and in doing so demonstrate to the world the extent and stability of British Columbia mining.

DR. GEORGE DAWSON, C.M.G.

(By a Personal Friend.)

I BELIEVE that his name was George Mercer Dawson, and I know that besides the additional initial before, he has a right to a baker's dozen of letters behind his name, but in the North, to which, by right of his work, he belonged, he was and will be for many a long year, just "George Dawson." As he was essentially a man "without frills," he would like that best.

In this world there are men of whom the world hears so often, that owing to the reiteration of their names, it concludes that they are great men, and lets them take what they want in the way of fame or money, rather than analyze and adjudicate upon their claims.

Most of these when they die, leave their names on the world's hoardings, and very little else; certainly they leave no void which the world feels.

There are others of whom the world seldom hears and only thinks when it wants something. These do leave a void when they die, and of these was the subject of this sketch.

If I were an Indian, or a herald, and had to typify my man by some beast of the field, I would unhesitatingly choose the beaver, as being purely Canadian, incessantly and invariably a worker in wild places, a benefactor of man, with an innate aversion to noise and publicity.

Let those who knew Dr. Dawson best judge if I am right. To us here in British Columbia, and that further North, to which our young men are turning their eyes, Dr. Dawson is the man who made the maps which can be relied upon, who wrote the reports in which there are no exaggerations, no biased statements, no hearsay evidence palmed off as being personal experience, no shadow of the influence of the accursed dollar.

There are, no doubt, other good maps in the world, but if you really want to try a hopeless task, go up between Wrangel and Dawson and try to sell to the prospector some other map of their country in competition with the Doctor's.

We are a free people, especially with our tongues, and we criticize and condemn our own institutions with refreshing frankness, but the Geological Survey of Canada is one of the things which pioneers believe in, and of those who constitute the geological department, Dr. George was not only the head and guiding spirit, but (knowing some of the others), we hope and believe, a type when Canada takes stock of its great

men, after the politicians have done shouting, and the big accumulations of wealth have been dissipated, she will find her front rank principally composed of these quiet workers on the frontier, men like Simpson and Mackenzie and Dawson who had spent their lives opening up a new dominion, whilst lesser men have been fighting over the management of it and the division of those spoils to which their betters broke the trails.

Dawson came from Pictou, in Nova Scotia, a country which has the habit of breeding workers, and was a fine instance of the theory of heredity.

His father, Sir John William Dawson, geologist and naturalist, inherited his instinct for science, so it is said, from his father, James Dawson, of Pictou, and in addition to his life's work, as an educator and principal and up-builder of McGill's University, contributed an immense amount of information upon geology and zoology to the general sum of Canada's knowledge.

Of him the Canadian Gazette said that "Canada owes him more than can be expressed."

Of his son the same paper said "he was a sterling and unostentatious worker in the public service."

This is a fine family record.

Sir John was the pupil of Sir Charles Lyell; the Doctor was the pupil of Huxley, Ramsey and Etheridge, and with such talents as father and son possessed and such instructors, it is perhaps not wonderful that their own works were, like the science they devoted themselves to, basic, that is to say, that just as science depends largely upon geology, so most of what we know about our country, depends upon what the Dawsons have told us.

The subject of this notice was born in '49, studied at McGill, and then entered the Royal School of Mines, London, where he won a scholarship in his second year, afterwards carrying off the Forbes medal and the prize for Paleontology and Natural History. He also carried off a reverence and genuine love for the Old Country which he now abandoned, although no man was ever more Canadian "core through" than he was.

Perhaps he was such a good lover of Canada just because he was such a loyal son of the old mother.

Mining surveys in his own province and a course of lectures in Quebec occupied the first years of his public life, after which he was appointed to the N. A. boundary commission as geologist and botanist, and in that capacity examined the country from the Lake of the Woods to the Rockies, presenting at the end of this period a full report of the geology and resources of the country in the vicinity of the 49th parallel, as well as a number of pamphlets upon special subjects connected with coal formations, fluctuations of the great American lakes, etc.

Somewhere about this time the doctor was waging war against the locusts, and published a pamphlet upon their habits and how to cope with them.

It was not until 1875 that Dr. Dawson joined the Geological Survey Department, and, to complete this subject in a sentence, he became assistant director of

the G. S. D. in 1883, and director in 1895. As such he died. In his public career he won for himself during these years the C. M. G. for his work upon the Behring Sea commission, in the prosecution of which work he spent the summer of 1892 in the study of seal life in the Behring Sea.

It was upon the commissioner's report that Her Majesty's government based their case, and perhaps it is unnecessary to remind our people that whatever the ultimate result, yet Britain established all her contentions at the trial.

Dr. Dawson received the LL.D. from Queen's University in 1890, and from McGill's in 1891, in which year he also received the Bgsby gold medal from the London Geological Society and the blue ribbon of science, being elected a Fellow of the Royal Society of England, and in 1897 he was awarded the gold medal of the Royal Geographical Society. He was also elected president of the Royal Society of Canada in 1893.

I think perhaps that this includes a mention of the principal public honors which fell to Dr. Dawson's lot but the greater position of his life's work was done in our own Northwest, and it is perhaps for that reason that he seems specially to belong to us.

Luck at first seemed against the Doctor. Early in life he suffered a severe injury to his spine, I believe from a fall as an infant, and this left him somewhat crippled and apparently frail and unfitted for an arduous out-of-door career. But you can't handicap a good horse out of the race, neither could luck stop the doctor.

His whole heart was in his profession. He loved the woods and rivers, and he knew them and could travel through and by them as stouter-built men would have failed to do. In one railway journey which we made together nearly across the continent, I was allowed to see so much of his mind that I know he had learned so much of this world that he could look at it even from the natives' point of view. He knew the origin and scientific history of the woods and mountains, but to him they were not mere results of certain natural processes, but live things with a story and meaning of their own. This, perhaps, and his readiness to share all work and laugh at every hardship was the reason of his extraordinary popularity with the Indians and frontiersmen who had worked for him.

It is a common theory that those who are handicapped physically in any way are apt to be but peevish passengers in life's journey. If so, Dr. Dawson was a startling exception to that rule.

In the performance of his duties he explored a large portion of the Northwest, on one occasion making a boat journey of 1,300 miles from the basin of the Liard to that of the Yukon. On this journey there was one portage of fifty miles, and to those who know the North as a country in which there can be no passengers, this feat alone should establish Doctor Dawson's reputation as a real traveller in the toughest of tough countries. I have had it from the lips of Indians, who are not generally eloquent in praise of

white men, that the Doctor was not only "skookum," but had a "skookum tumtum;" was not only a strong enduring man, but a cheery, brave man, ready to endure all things and suffer all things, saying nothing or making a merry jest of what some travellers might call dangerous hardships. We have a brand of this kind of traveller up North. If you will read some of the old Hudson Bay books, or listen to the synoptical description of long voyages by one or two still alive at the clubs, you may guess that "a d—d tough trip during which the 'bacey played out" is a condensation of what might have been three volumes of most exciting reading matter. But then these men don't go North for reading matter.

As a companion, Dr. George was incomparable. He was the one companion of whom no man could tire. Tolerant of everything except sham and wilful inaccuracy, full of sympathy and appreciation of everybody else's good qualities except his own, he was brimful of quiet fun and of accurate information on all sorts of subjects with which he fed and delighted you, where a less unselfish man would have choked and bored you. He never seemed to be teaching, but he taught you all the time, so that you always wanted more. Of every expedition whose members I have met, the Doctor when he was a part of it, appears to have been the life, and I know that in the reading room of the Rideau Club, the little figure with the quick, kindly smile and everlasting cigarette will be more missed than any other figure could be.

He was everybody's friend, or if he had an aversion it was only shown by silence. I can only remember to have heard of one rebuff administered by him, and that was so typical of his hatred of humbug to his quiet fun that I must tell it.

Some hungry aspirant for fame had conceived the idea of exploring one of Canada's Eastern rivers, just as others have explored the Cariboo road and other fairly well known portions of our province. This gentleman, having selected his river, wrote to Dr. Dawson for any hint he could give him as to the difficulties likely to be met with. The Doctor sent him back a list of the most comfortable hotels upon it.

But geology and geography did not occupy the Doctor's whole mind. Indeed, "the wonder grew, how one small head could hold the things he knew" and cared about. One of his last letters to the writer was an earnest appeal to visit Queen Charlotte Island and kill a specimen of the caribou which Dr. Dawson fully believed still exists upon that island. It is a long story, and one more suitable for the Natural History Society than for this journal, but it is sad to think that one of the Doctor's last wishes was to compass the death of his namesake, for the naturalists have insisted upon naming the beast of whom we have no specimens, Dawson's caribou.

Possibly when Mr. A. S. Reed has done killing all the biggest animals on earth, or Mr. Warburton Pike, when he has finished opening up Cassiar, will undertake this commission. The climate of Queen Charlotte island may not have exterminated the caribou,

but then they do not suffer from sciatica. Human beings do.

The news of Dr. Dawson's death will be a shock to all who knew him and loved Canada. It was too early for him to go back to camp, but the greatest pity of it all is that he has left no son to benefit his country by the exercise of those qualities which appear to have been the Doctor's by heredity.

COMPANY MEETINGS AND REPORTS.

CARIBOO CONSOLIDATED.*

THE first annual general meeting of this company was held on Wednesday at 18 Swithin's Lane, Lieut.-General Sir James Beyer Edwards presiding.

The secretary (Mr. E. W. Ayers), having read the formal notice,

The chairman, in moving the adoption of the report, said that immediately after the company went to allotment in May, 1899, the directors entered into an agreement with Mr. Thompson, their consulting engineer, and instructed him to proceed to British Columbia to visit the properties. He did so in the following month, and inspected almost all the company's properties. He reported unfavorably upon certain of them, and in consequence the directors approached the vendor company—the Gold Lands Corporation, Limited—with a view to obtaining some reduction in the cost price of the properties. After considerable negotiation with the people from whom they acquired the properties, the vendor company restored to this company 122,800 of its shares. Originally £250,000 in cash and shares was paid for the properties and this returned placed them in a much more favorable position than heretofore, because out of a capital of 350,000 shares they had only 167,200 issued. Mr. Thompson returned to British Columbia last summer, and made some very valuable reports, especially as regards Lightning Creek. He also obtained for them some valuable water rights. The work they carried on in the first season was the development of the Lowhee Creek, San Juan, and Ah Quay, and during last season they continued the development on those properties, but Mr. Thompson last season surveyed the bed of Lightning Creek most carefully with a view to giving his report upon the best means of developing it. He found that without ample water supply it would be impossible to get all the returns they ought to obtain from the rich gold-bearing gravels. He therefore carried out a survey for a considerable distance, crossing through a gap in the mountains into the Swift River valley, and he acquired for the company the water rights of that river, which would place them in a most favorable position. The properties consisted chiefly of hydraulic properties, and after two summers' trial they found that the scarcity of water arising from their being situated so high in the mountains was very great, and that the expense of conducting operations was so large that they could not expect to make a success of the company simply from the hydraulic workings. There remained for them the drifting propositions of Lightning Creek, on which they possessed four claims which were really the pick of the network of claims in that creek. These were the Eleven of England, Water Lily, Bay State and Amalgamated. These were contiguous and formed a considerable length of the creek. The pay gravel in these claims was near the bedrock, but could not be obtained and the gold taken out until the bedrock had been drained. The only feasible proposal which had come before them for carrying this out was that made by Mr. Thompson and supported by many other authorities for the construction of a drainage tunnel from the lower part of the creek so as to strike the bedrock just below their claims. This tunnel would run to between 2½ and 3 miles in length, and would cost some £30,000. The expense appeared to be great, but was not so when compared with the cost of developing a quartz reef. When the bedrock had been drained the gold could be obtained with practically very small additional expense. The claims adjoining theirs below Lightning Creek were owned by other people, and it was clear that if the properties were united and they were to halve the expense—and negotiations were proceeding on those lines—it would mean a saving of at least £15,000 to this company. He was not yet able to say what the probabilities were of these negotiations coming to a successful termination, but so far this company had been met in the most favorable manner possible. Their chances of success depended upon the development of these Lightning Creek gold claims, about the great value of which there was no doubt whatever. They were celebrated throughout the

whole of that part of America. Moreover, they could be worked the whole year round; indeed, they could be worked better in winter than in summer, because there was then less water to be dealt with. Whether these negotiations were brought to a satisfactory conclusion or not the board intended to commence to open up the tunnel with the least possible delay, and were determined to develop the claims thoroughly. Mr. Thompson would be starting on Saturday for British Columbia, in order to make the necessary arrangements for carrying on next season's work, and for beginning the tunnel with the least possible delay.

Mr. John Girdwood, J.P., seconded the motion. He said that the directors had the fullest confidence that they would bring the company to a very big success, and that the difficulties hitherto experienced would gradually disappear. He thought that their Lightning Creek and Lowhee Creek properties would give a good account of themselves, so far as dividends are concerned. In Lightning Creek they believed they had one of the very finest properties in the whole of British Columbia.

The motion for the adoption of the report and accounts was carried unanimously.

THE CROW'S NEST PASS COAL CO., LTD.

The annual meeting of the Crow's Nest Pass Coal Company, Limited, was held in Toronto, Friday, the First of March, 1901.

The following report was submitted to the shareholders:—

The directors have pleasure in submitting to the shareholders of the company their annual report, including statements of assets and liabilities as at 31st of December, 1900.

The net profits for the year, after paying all operating expenses and all charges of every kind at the head office and mines, amounted to \$141,064.10. This amount has been derived from the various departments of the company's business, viz: The sale of coal and coke, and from waterworks, house rentals, general store, etc. As no dividend was paid for the year on the company's capital, the above sum has been carried forward to credit of profit and loss, making a total sum at credit of that account (including the amount already there from the earnings of 1899) of \$188,874.52.

The coal produced during 1900 amounted to 220,458 tons. Of this tonnage 114,063 tons were sent to the company's coke ovens at Fernie, and produced 73,496 tons of coke, while the balance of 106,395 tons were disposed of as merchantable coal.

During the year the company paid out in cash the sum of \$874,080.83, of which the pay rolls amounted to \$419,037.09, the balance of \$454,943.74 having been disbursed for new coke ovens, addition to plant, and for development work at Fernie and Michel. One hundred and ten (110) new coke ovens were built in 1900, which makes, with the 202 in operation at the end of 1899, a total of 312 ovens, with a capacity of over 450 tons of coke per day.

The number of men at present in the company's employ is about 800, and this number will, of course, steadily increase as our mines are developed.

All of which is respectfully submitted,

ELIAS ROGERS, Managing Director. GEO. A. COX, President.

Toronto, Canada, 1st March, 1901.

FINANCIAL STATEMENT, DECEMBER 31, 1900.

| | |
|--|----------------|
| Assets. | |
| Mines, Real Estate, Plant, Development, etc. | \$2,266,916 65 |
| Cash in Bank | \$37,501 62 |
| Accounts Receivable | 67,005 42 |
| | \$ 104,507 04 |
| | \$2,370,523 69 |
| Liabilities. | |
| Capital Stock, paid up | \$2,000,000 00 |
| Profit and Loss Account:— | |
| Balance at Credit 31st December, 1899 | \$ 47,810 42 |
| Added in 1900 | 141,064 10 |
| | 188,874 52 |
| Bills Payable | \$121,795 72 |
| Accounts Payable | 59,853 45 |
| | 181,649 17 |
| | \$2,370,523 69 |
| E. R. WOOD, Treasurer. | |

I have examined the above statement of assets and liabilities with the books and vouchers of the company, and find the same correct.

A running audit has been maintained during the year, and I certify that the books are well and truly kept.

R. W. MACPHERSON, Auditor.
Toronto, March 1st, 1901.

In his address, the president, Senator Cox, said: "In congratulating you upon the success of the last year's operations, it

*This concern should not be mistaken for the Consolidated Cariboo Hydraulic Mining Co., or the Cariboo Consolidated of Camp McKinney.

may be worth while to refer to the erroneous ideas that have gone abroad with regard to the management and control of the Crow's Nest Pass Coal Co. We are, in every respect, a Canadian enterprise, with a large majority of Canadian stockholders, under Canadian control and management, and are giving employment to a great force of labor on Canadian soil. We are developing Canada's natural resources in one of the most important economic minerals, and are building up an immense Canadian industry, which is bringing wealth to the Dominion, and which, we feel assured, will constitute a most important factor in the Canadian industrial development of the future, unless our operations are restricted by a limited market and inadequate railway facilities.

It affords me great pleasure to announce that we are prepared to proceed at once with construction and development work involving an immediate expenditure of \$835,000, and we already have this money in the treasury of the company for this purpose. This large sum does not include the railway project, to which I will refer later, but will be devoted exclusively to development work, the building of coke ovens, dwellings, offices and other works in connection with the coal and coke industry of the company. We intend to build at Fernie, Michel, and at another suitable point, 720 coke ovens, which will involve an expenditure of \$540,000 under this head alone. We will then have 1,022 ovens, which will increase our capacity for coke production from over 450 tons per day, as at present, to more than 1,500 tons per day. Our expenditure will also include more than a quarter of a million dollars on mine improvements, offices and miners' dwellings. These expenditures and the extensive mining and coke-producing operations that are to follow will create and maintain two new towns in the coal district as large as Fernie, which now owes its existence to the works carried on by this company.

There is a prospective demand, provided we obtain access to the American market, as I shall hereafter mention, for 4,500 tons of coal per day within a year, and in three years we expect to increase our output to about 6,000 tons of coal per day, a large portion of which will be converted into coke in our ovens, and within five years we expect to have a pay roll of fully \$10,000 per day, which will be sufficient to maintain three important industrial centres in the coal district.

All business men will at once realize how important such a development will be to the country at large, as mining camps are invariably extensive consumers of supplies. Not only will there be the direct employment of several thousand Canadian workmen, but a new and most extensive demand will be created for the products of Canadian factories in the East, and the food supplies from the Western farms and cattle ranches.

It is only fair to you, however, to state that the present demand of British Columbia for coal and coke would not justify any such expenditures as we propose to make. This is self-evident when I state that the present demand of British Columbia does not exceed 1,000 tons of coal and coke per day, and we cannot expect this demand to increase in the near future, even under most favorable conditions, so as to justify such expenditures.

In order that we may proceed with this development, it will be absolutely necessary to secure access to the American markets by a route that will put us in a position to successfully compete with the coal and coke producers already in the field. If denied access to the American markets, except by round-about routes, if delayed in our operations by legislative obstruction, if prevented in any way from cutting down the cost of production to the narrowest possible margin, our success in the field will be proportionately cramped, and it will be quite impossible to undertake the development now proposed.

Recognizing, therefore, the necessity of obtaining direct access to the adjacent markets of the United States, an application has been made to parliament by five of our directors for a charter to build a railway from the coal fields to the boundary, where it is intended to connect with a spur line from Jennings, on the Great Northern railway.

This is simply an effort to secure an entrance, by the best possible route, to an almost unlimited market for coal and coke, where we must meet the keenest competition. And without this market any large development of these British Columbia coal fields will be practically impossible.

The fear has been expressed in some quarters that the establishment of railway connection between the Crow's Nest coal fields and the Great Northern railway system will deprive the Canadian mining and smelting industries of a supply of coal and coke, and that the company may create a shortage in the Canadian supply to benefit American smelting interests. These fears are groundless. From geological reports, it appears that there are over 250,000 acres of coal lands in the Crow's Nest country, containing a supply of coal which is exceeded by all authorities to be practically exhaustless, it being estimated that there are in this area 20,000,000,000 tons of coal. This would admit an output of 10,000 tons per day, allowing 300 working days per year, for over 6,000 years. This is entirely independent of the immense coal areas in Alberta and in other parts of British Columbia.

We are at present prepared to enter into time contracts with

the smelters of British Columbia to supply any quantities of coal or coke they may require, but so far as the local supply is concerned, its safety can be best assured by such development of the Crow's Nest mines as will be made possible by the building of the proposed line.

Successful operation of the mines on a large scale would be impossible if our market were limited to British Columbia and it were subject to the fluctuations we have experienced this last year.

With an immense coal and coking industry in operation, turning out from six to ten thousand tons of coal a day, the British Columbia smelters now in operation could close down or open up without notice, as often as they might feel inclined, and the change would not be felt. The smelters now in operation on the Canadian side only require about 300 tons of coke per day. If we are restricted as to markets, there will be higher initial cost, risk of suspension through accidents, difficulty in securing labor, and in meeting any variation in the demand.

Although there is an immense area of coal in the Crow's Nest country that is of the best quality for coking, we should not harbor the delusion that this district has all the coking coal on the continent. There will be competition from the existing sources of supply—from Cokedale, on Puget Sound, Pennsylvania, West Virginia, Utah and Colorado. There are also immense coal deposits in Montana, Washington, and other places, which may prove, when tested, to be of good coking quality.

To enter and hold this market, which means from 5,000 to 6,000 tons of coal per day, the Crow's Nest Pass Coal Co. must have the best railway facilities available, and that is why it is absolutely necessary to build the proposed spur.

There is hardly any industry so universally beneficial to a country as coal mining and coke making for export trade. The coal and coke are both brought to the last stage of perfection before being shipped out. All labor is expended on them in the country, and there is nothing further to be done with them except to consume them. Not so with logs, not so with lumber, not so with pulp, with wheat, with wool, and with many other products exported. Every dollar that comes into the country in return for coal or coke exports makes the country just that much richer. The farmer, the rancher, the miller, the merchant and the manufacturer will all profit. There will also be an enormous direct revenue to the British Columbia government from the royalty. The government is now deriving a revenue of about \$100 a day from our present operations.

In addition to the development of the coal and coke industry the proposed railway will open up a prospect, and an assured prospect of smelter development, which will prove from a public standpoint, of the very greatest importance. The success of the smelting industry depends upon the ability to assemble the various materials essential to profitable smelting at the lowest possible cost, and if the proposed line of railway is built, connecting the Crow's Nest fields with the American railway systems, the balance of advantage will be decidedly in favor of the Canadian side as the place for establishing a large and profitable smelting industry. The Canadian people have but to improve their opportunity, to stand out of the way and let the good fortune in.

In order to illustrate what I have said, permit me to point out how suitable a place Fernie or some point adjacent thereto, would be for the establishment of a smelting industry. There we have the coke, without any charge for hauling, while to carry it to any smelting point south of the line would involve a hauling charge, as well as an American duty of 60 cents per ton.

The limestone required is to be found at Fernie, with no expense except the cost of quarrying.

The lead ores of Southern British Columbia are now seeking a market, which is almost impossible for them to find, and those adjacent to the coal fields could, at a trifling cost for transportation, be laid down at Fernie, or some other convenient point. The dry ores necessary to make workable and profitable mixtures and blends are not at present to be obtained in British Columbia, but are to be found through the adjacent mining States along the lines and connections of the Great Northern and Northern Pacific railways; and the ore cars taking the coal and coke from the mines at Fernie to supply the railways and established industries in these States, instead of coming back empty, would, at a low cost for transportation, bring back these dry ores to such a smelter. There is no point south of the boundary line where a smelting industry could so easily or so profitably be established.

If a smelting industry were established south of the line there would be, as above mentioned, the cost of transportation of the coke to the site of the smelting industry; the duty on this coke entering the United States; the cost of transporting the lead ores from British Columbia to the site of the proposed smelter, and the American duty on lead ores entering the United States, which, upon the quality of ore found in some of the best mines in British Columbia would probably be about \$9.00 per ton.

Simply on the item of transportation, there would be the serious handicap of the ore cars bringing down the coke and

ore from British Columbia to a smelter on the American side being compelled to return empty, and this would necessarily entail a proportionately higher freight rate.

Not the least important factor in the situation is the fear in the minds of American capitalists interested in the mining industry of the West that an export duty may be put upon ores by the Canadian government, and this would cripple any smelting industry established on the American side dependent upon Canadian ores as its source of supply.

That this is not simple theory, but the mature judgment of practical smelting men, is evidenced by the fact that we have the most positive assurances from a smelting man of large capital and experience that if we would obtain the proposed railway connection he will at once commence the erection of a large smelting plant in British Columbia adjacent to the coal fields; and we have assurances scarcely less definite from others of the establishment of three or four more smelting industries at other suitable points in Southern British Columbia, provided the proposed road is built.

The prospect, therefore, for Southern British Columbia would appear to be exceedingly bright. Once the charter for the railway is assured, the construction of the coke ovens, the building of the homes for the miners, and the virtual establishment of two new towns in Southern British Columbia, will await only the opening of the season. Scarce more time will elapse, from the assurances we now have, before more than one large smelting industry will be put under way, and hundreds of thousands of dollars will be invested in developing this important industry in that country.

With improved transportation facilities, as well as the improved smelting facilities, which would be secured, a smelter could secure freight charges and give rates for treatment that are now impossible.

It is hardly necessary to dwell at length on the resultant benefits to mining and other enterprises in British Columbia. These benefits are self-evident.

In every lead mine there are masses of ore that will not pay at the present rate for treatment; in every camp there are propositions and mines just too lean to tempt operators or investors. Every dollar taken off the charge for treatment means thousands of tons more ore available, and proportionately swells the pay rolls of every camp. Every dollar of reduction in smelter charges widens the pay streak of every mine, and brings new mines within the paying class.

It would be a great misfortune to British Columbia and to the Dominion at large if this opportunity should be lost, through the failure to secure adequate means of transportation. There are rival projects south of the boundary. Immense coal areas in the States of Washington and Montana are in process of development, and if the parties interested in these properties once secure possession and control of the market in these States for coal and coke I fear the coal and coke of British Columbia will stand a very poor chance of ever taking it from them.

The promoters of this railway ask no cash bonus or land grant of any kind; they simply desire the opportunity of expending their own money to construct a railway which will be of great public benefit.

We now have a prospect of building up a city as large as Butte in the Crow's Nest coal district; and I cannot think it possible that either the parliament of Canada or the legislature of British Columbia will place any barrier in the way of the industrial development of our country, or will adopt a course which may delay that development half a century. I, therefore, look forward with confidence to a charter being granted; and, this being done, the development which I have outlined will at once be proceeded with; but unless the charter is granted the development outlined cannot be undertaken.

The president moved the adoption of the report, which was seconded by Mr. Jaffray, the first vice-president of the company.

Mr. Elias Rogers, managing director, gave an interesting address, detailing the past year's operations of the company. The usual formal resolutions were adopted and all the members of the board were re-elected for the ensuing year.

THE CARNES CREEK CONSOLIDATED GOLD MINES, LTD.

The annual meeting of the shareholders of the above company was held at the company's office on Tuesday; the vice-president, Mr. Temple, presiding, in the absence of the president.

The accounts were presented for the past year, duly audited by Mr. J. M. Doyle, and showed the total expenditure on the property to date to be \$26,892.61.

The report was as follows:

"Your directors are gratified to be able to report that the result of our work during the season confirms the belief in the high value of the company's properties.

"One claim, the Orlando, has been added to the properties. This claim adjoins the Roseberry and is a valuable addition to that group. Thirteen mineral claims in all, and 155 acres of land, are now held by the company.

"The extent and success of development work that is being done on surrounding properties, together with the improvements in transportation facilities, by means of roads and steamboats that are now being arranged for, will greatly aid in attracting the attention of investors to these rich mines, and we now anticipate being able, in the near future, to secure sufficient funds for full development and placing the property on a paying basis.

"The work on No. 2 level of the Roseberry now consists of 675 feet of tunnel, and reaches a depth of 300 feet below the surface. 311,605 shares of stock still remain in the treasury."

The report and balance sheet were adopted.

The retiring directors were re-elected as follows: Messrs. F. McCarthy, president; C. H. Temple, vice-president; I. T. Brewster, secretary-treasurer; W. Cowan, T. Kilpatrick.

CANADIAN GOLD FIELDS SYNDICATE.

From the report recently issued of the Canadian Gold Fields Syndicate, we extract the following statements:

The St. Eugene Consolidated Mining Company, Limited, has entered the list of dividend payers, and paid a dividend of \$105,000 for the quarter ending December 31st, 1900. This amounted to 3 per cent. on its capitalization, our share of the dividend being \$19,200. At the end of 1900, the issued capital of our company was \$600,000, leaving shares of the value of \$400,000 still unissued in the treasury of the company. In November last the board of directors declared a first quarterly dividend of 3 per cent. on the issued stock of our company, being at the rate of 12 per cent. per annum on par value. This dividend has been paid.

The St. Eugene Consolidated is now equipped with a concentrating mill of a daily capacity of 400 tons, double the size of any other concentrating mill in Canada. The property is so well developed that there is now considerably over two years' supply blocked out in sight, and new ore reserves are being steadily developed. The St. Eugene Consolidated is now shipping from 2,500 to 3,000 tons of silver-lead concentrates per month, and besides paying a dividend of 3 per cent. per quarter, has a large cash surplus on hand.

At the present market price of the St. Eugene Consolidated shares, our holdings in that company are worth more than the total issued capital of the Canadian Gold Fields Syndicate, Limited. This shows the strong financial position of our company.

Mr. W. H. Jeffrey, the company's mining engineer, has the following to say of the St. Eugene mine:

"I have visited the St. Eugene twice, the last time being in October, 1900. These properties are extensively developed, and equipped with a 17-drill compressor plant and a 400-ton concentrating mill. The tonnage in sight is very large, amply sufficient to keep the mill running for over two years. The veins are well defined fissures and the ore shoots unusually large. One ore shoot in the lower tunnel is being stope out forty feet wide. You need never have a moment's uneasiness about the success of the St. Eugene Consolidated, as it is one of the biggest and best silver-lead mines in North America."

Its present output is from 2,500 to 3,000 tons per month.

THE DARDANELLES MINING AND MILLING CO.

Adjourned annual meeting of the shareholders of the Dardanelles Mining & Milling Company, Limited, Non-Personal Liability, held at the offices of Messrs. Tupper & Peters, Board of Trade Building, Victoria, B. C., on the 25th day of March, 1901, at the hour of 3:30 o'clock, p. m., pursuant to adjournment.

The president occupied the chair. The following were appointed as directors: F. Peters, Sir C. H. Tupper, Col. S. W. Ray, J. J. Shallcross, J. T. L. Meyer, Capt. C. E. Clarke, W. J. Trethewey.

The chairman then read the circular dated 20th day of February, 1901, issued to the shareholders of the company.

The following resolution was moved by the Hon. Edgar Dewdney, and seconded by Mr. J. T. L. Meyer:

Resolved, that it is advisable and the directors are hereby authorized to sell and transfer to a new company, to be formed and called the Dardanelles & Okanagan Mining Company, Limited, the whole of the mineral claims, crown granted and otherwise, and all the other assets of this company, upon the following terms:

(a.) The new company to become liable for and to pay all the debts of this company.

(b.) Every shareholder in this company shall be entitled to receive one (1) share in the new company for every share held by such shareholder in this company, provided he complies with the requirements hereinafter stated.

(c.) The capital of the new company shall be \$1,500,000, divided into 1,500,000 shares of 10 cents each.

(d.) The shares in the new company taken up by shareholders shall be considered as paid up to the extent of 5 cents

on each share, and shall be assessable for the balance.

(c.) Shareholders in this company desiring to take shares in the new company shall so inform the secretary, in writing, by registered letter, stating the number of shares such shareholder intends to take, and at the same time remitting the sum of one (1) cent for each share subscribed for, such notification to be given and money paid on or before the 15th day of May next.

(f.) The balance of the uncalled amount of these shares shall be called up, if necessary, at the discretion of the directors of the new company, but no call to be for more than one cent a share, and calls to be made at intervals of not less than two months.

(g.) The balance of the shares in the new company not taken up by shareholders of this company shall be placed in the treasury of the new company, and may from time to time be disposed of in such manner and at such prices as the directors of the new company shall deem advisable.

Before the actual formation of the new company a provisional transfer may be made to trustees who shall be bound to carry out this resolution; the trustees shall be selected by the directors of this company.—Carried unanimously.

Before this resolution was passed, it was explained to the shareholders' meeting by the chairman that the effect of the resolution would be that such shareholders who did not take stock in the new company would lose all interest in the assets now owned by the Dardanelles Mining & Milling Company, and that by taking shares in the new company, they would retain an interest in its assets.

The meeting then adjourned.

THE ATHABASCA MINE.

MANAGER'S REPORT FOR 1900.

I REG to submit herewith my report for the twelve-month period from January 1st, 1900, to January 1st, 1901.

The period has been one of continued activity both in the mine, the mill, and in the construction of new works, which latter have been chiefly in connection with the completion of the compressor and the erection of the cyanide plant, which is designed to treat the tailings from the mill.

The results achieved are clearly set forth in the following table, which is a summary of the year's operations:

SUMMARY OF OPERATIONS FOR THE YEAR ENDING DECEMBER 31st, 1900.

| | Jan. | Feb. | Mar. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Total. | Per Ton. |
|----------------------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|------------------|-------------------|---------------|
| INCOME. | | | | | | | | | | | | | | |
| Bullion sold | \$ 10,846 03 | \$ 9,381 35 | \$ 9,233 13 | \$ 7,744 10 | \$ 14,865 08 | \$ 22,340 08 | \$ 13,977 71 | \$ 12,734 81 | \$ 11,599 33 | \$ 6,881 42 | \$ 5,301 34 | \$ 4,951 16 | \$ 130,053 64 | \$ 27,214 |
| Concentrates sold | 2,446 90 | 1,767 50 | 1,526 30 | 1,672 92 | 3,095 85 | 6,123 93 | 4,417 18 | 5,219 79 | 4,423 53 | 2,902 49 | 3,402 11 | 2,714 50 | 40,615 32 | 8,039 |
| Store and sundry profits ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 3,389 94 | 0,659 |
| Total | 13,273 05 | 11,350 92 | 10,765 60 | 9,417 02 | 18,890 93 | 28,466 01 | 18,404 89 | 17,924 60 | 15,932 86 | 9,783 91 | 8,793 42 | 7,665 66 | 173,938 90 | 34,240 |
| EXPENDITURE. | | | | | | | | | | | | | | |
| Mining | 10,171 79 | 9,443 63 | 7,808 47 | 7,458 14 | 8,171 01 | 7,783 58 | 8,054 90 | 8,854 59 | 9,643 74 | 9,203 99 | 8,538 06 | 9,594 29 | 104,726 19 | 20,721 |
| Milling | 1,156 84 | 1,002 45 | 1,211 47 | 1,174 26 | 1,039 30 | 1,203 43 | 1,149 07 | 1,286 72 | 1,299 09 | 1,225 43 | 1,254 95 | 1,340 81 | 14,357 52 | 2,835 |
| Tramming | 88 | 36 | 93 85 | 89 60 | 88 70 | 103 03 | 95 12 | 113 04 | 103 06 | 120 75 | 108 46 | 96 87 | 1,138 32 | 0,225 |
| Smelter costs, direct | 301 62 | 274 24 | 228 54 | 317 01 | 452 40 | 558 91 | 430 12 | 521 76 | 489 87 | 385 64 | 494 75 | 459 08 | 5,004 81 | 0,990 |
| " " indirect | 194 71 | 139 14 | 115 93 | 164 39 | 319 81 | 475 20 | 352 28 | 418 16 | 353 46 | 234 93 | 393 28 | 215 82 | 3,376 83 | 0,668 |
| Plant maintenance | 209 48 | 148 05 | 95 71 | 74 10 | 116 40 | 123 86 | 162 28 | 350 13 | 249 55 | 535 38 | 599 05 | 157 10 | 2,818 75 | 0,558 |
| Management: legal, general | 559 60 | 567 21 | 1,511 37 | 610 87 | 555 61 | 1,240 29 | 855 81 | 930 46 | 808 87 | 879 42 | 739 05 | 954 75 | 10,243 31 | 2,027 |
| Provincial taxes ..... | ..... | ..... | ..... | 301 29 | ..... | ..... | ..... | 505 81 | 125 | 463 66 | 445 70 | 398 96 | 2,240 42 | 0,443 |
| Bullion charges | 44 11 | 38 83 | 37 83 | 31 51 | 60 | 89 75 | 55 76 | 54 36 | 47 38 | 29 37 | 23 20 | 21 55 | 531 85 | 0,105 |
| Total | 12,816 15 | 11,630 15 | 11,105 12 | 10,251 17 | 10,793 29 | 11,575 02 | 11,135 06 | 13,036 63 | 13,113 22 | 13,078 57 | 12,593 50 | 13,239 81 | 144,407 71 | 28,572 |
| New construction | 7,607 20 | 437 90 | 559 74 | 200 13 | 2,451 53 | 1,938 90 | 3,550 55 | 6,680 45 | 7,547 80 | 8,048 02 | 3,458 95 | 1,964 62 | 44,472 88 | 8,800 |
| Total | 20,423 35 | 12,068 05 | 11,664 86 | 10,451 30 | 13,244 82 | 13,513 92 | 14,705 61 | 19,717 08 | 20,688 11 | 21,126 59 | 16,052 45 | 15,204 45 | | |

*Total Net Profit \$29,551.90. Total Profit per Ton \$5,847.00.

The produce for the year reached the figures \$170,668,496, which sum was obtained from 5,054 tons of ore. In the statement of cost the entire amount expended in development (which was \$29,014.48) is included in the cost of mining, and only the actual cost of new machinery, erection and buildings is included in item of "new construction." After making these charges, and adding to the produce the profits derived from sales of merchandise and other sources, the profit for the year on operation was \$29,551.90.

The vein has continued to present difficulties which have rendered the cost of mining high; it has been broken by faults, it has lain flat, and its width has been about the same as during the previous year. For every ton of ore about four and three-fifths tons of waste have been mined, and a further amount of waste (which I am not able to estimate), has been mined and left in the worked out stopes. Under these conditions, and, although every effort has been made to conduct the work on economical lines, the cost per ton is high. A complete statement of mining cost is submitted below, which

includes the cost of development and takes account of ore and waste mined, but no account of the waste noted in stopes.

We had anticipated early in the year that the vein would leave the schist and enter the granite at some period not far distant, and this expectation was fulfilled when our shaft (No. 2) first struck the granite in June. We had previously experienced on the schist side of the contact, a remarkable concentration of values (which is shown in the returns for May and following months), and some anxiety was felt as to the condition in which the vein would be found in the granite. Any doubts on this point were quickly removed when the vein was found in a stronger body than ever before, and with a tendency to average larger than in the schist.

In the new formation we experienced an entirely new series of faults, and the vein was very much disturbed; this was only to be expected in the neighborhood of the contact, and we expect an improvement in this respect as our development becomes more and more removed from the schist area. In common with the character of the ground, the value of the ore and its character have been uneven, and, owing to certain local conditions, a certain amount of waste had to be sent to the mill with the ore. These facts account for the drop in the produce during the last three or four months. I regard these features as local and temporary in character, and already we are beginning to find again bodies of ore as rich as any we have had in the schist. There is now no longer any room for doubt that the vein is the same as, or is closely related to the vein in our old (No. 1) shaft, and this extension of the vein northward is an important and highly favorable feature. On the south, the vein in the schist has been cut off by a prominent fault, and very little effort has been made to find the vein on the other side. This is one of the most important points for future exploration, for it can hardly be doubted that it can ultimately be found here, and as the last assay from the vein, where cut off in Intermediate No. 1 level, gave over \$300 to the ton, it is worthy of some outlay on exploration.

Regarding the future, it is difficult to forecast the form which development will take, owing to the extraordinary character of the vein. We have carried on development actively during the past year, to the extent of nearly 2,000 feet; but no comprehensive plan can yet be laid out, and we have to be guided each week by the result of the previous week's work. In some notes, which I attach hereto, on the geological aspect of the mine, I make an attempt to explain this matter more fully.

in the past is our grounds for confidence in the future, and, looked at in that light, I can confidently assert that the prospects of the mine have been very much benefited by the work of last year; this work has shown the existence of ore bodies, the richness of which was not before suspected; it has shown that the vein is greater in extent than formerly supposed, and that other ore chutes or pockets of similarly rich ore are scattered through the vein in both granite and the schist. But the most important result achieved by the development of last year is that the mine is now more open than it has ever been before and that it is possible for us to increase our output very largely. When we were mining very high grade ore this feature was not so important, as ore of that grade had to be treated with great care in the mill—now that the cyanide plant is completed we can make such changes in our mill as will enable us to treat 800 tons per month if necessary, and the fact that the mine is in a position to stand an increased output is a most important feature in considering the outlook for the coming year. If we encounter ore bodies such as we had last year, we shall be enabled to take advantage of them to the fullest extent, and it will enable us to pass through such periods as we have experienced during the last two months at a reasonable profit. I recommend that development work on the present ore body should be actively continued and that exploratory development work should be undertaken at the first opportunity. The gravity tramway has continued to perform its functions without delays or accidents of any kind; 5,054 tons have

trust, prove a valuable addition to the company's works. The extraordinary difficulties encountered in its construction have delayed its completion far beyond the date expected, but I am glad to be able to report that it is now finished. I regret to record that the dam erected to store the tailings broke out on July 1st, and a certain amount, probably one-third, was lost. The dam was completely wrecked, and since that date it has been impossible to save the tailings.

Power.—Careful attention has been given to the flumes and accessories, and an air-tight cover placed on all; the result is that no mishaps have occurred, and there have been no delays to the machinery from this cause. This is an important consideration, where, as in our case, we depend entirely upon water for power, and in this country where ice is a dangerous factor.

Taxes.—This company paid into the Provincial Treasury the sum of \$2,240.42. After June 30th the rate of taxation was raised from one to two per cent, on the gross output, after making certain deductions specified by law. The law was probably framed without a knowledge of the widely differing conditions under which mining is carried on in this Province. Under the present system of deductions allowed, it discriminates in an unequal manner between mines which produce ore at a low cost and those like ourselves, which operate on high grade ore with a heavy mining cost. My opinion is that the question of taxation should be approached from an entirely different standpoint; that the system of royalties, which is

DETAILED STATEMENT OF MINING COST, 1900, INCLUDING DEVELOPMENT AND ORE EXTRACTION.

| | Jan. | Feb. | Mar. | April | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Total. | Per Ton of Ore and Waste Mined. |
|-----------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|-----------|-----------|-----------|-------------|---------------------------------|
| WAGES. | | | | | | | | | | | | | | |
| Foreman and Shift. | | | | | | | | | | | | | | |
| Bosses | \$ 354 50 | \$ 427 34 | \$ 493 75 | \$ 381 77 | \$ 303 | \$ 260 | \$ 340 | \$ 373 62 | \$ 270 | \$ 250 | \$ 340 | \$ 285 50 | \$ 4,079 48 | \$ 0.114 |
| Timekeeper | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 50 | 600 | 0.021 |
| Miners | 6,139 57 | 5,144 99 | 3,700 20 | 3,359 36 | 3,137 24 | 3,054 16 | 3,093 17 | 3,606 12 | 3,889 17 | 3,992 66 | 3,078 24 | 3,635 48 | 46,400 45 | 1.659 |
| Muckers | 1,179 37 | 1,103 75 | 1,136 25 | 1,701 75 | 1,743 75 | 1,509 75 | 1,690 | 1,735 75 | 1,801 | 1,719 75 | 1,863 44 | 2,374 75 | 19,586 50 | 0.695 |
| Nippers | 155 | 140 | 107 50 | 63 | 93 | 97 50 | 175 50 | 180 75 | 180 | 160 50 | 145 75 | 171 | 1,678 50 | 0.060 |
| Blacksmith & helpers | 509 05 | 535 | 498 50 | 401 70 | 535 50 | 472 50 | 494 75 | 537 | 535 92 | 531 | 498 24 | 549 75 | 6,179 91 | 0.219 |
| Timbermen | 247 87 | 162 50 | 136 12 | 198 87 | 397 75 | 393 25 | 260 50 | 281 74 | 295 75 | 239 75 | 243 75 | 401 12 | 3,247 97 | 0.115 |
| Fitters & Engineers | 241 | 492 87 | 508 49 | 664 37 | 610 50 | 580 20 | 580 20 | 566 49 | 599 27 | 599 27 | 591 12 | 385 12 | 5,992 27 | 0.210 |
| Sundry | 61 75 | 34 50 | | 6 85 | | | 2 40 | 64 50 | 14 | 90 25 | 39 | 88 | 408 15 | 0.015 |
| Total | 8,612 36 | 7,885 33 | 6,560 78 | 6,721 66 | 6,241 66 | 6,524 66 | 6,744 72 | 7,355 97 | 7,635 11 | 7,651 28 | 7,419 54 | 8,140 72 | 88,101 29 | 3.130 |
| MATERIAL. | | | | | | | | | | | | | | |
| Powder | \$ 579 15 | \$ 860 | \$ 627 50 | \$ 417 50 | \$ 534 50 | \$ 544 50 | \$ 814 75 | \$ 649 50 | \$ 1,237 50 | \$ 588 75 | \$ 774 55 | \$ 615 | \$ 8,252 20 | \$ 0.203 |
| Fuse | 99 | 33 | 66 | | 142 91 | 33 | 75 85 | 90 | 60 | 70 | 90 | 93 | 852 76 | 0.030 |
| Caps | 35 | 38 | | 40 | 87 | 45 | 44 75 | | 27 50 | | | 27 50 | 217 75 | 0.008 |
| Candles | 245 | 133 75 | 247 50 | | 123 75 | | 123 75 | 123 75 | 123 75 | 248 25 | | 120 25 | 1,495 75 | 0.053 |
| Coal | 11 | 39 30 | 44 45 | 18 45 | | 52 45 | 13 50 | 98 35 | 3 50 | 75 84 | 38 40 | 50 | 425 44 | 0.015 |
| Steel | 284 90 | | 99 | 55 10 | 13 14 | 25 | 50 22 | | | 20 74 | | 136 | 684 10 | 0.024 |
| Rails | 15 86 | 16 | 2 40 | 20 30 | 15 | | 25 | 3 20 | 10 09 | | | 64 75 | 127 04 | 0.005 |
| Nails | 17 07 | 4 92 | 41 49 | 7 95 | 30 29 | 40 72 | 16 10 | 27 96 | 21 | 8 51 | 12 93 | 13 24 | 170 62 | 0.006 |
| Iron Bars and Sheets | 10 25 | 60 57 | 8 54 | 10 77 | 15 | 45 95 | 32 | | | 16 | 18 15 | 20 50 | 244 73 | 0.009 |
| Oil | 106 49 | 302 39 | 77 11 | 83 62 | 286 77 | 372 63 | 36 33 | 150 93 | 82 04 | 273 84 | 102 | 230 12 | 2,100 24 | 0.074 |
| Drill & Pipe Repairs | 16 | 15 | 10 | 15 | 10 | 15 | 10 | 10 | 10 | 10 | 10 | 5 | 465 57 | 0.017 |
| Timber and Wood | 335 11 | 45 37 | 38 20 | 69 06 | 105 22 | 120 62 | 102 91 | 176 10 | 202 88 | 172 40 | 63 18 | 77 76 | 1,390 40 | 0.046 |
| Sundry Supplies | | | | | | | | | | | | | | |
| Total | 1,539 43 | 1,558 30 | 1,247 69 | 736 98 | 1,249 35 | 1,258 92 | 1,310 18 | 1,498 62 | 2,008 63 | 1,552 71 | 1,118 52 | 1,453 57 | 16,512 90 | 0.576 |
| Gross | 10171 79 | 9,443 63 | 7,808 47 | 7,458 14 | 8,171 01 | 7,781 58 | 8,054 90 | 8,854 59 | 9,643 74 | 9,203 99 | 8,538 06 | 9,594 20 | 104,726 10 | 3.716 |

Per Ton of Ore Milled, 20.72.

been handled during the year at a cost of \$1,138.00, or 22 cents per ton, including current repairs and supervision.

In my reduction report and in the tables therewith, I describe the work of this department. Notwithstanding the fact that the proportion of sulphides in the ore has materially increased, and that, thereby, the ore has been more difficult to treat, the results show a material improvement on the work of last year, which I ascribe to the careful work of the foreman, Mr. A. Constans, and those working under him, most of them having served in the mill since the stamps commenced to drop. I append hereto a report on the air compressor and the development work in the mine which is one of the principal results accomplished by the aid of this plant. The compressor is in the charge, night and day, of one engineer, Mr. G. M. Holt, and under his careful supervision the machine has done excellent work. The cost of repairs to the drills has been remarkably small, and the installation of this plant has been fully justified by the results. Not only has sinking been carried on below the main tunnel and the cost per foot of development work has been materially decreased, but we have been able to push development work ahead so vigorously that the mine is better opened than before, and I hope that in this way we shall be able to avoid the violent fluctuations in produce of last year.

In new construction, I have to record the completion of the compressor by the addition of the second half, the construction of the new dam and flume for improving the water supply for this machine, the erection of certain buildings for housing the men, and more especially the erection of the cyanide plant. This latter has been built on a substantial scale and will, I

always vexations, should be abolished, and that an equitable system of taxation should be devised whereby all property in the Province, railroads, mines, real estate and personal property and all industries, should bear, not only an equal rate of taxation, but a rate which can readily and manifestly be demonstrated to be equal. This could only be effected by adopting sweeping reforms in the fiscal policy of the government, and in the meantime representations are being made with a view to adjusting conditions on a more satisfactory basis than at present existing.

Under the heading of plant maintenance, all expenses have been included in connection with general repairs, the preservation of the property, road repairs, etc. The company's property has been maintained in a thoroughly efficient condition, and many minor improvements, which might have been included in the account of new construction, have been charged to plant maintenance and income.

A sample of ore weighing about 200 pounds was sent to the Paris Exposition, the assay value of which was \$1,461.60 per ton in gold, and a similar sample was sent to the Fruit Fair at Spokane which assayed \$741.00; neither of which showed visible gold. The first mentioned is the highest sample which I have seen assayed from the mine but it would be no trouble to duplicate the second at any time.

The work of affecting the reorganization of the company, and the transfer of shares, which devolved upon this office, was, owing to peculiar circumstances, tedious and prolonged, but has now been satisfactorily settled. As soon as the last call is paid, certificates will be issued and transfers can be registered at this office.

Mr. H. W. Mussen has assumed, as superintendent, charge of the mine, and Mr. H. W. Mitchell is foreman. These changes were made on December 1st, and it is too early yet to pronounce any opinion on their value, which, I expect, will be great. I wish to acknowledge the unremitting zeal with which Mr. Mussen has discharged his various duties, and to acknowledge personally much assistance received from him and valuable information furnished in the compilation of this report.

Mr. F. Vans Agnew, duly qualified under the law as assayer at the examination held in Nelson in December, and his work throughout the year has been characterized by extreme accuracy.

The relations between the company and its employees have been harmonious, and at the present time a cordial feeling prevails, and the character of the work is very satisfactory.

It is satisfactory to be able to record the fact that the year has passed without any serious accident of any kind.

The mill has worked for 351 days 11 hours, having been idle 13 days 17 hours, of which the regular monthly clean-ups occupied 8 days 17 hours. Since the mill commenced to run in November, 1898, it has worked a total of 765 days 17 hours out of the possible 791. During this period not a stem, head, cam or tappet was broken.

The figures for the month of June are noteworthy. During this month the recovery in the mill, per ton of ore crushed, reached the high figures of \$59.73 per ton, giving a total of \$28,376.26 recovered during the working period of 29 days and 9 hours.

The average fineness of the bullion has increased 13 points as compared with last year, and as a general rule we notice that the fineness of the bullion increases directly with the quantity.

The most important feature in the reduction report is the superior percentage of recovery in the mill as compared with last year. Whereas in 1899 the ore yielded \$19.62 per ton with tailings valued at \$7.45; during 1900 the ore yield has increased to \$33.66, an increase of 58 per cent., while the tailings value has increased to \$8.71, an increase of only 8 per cent. The percentage of recovery in 1899 was 72.5, and during 1900 was 79.4. The saving thereby effected on the run during 1900 amounts to a total of \$14,904.30. This improvement is the more noticeable, inasmuch as the percentage of sulphides in the ore has risen materially. In 1900 the percentage of concentrates by weight to ton of ore milled is 10.2 per cent. against 8.3 per cent. for 1899; and in value, the percentage recovered in the concentrates amounts to 25 per cent. in 1900 against 22 per cent. in 1899.

The following table gives the details of milling cost:

DETAILED STATEMENT OF MILLING COST, 1900.

| | Jan. | Feb. | Mar. | April. | May. | June. | July. | Aug. | Sept. | Oct. | Nov. | Dec. | Total. | Per Ton. |
|-------------------------------|---------|---------|-----------|-----------|-----------|-----------|-----------|-----------|----------|-----------|-----------|---------|-------------|----------|
| WAGES. | | | | | | | | | | | | | | |
| Foremen..... | \$ 338 | \$ 326 | \$ 338 38 | \$ 337 25 | \$ 337 25 | \$ 338 85 | \$ 362 25 | \$ 364 50 | \$ 360 | \$ 366 75 | \$ 360 | \$ 369 | \$ 4,215 23 | \$ 0.834 |
| Assistants..... | 392 35 | 273 90 | 356 31 | 295 63 | 300 60 | 292 50 | 277 | 278 75 | 356 25 | 313 | 395 75 | 340 | 3,572 04 | 0.707 |
| Hauling Department..... | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 150 | 186 | 175 | 175 | 175 | 1,911 | 0.378 |
| Assay Concentrates..... | 97 | 51 85 | 150 | 145 37 | 71 75 | 115 | 74 50 | 110 | 149 | 100 | 120 80 | 115 75 | 1,301 02 | 0.257 |
| Total..... | 884 33 | 801 75 | 944 60 | 928 25 | 859 60 | 916 35 | 861 75 | 903 25 | 1,000 25 | 954 75 | 961 55 | 979 75 | 10,999 29 | 2.176 |
| MATERIALS. | | | | | | | | | | | | | | |
| Shoes and Dies..... | \$ 75 | \$ 75 | \$ 75 | \$ 70 45 | \$ 75 | \$ 75 | \$ 100 | \$ 125 | \$ 75 | \$ 100 | \$ 106 71 | \$ 135 | \$ 1,093 16 | \$ 0.216 |
| Stems..... | | | | | | | | | | | | | | |
| Heads..... | | | | | | | | | | | | | | |
| Cams..... | | | | | | | | | | | | | | |
| Tappets..... | | | | | | | | | | | | | | |
| Screens..... | 15 05 | | | | 18 | 10 | 10 | 10 | | | | 1 73 | 64 78 | 0.13 |
| Small Repairs..... | 10 27 | 10 | 10 | 10 | 10 | 10 | 32 50 | 20 | 22 | 20 | 20 | 26 50 | 201 27 | 0.040 |
| Guides..... | | | 24 36 | 20 | | | | | | | | | 44 36 | 0.009 |
| Rabbit..... | | | 10 70 | | | | | | | | | | 10 70 | 0.002 |
| Oil, Grease and Gasoline..... | 36 | | 14 80 | 12 20 | 3 60 | 16 37 | 22 20 | 59 57 | 22 50 | 31 10 | 13 30 | 17 25 | 239 89 | 0.048 |
| Mercury..... | | | | 48 50 | | 48 60 | | 55 95 | | | | | 61 20 | 0.042 |
| Assay Supplies..... | 27 40 | 21 45 | 27 70 | 17 45 | 13 10 | 35 25 | 22 15 | 29 25 | 24 65 | 30 95 | 25 | 65 95 | 340 | 0.067 |
| Wood..... | 75 | 75 | 65 | 45 | 40 | 50 | 63 17 | 75 | 50 | 97 71 | 60 | 50 | 715 88 | 0.141 |
| Belts..... | | | | | | | | | | 22 70 | | | 22 70 | 0.004 |
| Insurance..... | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | | | | | 70 | 0.014 |
| Sundry Supplies..... | 23 77 | 9 25 | 29 16 | 6 41 | | 31 86 | 25 30 | 21 | 22 60 | 21 22 | 22 54 | 3 13 | 216 33 | 0.043 |
| Cyanide..... | | | | | | | | | | | | | 23 15 | 0.005 |
| Ore Sacks..... | | | | | | | | | 72 | | | | 72 | 0.014 |
| Total..... | 272 49 | 200 70 | 266 78 | 246 01 | 169 70 | 287 08 | 285 32 | 386 47 | 288 84 | 270 68 | 293 40 | 360 76 | 3,348 23 | 0.658 |
| Total Wages and Material..... | 1156 84 | 1002 45 | 1211 47 | 1174 26 | 1029 30 | 1203 43 | 1149 07 | 1289 72 | 1290 09 | 1225 43 | 1254 95 | 1340 51 | 14,327 52 | \$2.83 |

In this table are included hauling concentrates, assaying and assay supplies, including gasoline fuel.

The two tables below are of interest in considering the concentration problem.

Average sample from ore pulps from mill runs, December 2nd to December 15th, inclusive.

| | Oz. per ton. |
|-------------|--------------|
| Gold..... | 1.35 |
| Silver..... | .45 |

| | Per Cent. |
|-----------------------|-----------|
| Zinc..... | 2.2 |
| Lead..... | 1.6 |
| Iron..... | 10.7 |
| Silica..... | 68.8 |
| Sulphur..... | 6.0 |
| Lime, (CaO)..... | 1.9 |
| Alumina, (Al2O3)..... | 6.0 |

This run is represented in concentrates by lot 25 or nearly so.

DETAILED CONTENTS BY ASSAY OF CONCENTRATES FOR 1900.

| | GOLD. Oz. Ton. | SILVER. Oz. Ton. | ZINC % | LEAD % | IRON % | INSOL- UBLE % |
|------------|-------------------|---------------------|--------|--------|--------|------------------|
| Lot No. 1 | 2.33 | 2.8 | 5.1 | 9.1 | 18.7 | 51.9 |
| Lot No. 2 | 2.33 | 2.3 | 4.1 | 8.0 | 20.0 | 49.9 |
| Lot No. 3 | 2.39 | 2.9 | 4.3 | 6.8 | 23.1 | 42.2 |
| Lot No. 4 | 2.50 | 2.3 | 6.0 | 8.5 | 20.7 | 35.4 |
| Lot No. 5 | 2.51 | 3.2 | 5.5 | 9.0 | 21.6 | 36.2 |
| Lot No. 6 | 3.15 | 4.0 | 6.6 | 10.0 | 24.0 | 32.9 |
| Lot No. 7 | 3.03 | 4.4 | 6.2 | 9.2 | 22.3 | 37.5 |
| Lot No. 8 | 3.41 | 5.2 | 9.9 | 10.6 | 20.8 | 27.9 |
| Lot No. 9 | 4.38 | 6.6 | 11.0 | 10.7 | 21.2 | 28.1 |
| Lot No. 10 | 4.65 | 6.4 | 9.7 | 10.7 | 20.2 | 25.9 |
| Lot No. 11 | 4.61 | 6.8 | 10.5 | 12.5 | 19.7 | 25.0 |
| Lot No. 12 | 6.38 | 6.8 | 9.6 | 12.5 | 21.7 | 23.6 |
| Lot No. 13 | 4.96 | 5.8 | 9.8 | 11.8 | 21.7 | 25.1 |
| Lot No. 14 | 5.41 | 5.5 | 7.8 | 10.8 | 22.4 | 33.4 |
| Lot No. 15 | 4.85 | 8.2 | 11.0 | 10.6 | 22.7 | 24.6 |
| Lot No. 16 | 5.24 | 9.2 | 14.5 | 9.2 | 22.6 | 17.4 |
| Lot No. 17 | 4.52 | 7.9 | 12.2 | 9.1 | 28.6 | 23.6 |
| Lot No. 18 | 4.56 | 9.1 | 13.2 | 9.4 | 19.7 | 28.5 |
| Lot No. 19 | 4.65 | 10.5 | 12.2 | 9.0 | 19.5 | 29.6 |
| Lot No. 20 | 3.93 | 9.7 | 11.1 | 8.0 | 22.4 | 25.5 |
| Lot No. 21 | 2.90 | 7.2 | 8.9 | 6.0 | 30.0 | 24.0 |
| Lot No. 22 | 2.22 | 4.8 | 7.0 | 4.6 | 38.3 | 15.4 |
| Lot No. 23 | 2.09 | 3.7 | 5.6 | 3.4 | 47.6 | 14.1 |
| Lot No. 24 | 2.64 | 5.2 | 5.2 | 4.2 | 42.6 | 13.0 |
| Lot No. 25 | 2.67 | 6.0 | 5.5 | 4.8 | 34.3 | 11.9 |
| Lot No. 26 | 2.33 | 4.6 | 6.0 | 4.4 | 40.6 | 17.6 |
| Average | 3.66 | 5.8 | 8.3 | 8.5 | 25.6 | 27.7 |

Certain conclusions can be plainly drawn from the above figures; firstly, that the concentrates are cleaner than formerly; secondly, that the lead and zinc contents are closely associated together, and that the presence of the precious metals follows directly the presence of these two base metals; thirdly, that the iron sulphides have a low value, if any. It seems probable that the loss in the mill occurs almost entirely

in the concentrates; the figures showing that the greatest loss occurs in the zinc sulphides, which are the richest sulphides we have. I believe a material improvement could be made in the percentage of recovery by an enlargement of our concentrating plant, but as the decision was arrived at early in this year to treat the tailings by a cyanide process, this feature received no further practical consideration.

The policy has been adopted to run the mill in such a manner as to treat as efficiently as possible, all the ore which the mine has furnished. The mill has not at any time been run to its full capacity, even as at present arranged; and if the cyanide

retreatment process proves as successful as anticipated, and less care is necessary in the first process, we can increase the capacity of the mill materially by making a few changes in the arrangements of the mortars, and crush probably up to 800 tons per month, at a merely nominal increase of cost.

In the assay office, work of a more systematic and accurate character has been carried on than was possible last year.

The system of taking daily samples is the same as that pursued last year, and though the method of taking the feeder sample is not absolutely accurate, the results are fairly satisfactory.

The results are summarized below:

| | Feeder. | Tailings. | Actual Recovery. |
|------------------------|---------|-----------|------------------|
| January | \$46.00 | \$19.46 | \$32.66 |
| February | 42.67 | 7.49 | 32.60 |
| March | 35.97 | 7.26 | 25.78 |
| April | 41.86 | 8.05 | 24.19 |
| May | 55.69 | 10.28 | 44.83 |
| June | 70.66 | 13.94 | 59.71 |
| July | 53.08 | 10.85 | 45.42 |
| August | 47.09 | 10.60 | 41.56 |
| September | 54.62 | 10.07 | 38.74 |
| October | 33.10 | 6.05 | 21.92 |
| November | 27.39 | 5.33 | 18.86 |
| December | 24.41 | 4.04 | 17.02 |
| Average for year | 44.38 | 8.71 | 33.65 |

AIR COMPRESSOR AND DEVELOPMENT WORK.

The details of the air compressor plant were given in last year's report. The machine commenced to work on December 29, 1889, with one side only. The second side was afterwards installed and commenced to work on June 18, 1890. During the dry season, from July 30th to September 3rd, the water supply was only sufficient to run one side. The machine has worked entirely satisfactorily during the year, and our experience is, that with only one side working, we can deliver sufficient air to the mine to distance of 4,800 feet at a pressure averaging 70 to 80 pounds, to run 4 drills (3½ inch, one hoist (6½), one station pump (7x4½x8) and two forges. With both sides of the compressor working we have more air than we require for six drills, and the other machinery as above. The endless 8-ropo drive is very successful, it is noiseless and smooth in action, it never requires lacing and the wear is practically nil. There is practically no slippage at all. Two accidents have occurred to the air-pipe line, one caused by a wash-out which occupied 102 hours, and one caused by a falling tree, which occupied ten hours in repairs. The expenses in connection with the compressor, including engineer and supplies at compressor, machinist's time at the mine keeping the drills and machinery in repair and attending to pipe work, drill repairs and supplies and pipe extensions in the mine, have amounted during the year to \$5,071.46, and this sum has been charged, one-half to development, and one-half to extraction of ore, which is the proportion in which air is used in development and in stopping.

The development work done is as follows:

| | Total ft. | Total ft. |
|---------------------------------|-----------|-----------|
| Sinking shaft No. 2, 7x10 | 250 | 250 |
| Raising— | | |
| No. 1 east | 75 | |
| No. 2 east | 47 | |
| No 2 cross-cut | 10 | |
| Garner raise | 20 | 152 |
| Drifting— | | |
| No. 1 west | 260 | |
| No. 2 west | 132 | |
| No. 1 east | 375 | |
| Granite drift | 250 | |
| No. 2 east | 145 | |
| New drift main tunnel | 90 | |
| Main tunnel No. 1 | 47 | |
| No. 2 cross-cut | 75 | |
| Intermediate No. 1 | 15 | |
| Intermediate No. 3 | 45 | |
| Intermediate No. 2 | 145 | 1549 |
| Total | 1921 | |

SUMMARY OF MINING COST.

| | |
|--------------------------------|--------------|
| Cost of Development | \$ 29,014.48 |
| Cost of extraction | 75,711.71 |
| Total | \$104,726.19 |
| Per ton of ore | \$ 20.72 |
| Per ton of ore and waste | 3.71 |

The cost per foot for 1889 was \$18.90 and for 1890 was \$15.10, an actual saving of \$3.80 per foot. On the number of feet driven this saving amounts to \$7,299.80, which sum contributes handsomely to the initial outlay on the installation of the plant. In reality, the results surpass the figures given, as the development work for the year 1890 includes 250 feet

of shafting, and has chiefly been carried out below the level of the main tunnel, requiring a larger expense in handling the material than during 1889.

Apart from the question of cost, the compressed air has been the means whereby the mine is now in an entirely different ore producing condition to what it has ever been before. The effect of this has been fully dwelt on elsewhere.

The following table sets forth the comparative cost of the work done in 1889 and 1890:

COMPARATIVE STATEMENT OF WORK DONE AND COST THEREOF.

| DEVELOPMENTS | 1889. | | | 1890. | | |
|---------------------------|-----------------------|-------------|----------------|-------|-------------|----------------|
| | Feet. | Total Cost. | Cost per Foot. | Feet. | Total Cost. | Cost per Foot. |
| Sinking | one | \$ | \$ | 250 | \$ | \$ |
| Raising | 105 | | | 132 | | |
| Drifting | 1110 | | | 1510 | | |
| TOTAL | 1275 | 24104.34 | 18.90 | 1921 | 29014.48 | 15.10 |
| Extraction of ore | No returns available. | | | Tons. | Total Cost. | Cost per Ton. |
| Ore milled | | | | 5934 | \$ | \$ 14.97 |
| Ore and waste mined | | | | 28179 | 175211.71 | 6.22 |

CYANIDE PLANT.

Reference was made last year to certain experiments which were being made to ascertain the suitability of the cyanide process to recover the gold of the tailings. After Mr. Patterson left, these experiments were further elaborated, but as the results do not differ materially from those given last year, no further details are given herewith. Having by means of prolonged experiments satisfied ourselves that the process was applicable to our needs we decided to adopt the following plan: (1) settling tanks; (2) straight percolation, assisted by vacuum; (3) deposition on zinc shavings; (4) acid treatment for refining the product; and at the end of June we completed the designs for a plant on the above plan of sufficient capacity to treat 35 tons daily, which is in excess of our needs at present.

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, each 4 cubic foot capacity; 1 clean-up tank, diameter 6 feet, stave 2½ feet; 1 clean-up tank, diameter 4 feet, stave 6 feet; one vacuum filter box; one Hampson zinc lathe; one solution pump; one vacuum pump.

The settling tanks are provided with automatic distributors, angular 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 that the tailings can be 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 building is heated by steam through 3,000 feet of 1-inch pipe, and the condensed water is returned to the boiler. The pumps and lathe are worked by means of an endless single rope drive (on the same system as now working on the air compressor) from one of the shafts in the mill; the distance covered by the rope drive is 142 feet. The building is 100 feet long, 62 feet wide, and 7½ feet high.

It is situated immediately below the mill, and the tailings pass directly into the settling tanks. Outside of the building a tank has been built of sufficient capacity to receive two days' supply of tailings in case of an accident. Work was commenced on the plant on July 1st, and proved more difficult and costly than was anticipated owing to the bad character of the ground. The work of excavation was heavy and elaborate precautions had to be taken to prevent the mill above from collapsing. In consequence of the bad ground the strength of the masonry walls had to be correspondingly increased.

The principal retaining wall is 12 feet thick, 23 feet 6 inches high and 82 feet long. In all 1,198 yards of rock masonry were built, requiring 370 barrels of cement. About 160,000 feet of sawn lumber and 90,000 feet of hewn lumber were consumed. At this date the plant is practically complete and ready to make its first run in a few days.

Whilst our experimental plant was running we made a series of tests in a revolving barrel on our concentrates. The question is not so material to our interests as the treatment of the tailings, but no economy is so small as to be undeserving of consideration, and under certain conditions its importance

might be very great. I give in the table below the result of all the experiments which we carried out on these lines.

These results show several wide variations, but the failures can usually be traced to some cause which can be avoided. We achieve so many very satisfactory results that I think we are quite within the mark when we believe that we can obtain a recovery, at least as good as that returned by the smelters, (above 92 per cent of the gold and silver); and at cost of about \$4 to \$5 per ton for treatment; which would effect a saving to us on our present output of about \$3,000 annually. Had not the plant exceeded so much the sum allotted for its construction, I would have suggested the installation of a small working plant for this purpose. The matter, however, can be taken up at any time.

The effects of this plant will be, I believe, far-reaching, even beyond the increased recovery of the gold values in the ore. For it will enable us to dispense with the slow method of milling which we have hitherto felt it wise to adopt and even practically double the capacity of our mill. If the opinion which I have expressed above is correct, that the output of the mine can be very largely increased in the future, this will be a happy combination of circumstances which will have a most important bearing upon our product during the coming year.

A FEW NOTES ON THE GEOLOGICAL ASPECT OF THE MINE.

The geological and economical problems of this mine are so closely associated that some notes on the character of the vein may prove interesting.

ATHABASCA GOLD MINING COMPANY, LIMITED.—CYANIDE CONCENTRATE TESTS. REVOLVING BARREL.

| No. | DATE. | Dry Weight of Concentrate. | Grammes of Cyanide Used. | Pounds of Water used. | Percentage of Solution Used. | Leaching Time. | Ounces Gold before. | Value. | Ounces Gold after. | Value. | Percentage of Extract. | Strength of Leachings. | Pounds of Cyanide lost. | Loss in C. of Ton of Ore. |
|-----|------------|----------------------------|--------------------------|-----------------------|------------------------------|----------------|---------------------|----------|--------------------|--------|------------------------|------------------------|-------------------------|---------------------------|
| | | | | | | | | | | | | | | |
| 1 | April 26th | 62 | 91 | 20 | 1.0 | 44 | 3.34 | \$ 60.64 | .58 | 11.99 | 84.4 | ..... | ..... | 5.3 |
| 2 | " 28th | 70 | 97.5 | 20 | .75 | 24 | 3.32 | 68.62 | 1.26 | 20.04 | 62.0 | ..... | ..... | 19.4 |
| 3 | May 7th | 65 | 340 | 20 | 3.75 | 24 | ..... | ..... | .20 | 4.13 | ..... | ..... | ..... | ..... |
| 4 | " 9th | 65 | 340 | 20 | 3.75 | 24 | 4.76 | 98.39 | .26 | 5.37 | 94.5 | ..... | ..... | ..... |
| 5 | " 14th | 65 | 340 | 20 | ..... | 24 | 2.82 | 58.29 | .18 | 2.72 | 93.6 | ..... | ..... | 17.2 |
| 6 | " 16th | 65 | 90 | 20 | 1.0 | 24 | 4.74 | 97.98 | .30 | 7.44 | 96.4 | ..... | ..... | 5.0 |
| 7 | " 18th | 65 | 115 | 20 | 1.25 | 24 | 6.10 | 126.00 | 1.12 | 23.15 | 89.6 | ..... | ..... | 5.4 |
| 8 | " 20th | 65 | 68 | 20 | .75 | 24 | 4.26 | 88.05 | 1.44 | 20.70 | 66.2 | ..... | ..... | 3.0 |
| 9 | " 23rd | 65 | 46 | 20 | .50 | 50 | 4.78 | 98.80 | 2.14 | 44.23 | 55.2 | ..... | ..... | 2.6 |
| 10 | " 27th | 65 | 68 | 20 | .75 | 48 | 4.64 | 95.91 | .88 | 18.19 | 81.0 | ..... | ..... | 3.6 |
| 11 | June 6th | 65 | 115 | 20 | 1.25 | 48 | 4.34 | 89.71 | .38 | 7.85 | 91.2 | ..... | ..... | 6.2 |
| 12 | " 10th | 65 | 91 | 20 | 1.0 | 24 | 6.20 | 129.39 | 3.46 | 65.34 | 49.3 | ..... | ..... | 5.0 |
| 13 | " 14th | 40 | 68 | 30 | .50 | 72 | 4.90 | 101.28 | 1.78 | 30.70 | 53.7 | ..... | ..... | ..... |
| 14 | " 19th | 40 | 170 | 30 | 1.25 | 48 | 6.08 | 125.67 | .38 | 7.85 | 93.7 | ..... | ..... | 12.1 |
| 15 | " 23rd | 40 | 170 | 30 | 1.25 | 24 | 5.30 | 109.55 | .24 | 4.96 | 95.5 | ..... | ..... | 7.4 |
| 16 | " 25th | 40 | 130 | 30 | 1.0 | 48 | 7.58 | 156.68 | .20 | 4.13 | 97.4 | ..... | ..... | 6.2 |
| 17 | " 29th | 40 | 130 | 30 | 1.0 | 24 | 5.26 | 108.72 | .76 | 15.71 | 85.5 | ..... | 57.3 R | 8.1 |
| 18 | July 7th | 40 | 130 | 30 | 1.0 | 48 | 4.74 | 97.98 | .42 | 8.68 | 91.1 | ..... | ..... | 7.8 |
| 19 | " 10th | 40 | 130 | 30 | 1.0 | 24 | 2.78 | 57.46 | .14 | 2.89 | 94.9 | ..... | ..... | 9.75 |
| 20 | " 13th | 40 | 170 | 30 | 1.25 | 24 | 4.60 | 95.88 | .30 | 7.41 | 92.4 | ..... | ..... | 6.4 |
| 21 | ..... | ..... | ..... | ..... | ..... | ..... | 3.92 | 81.03 | .12 | 2.48 | 96.9 | ..... | ..... | 6.15 |
| 22 | ..... | ..... | ..... | ..... | ..... | ..... | 5.48 | 111.26 | ..... | ..... | ..... | ..... | ..... | ..... |

*NOTE.—126 or 57.3 Grammes.

There are two distinct country rocks. One is an area of altered igneous rock which in this immediate neighborhood consists of dark green, fine grained, biotite and actinolite schists. The other is an area of intrusive granite of later origin.

The mineral deposit occurs in the neighborhood of the two rocks. Where the contact can be seen it is usually clearly defined but broken, evidence of movement being frequently visible. The line of contact is about east and west and the strike of the vein is probably north and south.

Numerous well defined silicious dykes accompany the vein; these are cut by the vein and by all the faults which cut the vein, and are clearly older than the vein. At times the intersection of the dyke and vein is clearly defined; at other times the two are difficult to distinguish. These acid dykes have been determined to be aphyte and seem to be intimately associated with many of the important ore bodies of British Columbia.

Of basic dykes, one at least is very conspicuous and runs in a straight line as far as our development has gone, at least 600 feet. During the whole of this course, this dyke occupies a fault plane, and the throw of the vein on the fault varies between three and ten feet. Dykes of this character which have been determined to be mica lamprophyre, are frequently seen cutting all the rocks of the district in many directions. They often occupy fault planes and are not uncommonly seen following veins.

Numerous and extensive faults are a noticeable feature of this mine, and have confused the problem; have added to the difficulty of locating the ore bodies and laying out development work. At the surface the faults seemed to have no general

direction; they were very numerous, but the throw was small. As depth was gained, a series of faults in the schist area was encountered running east and west, approximately parallel, in which the down throw was almost invariably southwards. In the granite area, a series of faults was encountered running north and south, with a throw down, to the east. The result of these complicated movements is to connect the vein in No. 2 shaft (our present shaft) with the vein in No. 1 shaft (our old shaft) or at least to bring the two into close relation. It will probably always remain open to argument, even when the ground is removed, as to whether or not they are the same or parallel veins, and, in either case, it is strongly to be recommended that, at some convenient point, cross-cutting should be carried on to endeavor to prove the existence of parallel ore bodies.

With the experience gained during the last twelve months, we have been compelled to modify our ideas of the structure of the ore body and of the method of development. We were proceeding last year upon the assumption that the strike of the ore body was along the main tunnel, east and west, with a dip northward at a very slight inclination from the horizontal, and shaft No. 2 was sunk according to this plan. The developments, however, in the bottom of the shaft, in No. 2 and No. 1 west, and No. 2 and No. 1 east, and the extension of the main tunnel have caused us to form the opinion that the true direction of the ore body is north and south, dipping west about 40 degrees, and development is now being carried on tentatively on these lines.

The character of the ore in the two formations is not alike. In the schist the ore is remarkably uniform in width, in appear-

ance and in values, showing a tendency to concentration of values along the contact. The ore is a bluish quartz banded with sulphides of lead, zinc and iron.

In the granite the ore is more uneven in every respect. It is more variable in size, value and character; the general average of the width seeming to be greater in the granite than in the schist. The dissemination of sulphides is more uneven; in some places they are nearly solid, in some places nearly absent. Iron sulphides predominate to a greater extent, and the color of the quartz is of a milky reddish hue. The values are very confused—assays of upwards of \$600 per ton alternating with almost barren ore.

I wish to thank Mr. O. E. Le Roy, of McGill College, for the assistance which he has rendered us in helping to determine the character of the rocks as above.

Electric smelting is a development that has been forced upon Swiss metallurgists by the scarcity of coal. Hematic ore from the Bernese Oberland, near Meiringen, is to be transported by an aerial ropeway to the village of Innet Kirchen, where the electric smelter will be established. A concession has been obtained permitting the use of 60,000 horse-power from the River Aar for generating the current required.

Mining for wood is a curious industry of Mengtze in Tongking. A pine forest was here swallowed up by the earth at some time in the past, and the trees, some of them three feet in diameter, now lie in a slanting position beneath about 25 feet of sandy soil. Being impracticable, the wood from these rubber mines is prized by the Chinese for coffins.

SMELTING A LEAD-COPPER ORE.*

(By P. R. Robert.)

The ore was furnished by the Standing Elk Mine, on Bunker Hill, Nevada, U.S.A., and consisted mainly of lead carbonate and galena, with a small percentage of copper as red oxide, malachite, and hydrous silicate.

The total smelting run embraced 680 tons of ore, 14.4 tons of matte slag, and 9 tons of flue-dust, or a total of 704.4 tons; and the materials consumed were 139.04 tons of coke, 90,515 tons iron ore, 131.35 tons limestone, and 75 cords of wood.

The yield was 1,423 bars—142,331 lb. lead copper matte assaying 111.93 oz. silver per ton, besides containing 63.05 per cent lead and 19.6 per cent copper.

A blast pressure of 1½ in. mercury was used. It was necessary to dispense with the ordinary lead well on account of the presence of copper, which immediately chilled therein. The furnace was an ordinary 72x36 in. water jacket, made for galena ores; the jacket was in two parts, and there were 8 tuyeres—4 on a side. The front was of fire-brick, with two tap-hobs—top upper for slag and a lower for lead and matte.

The lead and matte were drawn off together at intervals, as required, into a pot with a hole about 1 inch diameter in the bottom, plugged with clay. After standing about a minute, the pot was wheeled directly over the bullion moulds, and the lead was run into them. The matte remaining in the pot, and some lead, were deposited by themselves. The remaining lead after draining off, was sent to the melting pot, and run into bars.

At first a deep crucible, as made ordinarily for lead, was used; but experience soon proved that a shallow bottom, sloping to the front, was preferable.

The engine at the furnace ordinarily ran at 35 revolutions, and the No. 4½ Baker blower at 77 revolutions.

In another run the bottom of the jacket was 9 inches below the tuyeres, the slag tap was 9 inches below the tuyerer, the lead and matte tap, was 12½ inches below the bottom of the tuyeres, and the furnace bottom at the front end was 18 inches below the tuyeres and only 4 inches below the bottom of the jacket at the back end.

The run was made on 439.9 tons ore, 20 tons old matte slag, and 35.55 tons new matte slag.

The fuel and fluxes used were 209,360 lbs. coke, 88,640 lbs. iron ore, and 199,440 lbs. limestone.

Consumption of coke was one ton per 7.4 tons of charge; and 20 tons of ore per diem were smelted.

Wood used was a fraction over one cord per day.

Total cost of smelting was \$11.69 (£2 8s. 8d.) per ton.

The yield was 44.45 tons lead bullion assaying 209.24 oz. silver per ton, and 46.43 tons lead-copper matte assaying 161.297 oz. silver per ton. The matte assayed 65 per cent lead and 28.1 per cent copper.

The above run was made under very peculiar conditions. The season was unusually dry, and water was very scarce; a pipe a half inch in diameter with three or four inch head would carry the whole supply; hence it was necessary to use it very carefully, and over and over again. As it returned from the cooling reservoir, it had a temperature of 140 degrees F. This involved the circulation of a greater volume through the jackets; but the furnace worked more satisfactorily than when cold water was used.

The loss of silver in the slag was only .32 oz. per ton.

When the fire-assay of lead is rendered unreliable by the buttons being alloyed with copper, the writer adopted the following method:—

The lead ore or matte is treated with nitric acid, and the solution is diluted and filtered; precipitation is effected by sulphuric acid, throwing down PbSO₄, BaSO₄, SrSO₄ and CaSO₄. The precipitate is washed down to the point of the filter with water to which a drop or two of sulphuric acid is added; and then dried. The dry precipitate is placed in a small annealing cup of clay; and the filter is ignited; the ashes are added to the precipitate in the cup. Cyanide of potassium equal to about five times the weight of the precipitate is then added; a larger quantity will do no harm. The whole of the contents of the cup are fused at a gentle heat over a spirit lamp. The lead sulphate in a few minutes is reduced to metallic lead, C. P., which settles in the bottom of the cup. The cup is allowed to cool, and then, with contents, is placed in a porcelain dish with water. The cyanides readily dissolve, leaving the metallic lead, which is dried and weighed.

* Abstract of a paper read before the Institution of Mining and Metallurgy in Science and Art of Mining.

When the steamer Queen City left for the West Coast on the 1st, she took up more plates and supplies for the miners at work at Wreck Bay, where work has now been resumed for the summer season. At least six machines will be in operation there this summer and the company engaged in working the rich black sand deposits there expect to take out at least one hundred thousand dollars, if not more, during the present season of work. All the available land along Long Beach has been recently staked, but as yet nothing has been learned regarding the value of the sand deposits found on that beach.

INSPECTION OF METALLIFEROUS MINES ACT.

THE NEW CODE OF MINE SIGNALS.

WE publish below the amendment to section 25 of the "Inspection of Metalliferous Mines Act, and Amending Acts," which substitutes a new code of mine signals for that formerly in use. The new signals are especially well considered to lessen the danger of accidents, and we would particularly direct attention to the procedure to be followed in signaling for blasting or "ready to shoot," and in the case of danger, fire, or other cause. We doubt if a better code could well be devised.

Hoisting.

- 1 Bell—Stop Immediately—if in motion.
- 1 Bell—Hoist, (see Rule C.)
- 2 Bells—Lower, (see Rule C.)
- 3 Bells—Caution—"Men On," (see Rule D.)
- This is a caution signal—not a signal to move—and means, when the next signal to move is given "proceed slowly and with extra care," in accordance with such signal.
- 4 Bells—Blasting or "Ready to Shoot," Signal, (see Rule E.)
- This is a caution signal and if the engineer is prepared to accept it he must acknowledge it by raising bucket a few feet and letting it back slowly.
- This signal, once accepted, takes precedence over all others, and 1 Bell, given when miners are in bucket, is signal to hoist away from blast.
- 2 Bells, double-pause, followed by station signal (2—station signal), calls Cage or Skip to that station (see Rule A).

| STATION. | SIGNALS. | | STATION. | SIGNALS. | |
|----------|----------|--------|----------|----------|--------|
| | Bells. | Pause. | | Bells. | Pause. | Bells. |
| No. 1 | 2 | — | No. 11 | 4 | — 1 |
| No. 2 | 2 | — | No. 12 | 4 | — 2 |
| No. 3 | 2 | — | No. 13 | 4 | — 3 |
| No. 4 | 2 | — | No. 14 | 4 | — 4 |
| No. 5 | 2 | — | No. 15 | 4 | — 5 |
| No. 6 | 3 | — | No. 16 | 5 | — 1 |
| No. 7 | 3 | — | No. 17 | 5 | — 2 |
| No. 8 | 3 | — | No. 18 | 5 | — 3 |
| No. 9 | 3 | — | No. 19 | 5 | — 4 |
| No. 10 | 3 | — | No. 20 | 5 | — 5 |

In mines where there is a sub-station or ore pocket below level of station, such sub-station or pocket shall be designated and signalled by the signal of such main station followed by 1 Bell.

Example.—Ore pocket under station 7 shall be signalled 3—2—1.

Ore pocket under station 3 shall be signalled 2—3—1.

Danger.

5 Bells, without pause between them, means Danger (fire or other cause) and followed by a station signal, calls cage to that station.

This signal takes precedence over all others, except an accepted Blasting Signal.

Miscellaneous.

- 5 Bells—Steam—Turn off or on.
- 6 Bells—Air—Turn off or on.
- 7 Bells—Foreman Wanted—to be preceded by station call.
- 3—3—3 Bells—Break-Down in Shaft—Engineer must proceed very slowly and carefully, in accordance with signals to be afterwards given, if so directed, by verbal orders only.
- 4—4—4 Bells—All Blasting in Shaft is Finished.
- 2—2—2 Bells—Send Down Drills.
- 3—2—3 Bells—Send Down Picks.

Electric Bell Signals.

The following addition to the code shall be made where electric bells are used in connection with other bells:—

If cage is wanted, ring station signal. Station tender will answer 1 Bell.

Reply 1 bell to go up.

Reply 2 bells to go below.

If station is full of ore, and station tender is wanted, ring signal and do not answer back.

2—1—1—2 bells are rung, engineer or station tender does not understand, repeat signal.

In case of danger or accident, ring 9 bells, a pause, followed by regular station signal.

Rules of Instruction.

Note.—"Cage" in these rules signifies either cage, skip or bucket.

"Bell" in these rules signifies stroke of bell, gong, hammer, or other signalling arrangement.

Rule A.—No person but the station tender shall ring signal bell, except in case of danger, or when main shaft is being sunk.

This shall not apply in mines where no station tender is employed.

Engineer must slow up when passing stations when men are riding.

Rule B.—Method and Order of Giving Signals.—In giving signals, make strokes on bell at regular intervals.

In signals requiring such, make the pause (—) take same time as for one bell. A double pause (— —) must be made between all cautionary signals, station signals, and executive signals.

Signals must be given in order designated—1st, cautionary signals; 2nd, directional signals; 3rd, executive signals.

Example.—3 — — 2 — 5 — — 2 means "men on, to No. 5 station, lower away."

In "call signals," the station number is given first, followed by Call.

Example.—3 — 2 — — 7 means "No. 7 Station wants foreman."

Rule C.—The Hoist Signal (1 bell) means "to surface," and the lower Signal (2 bells) means "to bottom," or level from which hoisting is then being regularly done, unless these signals are preceded by a station signal signifying that cage is to be stopped at station designated.

Rule D.—When men are to ride, the Caution Signal (3 bells) must be given before they enter cage, which must not be moved until the Hoist or Lower Signal is given, and then only after a double pause (15 seconds), when cage must be started very gradually.

Rule E.—The Blasting or "Ready to Shoot" signal (4 bells) must be acknowledged by engineer, as described, before it can be considered as accepted by him. Miners must not light fuse before the engineer has so acknowledged and accepted their signal, as it may not be possible at that moment to hoist.

The engineer, before acknowledging the Blasting Signal, must stand ready to hoist immediately on required signal. Having acknowledged and accepted such signal, the engineer must not quit his post, and must not allow anything or anybody to interfere with his prompt obedience of the signal to "hoist away" from blast.

Rule F.—Timber, tools, etc., longer than the length of bucket, or skip, or placed within a cage, must be securely lashed in place before being lowered or hoisted.

11.—Printed copies of this Code of Signals shall be posted in engine-room in front of engineer, on gallows frame, at such working station in the mine, and elsewhere as the Inspector may direct, and should such copies become at all illegible, they must be replaced promptly by fresh ones.

12.—Sections 8 and 10 of the "Inspection of Metalliferous Mines Act Amendment Act, 1890," are hereby repealed.

13.—This Act shall come into force on the 1st day of July 1901.

EIGHT HOUR DAY FOR ENGINEERS.

In committee of the whole, section 4 of this bill, providing that monthly returns of output be sent to the department of mines, was amended to apply only to mines shipping or treating ores. The following amendment was also adopted, on motion of Mr. Curtis:

"That from and after the 1st day of January, 1902, it shall be unlawful for any person or persons to operate or handle for more than eight hours in each twenty-four hours, any first motion or direct-acting hoisting engine, any geared or indirect-acting hoisting engine, at any mine employing fifteen or more men underground, where the duties of a fireman are performed by the engineer in charge; also any stationary engineer operating a stationary engine developing 50 or more horse-power where such engineer has charge or control of a boiler or boilers in addition to other duties performed by him. This act shall only apply to such steam plants as are in continuous operation, or are operated 20 or more hours in each 24 hours.

"From and after the 1st day of January, A. D. 1902, it shall be unlawful for any person or persons, company or corporation, to induce, or persuade, or prevail upon any person or persons to operate or handle such steam engine or engines for more than eight hours in each twenty-four hours, as described in the preceding General Rule No. 21A of this section: Provided, however, that the provisions of this act shall not apply to persons running any engine or machinery more than eight hours in each twenty-four for the purpose of relieving another employee in case of sickness or other unforeseen cause."

The bill was then reported complete with amendments; to be read a third time at the next sitting of the house.

THE MONTIUS MINING.

MOUNT SICKER.

(From Our Correspondent.)

IN the new parallel vein on the Lenora the ore is exceptionally high grade, the best assay running \$130 in gold, 626 oz. silver and 14 per cent. copper. This vein is parallel to the main vein at a distance of about 140 feet. Meanwhile it is estimated that there are at least 50,000 tons of shipping ore in sight in the property, besides 15,000 tons of concentrating ore on the dump and about 72,000 tons of concentrating ore in the mine. A shaft 180 feet deep has been sunk, and about

1,700 feet of underground work has been completed, not counting chutes or raises in the main stope. The company have completed 6 1/4 miles of railway, and have also graded about five miles further to Osborne Bay.

At the Tyee, about 1,500 feet of work has been done during the past two years. A shaft 8x6 in the clear, has been sunk to a depth of 200 feet. This shaft was put down 150 feet to the Lenora's line, on an outcrop of the same ore body that is being so successfully worked in that mine. Cross-cuts have been driven to the north from the 160 and 200-foot levels, both of which have proved large bodies of copper ore. From the 200-foot level, a main centre drift is being run east, following a line of graphitic schists that bound the ore body. This drive is now nearly 350 feet east of the shaft, or 500 feet from the line. Cross-cuts at 75, 150 and 250 feet have proved the ore body to be large and permanent, and a cross-cut from the 350-foot mark will soon be started. At 150 feet east of the shaft a cross-cut was run to the north for 37 feet, 22 of which carried ore, and without reaching a wall. A vertical upraise was put up from this cross-cut and carried good ore for over 30 feet, assaying from 5 per cent. upwards in copper, 83 upwards in gold, and 4 oz. silver. A working shaft of three compartments measuring 13x5 inside the timbers, is now being rapidly sunk further to the east, to work the ore body that has been proved by past work. Two boilers of 50 horse power each have been installed, together with a 10x12 double cylinder hoisting engine and a 3-drill compressor. The drills used are by the Vauxhall Iron Works, of London, England, and the Ingersoll-Scott.

KAMLOOPS.

(From Our Own Correspondent.)

The Iron Mask continues working and is steadily showing up a large ore body with shoots of high grade ore. Another payment of \$11,000 was made last month by the B. C. Exploring Syndicate on this property. There now remains only one more payment to be made. This syndicate has also purchased a splendid smelter site on Kamloops Lake about three miles north of the mine and about four miles west of Kamloops. Work continues on the Python tunnel, but no new developments are reported. At the Kimberley the ore body has been met in a second cross-cut driven from the old tunnel. This ore body is now well exposed at the 100-foot level, and deeper work will probably be planned in the near future.

At the Copper King, Chetty Creek, there are about four car-loads of ore ready for shipment, and shipping will commence early in the month. During the winter the management has directed its energies chiefly to development work, and some good ore is now being met at the 110-foot level.

The scows for the Jamieson Creek dredge are completed, in readiness for launching, and the erection of the machinery will be commenced shortly. No properties except those working through the winter, have been operated as yet. Meanwhile the snow has left the valley, and the roads are getting into good condition, so that we may expect an increased activity in mining matters in the immediate future.

REVELSTOKE AND NORTH KOOTENAY.

(From Our Own Correspondent.)

It is a difficult matter, during the course of our long Kootenay winters, to find news that, while it may be actually fresh, yet so resembles what has been repeatedly mentioned previously, that it looks like no news. And indeed when it is considered that but very few of the known and fairly developed properties are worked at all in the winter, the names of those that are still active must continually re-appear.

So, to be brief, the Nettie L. is still the only mine in the Lardeau that is doing anything, and that mine is very busy getting out the 1,000 tons promised between November and May. Other claims are no doubt being worked by very small forces of men, two or three usually, but they are hardly in the list of producers as yet. In the Fish Creek (or Fish River) district, there has been steady work on the Imperial group, and as mentioned in previous notes, several other smaller concerns have been working all the winter. With the arrival of spring, now happily not far off, this camp will be exceedingly busy, as the Double Eagle Co. intend to go ahead with development on several of their properties, probably the Moscow and the Trilby group by preference, but that matter will be decided later. The May Bee (adjoining the Nettie L.) also belongs to this company, and will be greatly developed during the coming summer. As regards Revelstoke itself, great hopes are entertained of some really adequate system of transportation being established to the Big Bend, most likely by steamer; but that vast and practically unexplored region is already known to possess such wonderfully big

ACTIVITY AT FISH CREEK.

bodies of ore, both silver and gold bearing, as well as the well known mica deposits near Canoe River, that there can surely be little doubt that capital will be attracted to it, and when that comes, the rest is usually easy. At present anyone who wants to explore that great district must do so on foot, and the trail is unique, inasmuch as it is chiefly up hill both ways (at least that is how it appears to the writer.) With the opening of the Big Bend country undoubtedly other small towns will establish themselves on the road, but Revelstoke will even then remain a sort of base for all supplies.

Three of the men who have been working in the Standard Basin all the winter recently arrived in town, and after getting a few assays made (which turned out exceedingly well in gold) returned to camp. They report great progress in the lower tunnel, which is now some 300 feet in, and also report that in No. 2 tunnel some 600 feet distant from the lower tunnel, they have struck a body of copper ore $3\frac{1}{2}$ feet thick. Assays of this latter are not to hand yet, but the rock that carried well in gold was chiefly arsenical pyrites in diorite. Let us hope our British Columbia government will not promptly tax them \$100 apiece for presuming to find anything better than country rock! "But more of this anon."

BOUNDARY DISTRICT.

(From Our Own Correspondent.)

Steady progress continues to be the order of the day in the Boundary district. The three chief ore producers, viz., the Old Ironsides and Knob Hill group, the Mother Lode and the B. C., are now, together, turning out about 1,100 tons of ore daily. Of this quantity, nearly 650 tons comes from the Old Ironsides and Knob Hill group; about 350 tons from the Mother Lode and rather better than 100 tons from the B. C. At present no other property in the district is maintaining a regular output, although several other claims are approaching the stage of regular production. As, however, the total daily

output, capacity of the local smelters at work averages rather less than 1,000 tons, as yet nothing is lost by the output being restricted to the quantity mentioned. Of course, more mines could do as the B. C. is doing, and send their ore to Trail, but the general disposition appears to be to have it treated by one or other of the local smelters.

There is really little that is new to chronicle in connection with the Old Ironsides and Knob Hill group, the several mines of which are by far in the lead as regards output, and are likely to continue a long way ahead in this respect of all others in the Boundary country. Official announcement has been made that this group will, before the close of next summer, be required to maintain a daily output of about 1,200 tons, in order to supply the Granby and Ironsides smelter, which, by that time, will have facilities for treating that quantity daily. The reported offer of \$15,000,000 for the Miner-Graves properties, which include the Granby smelter, the Old Ironsides, Knob Hill, Victoria and Grey Eagle mines, and other interests, has emphasized the importance of these properties, and attracted fresh attention to them. The enormous quantity of ore already opened up in the mines, its singularly suitable nature for economical smelting, and the marked success that has attended and is still attending the operation of the Granby smelter, combine to greatly impress capitalists with the big possibilities of this industry. It appears, though, that its present owners fully appreciate its great promise, and are taking advantage of the opportunities it affords them for building up copper mining and smelting business of large proportions.

Some particulars of progress on the Snowshoe group, situate in the vicinity of Old Ironsides and Knob Hill, were given last month. There is nothing fresh to add just now, the work on this property continuing on similar lines of development to those followed for the greater part of the past year. Mr. Anthony J. McMillan, managing director of the British Columbia (Rossland and Shocan) Syndicate, which owns this group will probably return shortly from England, and it is expected that, as a result of his conference with his co-directors in London, development operations will be enlarged.

The Brooklyn and Stenwinder group is another neighbor of the Old Ironsides and Knob Hill that is not likely to suffer from either lack of capital or experienced, practical management. This group, which is owned by the Dominion Copper Co., Ltd., of Toronto, consists of the Brooklyn, Stenwinder, Idaho, Rawhide and other mineral claims near Phoenix. The company lately closed a contract with the James Cooper Mfg. Co., Ltd., of Montreal, Quebec, under which the latter has undertaken to supply a Corliss cross compound Ingersoll-Sergeant air compressor, steam cylinders, 18 inch and 31 inch diameter, by 36 inch stroke, air cylinders 18 inches diameter by 36 inch stroke; 10 Ingersoll-Sergeant $3\frac{1}{4}$ inch drills, with double screw columns, hose and fittings complete; an air receiver 54 inch by 12 feet, and a feed water heater of a capacity of 200-horse power. This constitutes a 20-drill plant, and it is to be shipped in about three months. For immediate

shipment other plant has also been contracted for between the same parties, including a Bullock diamond drill equal to drilling a 1,000-foot hole, and 1,000 feet of rods; a 5-drill Ingersoll-Sergeant air compressor; a 60-horse power locomotive boiler; an air receiver, 42 inch by 8 feet; a boiler feed pump and a quantity of supplies. This latter plant is for the Stenwinder, there already being a plant of similar capacity, excepting the diamond drill, at work on the adjoining Brooklyn claim. The larger plant will be for the joint use of the Brooklyn, Stenwinder and Idaho. Very little information is available just now as to what development work is in progress on this group, which is reported to be employing from 100 to 120 men. When work was resumed two or three months ago the number of feet of development previously done stood thus: Brooklyn.—Sinking and raising (including shaft 288 feet in depth), 340 feet; cross-cutting and drifting, 2,050 feet. Stenwinder.—Shaft, 344 feet; cross-cuts, 115 feet; drifts, 50 feet. Idaho.—Shaft, 50 feet. Rawhide.—Tunnel, 450 feet. Cross-cutting at the 250-foot level in the Brooklyn was the first development work undertaken when operations were resumed, and later similar work was done in the Stenwinder. Now the sinking of a main shaft on the Idaho is in hand as well.

In the Wellington camp things now have a more promising appearance than for some time past. At the Winnipeg the winze from the 300-foot level is now down about 70 feet and is in ore that for quantity and assay value is very promising, but more than this, the mining manager, Mr. Nicholas J. Tregear, will not say just now, preferring to wait to see if further development and additional sampling will confirm the firm present promise. Mr. Richard Plewman

of Rossland, managing director, states that the vein in the winze has now widened out to

10 feet, with eight feet of solid ore in the bottom. At a depth of 51 feet there was only two feet of solid ore in this winze. Furthermore, the values of the low grade ore have steadily improved.

From Rossland, where the head office of the company is situate, it is learned that a plan has been perfected whereby the treasury of the Brandon and Golden Crown Mining Co. will be restored, and which will, it is stated, enable operations to be resumed shortly, on an extensive scale. Owing to the slump in the mining shares in Eastern Canada, the directors were unable to dispose of any more treasury stock, and in consequence, operations were suspended last November. The reorganization just effected, has taken a different form from that usually adopted. Instead of the company being re-constructed, and made assessable, as is the practice, the original subscribers have entered into a written agreement, in virtue of which they have agreed to contribute or surrender to the treasury, 40 per cent. of their original holdings; and, as the subscribers' stock has been in pool since 1897, this arrangement was thus more easily accomplished. With the treasury on hand, the 40 per cent. contributed by the original subscribers will bring the shares in the treasury to 450,000. Negotiations for the sale of a large block of the treasury shares are said to be now in progress, and the proceeds will, it is expected, not only pay off the floating debt, but will provide sufficient funds for working capital, so that when ore shipping shall be resumed, it will be on a permanent basis.

Some ore is again being sent out from the Athelstan, also in Wellington camp, but until development below the 100-foot level shall have been done on a more extensive scale than any work yet done on this property, the Athelstan is unlikely to be anything more than an intermittent shipper of a few hundred tons at a time. It is understood that the management of the Standard Pyritic Smelting Co. is supplying the money for present work on the Athelstan, and that the ore is to be treated at its smelter near Boundary Falls.

The B. C., in Summit camp, is keeping up its ore shipments, which, by the end of March, will have aggregated about 28,000 tons. Cross-cutting at the 400-foot level is now in progress, the policy at this mine being one that is only to be expected from experienced and capable managers, of Mr. S. F. Parrish's type, viz: that of keeping development well ahead of stoping.

The reports widely published to the effect that the B. C. had been sold, have been authoritatively contradicted. Other properties at work in Summit camp are the R. Bell and the Blue

Bell. The former is deepening its shaft, now down about 270 feet, preliminary to cross-cutting the ledge in more settled country than where it was cut at about 80 feet down. The Blue Bell prospect shaft is now down about 100 feet, and it is stated that at 125 feet a cross-cut will be run. Some good grade ore has been exposed in this shaft, and the intention is to instal a power plant should developments at the greater depth appear to justify the expenditure, as it is confidently anticipated they will do. A little surface prospecting on the Oro Donoro and the sending out of ore of a rather low grade from an open cut on the Emma are the only other items of mining news from this camp.

Deadwood camp grows in importance each month. The big hoisting engine and the ore sorting plant at the British Columbia Copper Co.'s Mother Lode mine, particulars of which were

given last month, are now in operation. The latter is new in this district, but it is working effectively and economically. The two new platform cages have been put in and now the mine can easily put out more ore than the smelter under the same ownership, can at present treat. The recent provision of plenty of power, both for drilling and hoisting, makes it practicable to resume sinking, so shortly the deepening of the main shaft to the 500-foot level will be pushed on with. By the time the mine shall have been opened up at the 400 and 500 levels, a second furnace will have been added at the smelter, but that will not be until about five or six months hence, possibly a little later. Meanwhile preparations will be made to still further increase the producing capacity of the mine, and the treatment capacity of the smelter with the object of handling, by the close of the current year, about 1,000 tons of ore daily.

A contract has been let for deepening the shaft on the Sunset, owned by the Montreal-Boston Mining Co., from the 200 to the 400-foot level. It is intended to cross-cut at the latter depth, and it is expected that the Sunset lead will be cut at about 500 feet from the shaft. The cross-cut will have to be driven 600 feet farther to get under the shaft on the adjoining Crown Silver, owned by the same company. The Crown Silver shaft, started at a considerably higher elevation than that on the Sunset, is down 265 feet, with 193 feet of cross-cutting and drifting at the 150-foot level and 748 feet at the 250 level. Some nice ore was met in these workings, so the prospects are favorable for excellent results at greater depth.

Work is being continued on the Ah There, Greyhound, Marguerite and Morrison. There have been statements made for several weeks past that the Morrison is to start shipping ore to the Standard Co.'s smelter, but delay has taken place in putting in a railway spur to provide transportation facilities. The report now is that the spur will be completed by about May 1, by which time the pyritic smelter should be running. There is a prospect of the Buckhorn resuming work shortly, but nothing definite to this end has yet been arranged.

The Granby smelter at Grand Forks, is maintaining its good record, of an average of rather better than 600 tons of ore a day. The B. C. Copper Co.'s smelter is treating 300 to 325 tons daily and turning out about 12 tons a day of 50 per cent. copper matte with gold and silver values not made public. Now that the Boundary smelters are sending out an equivalent to about 15 tons of copper daily, it can no longer be truthfully stated that the district is non-productive. And the most satisfactory feature of the situation is that this is only the beginning of a production that bids fair to grow to such large proportions as will add materially to the wealth produced within this increasingly important Province.

NORTH FORK OF KETTLE RIVER.

(From Our Own Correspondent.)

The following are extracts from a letter recently written by Superintendent Liljgrass, of the Humming Bird mine, on the North Fork of Kettle River, and giving some information relating to that property:

"The face of the drift, which is being driven on an incline of about 19 degrees, is 171 feet from the outcroppings where the first workings were started. From the mouth of the cross-cut tunnel, run at slightly greater depth from the other side of the hill, to the face, is about 150 feet. The drift was started on an incline about 133 feet from the portal of the tunnel. The cross-cut tunnel came under the old workings about 90 feet in. The ore has been continuous from the portal of the old adit to the face of the present drift.

"The ore at the face of the incline is four feet wide, and has the appearance of straightening up beside a porphyritic diorite dike. There is a decided change taking place in the character of the ore next to the dike, the pyrrhotite being largely displaced by magnetite.

"We have shipped 234 tons of ore, giving \$20.61 per ton to date, and have 32 tons more ready to ship, but the frost is just coming out of the ground, so that shipments are for the present out of the question. We are therefore only extracting what ore we are meeting in actual development that has to be removed."

ROSSLAND.

(From Our Own Correspondent.)

The fifteenth of March (pay day) was fixed as far back as January by some of the knowing ones here as the date of fresh labor troubles, and it was asserted that the history of last year at this time would be repeated. Nothing of the sort has taken place; on the contrary, everything is working smoothly, and the outlook for the camp and district during the coming summer is improving daily.

Notwithstanding the fact that the Northport smelter has

been compelled to close down one of its stacks for repairs, the ore output to this point has been steadily increasing all year. On March 15th the Le Roi alone sent out 40 carloads, or, approximately, 1,500 tons, and the shipments for the week ending the 16th, broke all records, with 9,200 tons to the good, while the week previous—a record to that date—showed over 9,000 tons. It will readily be seen that the output is limited at the present moment only by the smelter capacity, and that the indications point to an average of at least 10,000 tons per week, provided that the smelters can keep pace with the mines. As a high official connected with the chief shipping mines put it at the end of a lengthy interview this week: "Up to date we have been preparing and paying out money very freely; now we are going to ship ore steadily and in larger quantities, and you will be surprised at the dividends declared and the progress made in the next eight months." All of which is clear enough to anyone patiently watching the progress of mine development here day by day.

The shipments however only half tell the tale. With the shares of the War Eagle below half a dollar and Centre Star stock around par, the Eastern Canadian flatly refuses to believe that Rossland mines are of any account, and British Columbia mining ventures fare very badly in the East in consequence. One or two bear publications in Montreal and Toronto have seized with avidity on the delightful reports recently issued by the Centre Star and War Eagle management to further depress prices, and to knife Rossland property generally. The results, which I believe will be attained in better times, during the remainder of the current year, should satisfactorily dispose of the value to be attached to criticism of the kind referred to and should demonstrate to all concerned either that the authors were lamentably ignorant or that their articles were both vicious and venal.

To thoroughly grasp the War Eagle, Centre Star situation, one must understand several matters not usually referred to in the press. In the first place, neither Mr. William Gooderham nor Mr. Blackstock, who control both mining companies, have any concern whatever with the state of the stock market. They have never decreased or increased their holdings in the mines mentioned, nor have they any intention, or so doing. Mr. Gooderham has repeatedly made this statement publicly, and, in addition, during the period when War Eagle stock was climbing up to \$3.90 he warned the investing public through the press that the stock was far too high-priced. If the War Eagle president had more experience in mining he would have stepped in and prevented the shares reaching their present absurd price, if only to protect his own good name and fame among the many hundreds of Canadians who followed him into the mining field. However, he has not done so, and has left all matters to Mr. Blackstock and Manager Kirby, not even attending the War Eagle meeting. As Rossland is at present suffering considerably from this grossly stupid want of management and the War Eagle tangle generally, it is not surprising that at least three of the most unpopular men in the camp to-day are Messrs. Gooderham, Blackstock and Kirby.

In some instances when a new manager is appointed, that official deems it his painful duty to depreciate the concern placed under his charge—a very ancient practice. If he succeeds, then lies all the honor and glory, and if otherwise, why, he always said he did not expect better things. The reports just issued by the Centre Star and War Eagle would most certainly go to prove that Mr. Kirby, the manager, is exceedingly careful not to over-estimate the condition and possibilities of the mines, and it will be a matter of surprise, if, later on, a very great change for the better is not announced, which, of course, will redound to the lasting credit of the manager. Meantime, the investors and the public generally are saying very unpleasant things.

Turning from the Centre Star and War Eagle group it is a pleasure to view the quick development and progress made in the mines which adjoin these properties—the Le Roi, Great Western, Le Roi No. 2, Iron Mask and the Kootenay. Here progress alone, well considered lines is everywhere in evidence, and this summer will see some of the fruits of past development.

The discoveries in the Homestake, White Bear and Green Mountain properties—the last two having been located with the diamond drill—are being followed with keen interest. It will be some time yet before the true value of the finds can be ascertained with accuracy, but the indications in all three mines are extremely good.

Although an expert from New York has been busy for some time examining and valuing the Canadian smelter at Trail, on behalf of the Gooderham people, no definite announcement has yet been made of a sale of the plant. If the War Eagle-Centre Star outfit purchase the smelter, one result will be an immediate heavy shipment from the War Eagle, as there is admittedly a large quantity of low grade ore available, which is now being held back for better treatment rates.

Le Roi.—The main five-compartment shaft on the Black Bear ground is now close to what will be the 1,000-foot station. By the time this is in print the point mentioned will be reached.

The old main shaft is being straightened out and utilized and in the drifts to the west, the Josie dyke has been successfully pierced, and the ore body has been encountered in place, an important find for other properties beside the Le Roi. All the new machinery, with the exception of the second hoist, is now in running order, and is working smoothly and satisfactorily, though it will take a little time yet to get the new system in perfect control. One result attained is that from the time the ore is first placed in the mine bucket until it comes in place on the roasting beds at the smelter it is never handled again. The new machinery crushes samples and sorts the ore, which now travels to the Northport plant from the mine workings at a considerably reduced cost than was formerly the case. The figures quoted in these columns for cost of mining, etc., i. e. whole cost of mining, \$3.25; freight and treatment, \$4.50, with \$13.00 for the average value of the ore, are substantially correct, but this does not include the cost of refining, which may be put at about \$1.50. Against this, however, it may be noted that the cost of treatment is really under \$4.00, so that the net value of the shipments is something slightly over \$4.00 per ton. More men are being engaged week by week, and the output may be looked for not only to hold its own, but to still further increase. The second hoist for the main shaft is rapidly being assembled, and should be in working order by the end of the month.

Centre Star.—The mine continues to make a weekly output of 2,200 tons of ore, without any special effort to press the shipments. A fully equipped machine shop has been added to the plant; here repairs are properly made to the running gear, and a small amount of manufacturing is carried on. The fifth dividend of one per cent., or \$35,000, has been declared payable April 1. This makes a total of \$175,000 paid to date. Development at the sixth, or lowest, level, shows that the ore body retains its value, 700 feet down.

Rossland Great Western.—The completion of the 40-drill electric compressor plant will take place in a few days. The plant has been supplied by the Canadian Rand Drill Co., and is practically a duplicate of the Centre Star compressor, except that the latter is operated by steam. An interesting comparison can shortly be made as to the cost of steam and electricity between the two plants.

About 2,000 tons of shipping ore is lying on the dump awaiting the completion of the smelter improvements. Between 400 and 500 tons a week now goes down to Northport, and this will be increased to at least 100 tons a day when the smelter is ready to take it and the new railway ore cars arrive. The shaft has reached the 800-foot level, and a station is being cut out.

War Eagle.—The electrical compressor has been taken apart for needed repairs, and men are busy completing repairs to the shipping tramway and making other surface improvements. There are some five lawsuits in which the War Eagle Co. is interested set for hearing on April 15. The War Eagle is suing the James Cooper Mfg. Co., the Western Kootenay Power & Light Co. and the General Electric Co., and the first two companies have brought cross actions against the mining company. The now celebrated hoist and compressor plant, and the power to run the same, is the cause of all this litigation, and an interesting trial is looked for. The shaft is now down over 1,300 feet. Development of the lower levels will demonstrate very soon whether the high values obtained in the upper levels can be found under the barren zone, the existence of which has so frightened some stockholders. About 800 tons a week is being sent out.

White Bear.—Drifting along the ledge recently ascertained by the diamond drill, has been in progress for the past fortnight and a body of pay ore has been encountered, much to the satisfaction of the management. Further developments are looked for with interest.

Homestake.—The tunnel is now well past the point of intersection with the shaft. The tunnel will be driven some 200 feet further, when it is expected that the formation will permit the drawing off of the upper workings, which are at present filled with water. The next step will be to connect the shaft and tunnel, there being about 100 feet of rock between the two.

Le Roi No. 2.—Sinking is in progress on the shafts of the Josie and No. 1. There is plenty of ore in sight, and weekly shipments continue, about 130 tons daily being sent out.

Kootenay Mines.—No arrangements have yet been concluded to commence shipping, but the mine is in a position to make a good output now. The main shaft is some 600 feet below No. 6 tunnel, the lowest working.

I. X. L.—About 50 tons per month of high grade ore, running from \$70 to \$80 per ton, is being shipped to Northport.

Spitzee.—The good showing in the shaft now nearing the 100-foot level continues.

Velvet.—The 40-drill compressor will be installed and in working order by the end of the month.

Evening Star.—Shipments are stopped for the present, until the roads harden.

Portland.—The main tunnel is now in over 1,000 feet.

Bonanza No. 2.—The tunnel is now in nearly 200 feet, and is still in ore of a shipping grade. About 300 tons of ore, ready for shipment, is on the dump.

Cascade.—The ore shoot which is practically ready for stoping, is over 400 feet in length. The vein on the mineral level is 15 feet wide.

SLOCAN.

(From Our Own Correspondent.)

The effect of the smelter difficulty is apparent in the utter stagnation which pervades business circles throughout this district.

Last week, for the first time in many months, our great stand-by, the Payne, failed to enter the list of shippers, and those who had not previously given the matter thought began to see the seriousness of the situation.

With a thousand tons of concentrates piled along the track, matters are brought to a standstill at the Whitewater for want of a market. The Highland mine and mill at Ainsworth, which started out with such promise of excellent results a few months since, now lie idle and deserted; and throughout the entire silver-lead producing portions of the Province there is an expectant hush as if waiting for the next important move which all feel instinctively must come before long.

The proposal to amend the Mineral Act along lines first suggested by Mr. Carlyle, by requiring locators to do ten feet of work within ninety days before recording, has met with the same storm of opposition from the identical class of prospectors who objected last time the subject was broached. However, notwithstanding petitions praying that the act be left as it is, and the manifest feelings of insecurity which a continual tampering engenders, the better class of prospectors who live by honestly working their claims, and not by systematic wild-cutting and incessant re-staking, are favorably disposed to the change.

With such a law in force, it will be obviously impossible to witness a spectacle of over seventy claims on one mountain which have been staked and re-staked continuously for six years past and on which not a single stroke of work has ever been done, such as is presented right here at our doors. If the present owners do not consider they are worth working, by all means let somebody else have a try who does.

On the first of March operations were entirely suspended at the Bosun mine—probably the most constant and uniform shipper in the Slocan—as a result of advices received from London. That nothing serious is the matter is evidenced by the fact that the force is being gradually re-engaged, the management being highly pleased at having located the vein carrying ore in the lower tunnel, after driving through 500 feet of superficial wash.

The troubles at the Chapleau are in a fair way to being adjusted, but such gross mis-management in connection with any mine is inexcusable after the experiences of the past.

It is almost painful to be obliged to record that such a valuable property as the Molly Gibson is also in serious financial difficulties. The smelter situation is responsible, we know, for a great deal, but it would be unfair to saddle it with failures with which it has absolutely no connection.

The settlement long known as "the foot of the lake," and later as Slocan City, has recently added to its dignity through the medium of incorporation.

By careful avoidance of the errors of the past, a prosperous future awaits the dry ore belt, with which the fortunes of the swaddling city are indissolubly bound up.

YMIR.

(From Our Own Correspondent.)

The last returns from the Ymir mine are as follows: 80 stamps ran 611 hours, during which time 4,900 tons of ore were milled, producing 447 tons of concentrates. Total receipts for month from bullion saved on the plates and from concentrates were \$41,600, and working expenses \$15,400, leaving a net profit of \$26,200. The deeper development work now proceeding at Ymir mine is opening up the property in such a

fashion that it is safe to say it will shortly be one of the heaviest producers in the Province. For the past eighteen months the output has been in the neighborhood of 200 tons per day, and all this has been taken from above the 300-foot level. It is estimated that there are still over 100,000 tons of ore remaining above this level. The deeper development is being prosecuted by means of a shaft sunk from the No. 3 level. This shaft has now reached a depth of nearly 600 feet. At each 50 feet in the shaft the ledge has been cross-cut from wall to wall, and drifts driven for 50 feet on the vein in both directions. The ore body at these lower depths is even of larger dimensions than above, and is, moreover, reported to carry slightly higher values. The width at the 300-foot level varies from twelve to forty-six feet, the general average being in the neighborhood of thirty feet. Besides the shaft, a cross-cut tunnel is being driven to tap the vein at a point 1,000 feet below the surface. This tunnel, when completed, will have a total length of 2,100 feet. At present it has been driven 800 feet,

and is being constructed wide enough to contain a double row of rails, in order that in future it may form the main working entrance of the mine. Its entrance being on a level with the mill, it will, when completed, supersede the use of the H. H. Hoyle tramway, by which the ore is at present brought to the mill from the No. 3 tunnel. In addition to the above developments, the Ymir Company is installing a cyanide plant, which, it is estimated, will effect a further saving of \$1 per ton of from \$5,000 to \$6,000 per month. At the present rate of production, viz., 200 tons per day, the mine is making profits sufficient to pay 20 per cent. dividends on its capital, but the stopes have been arranged so that at any moment the rate of production can be increased to 1,000 tons per day, given the necessary milling power. It is currently reported that the present complement of 80 stamps will be doubled in the near future.

The total ore production for 1900 from the Yellowstone mine, eight miles south of Ymir, has just been published, and amounts to 8,607 tons, which has all been milled by the 10-stamp battery. The property being owned by a private syndicate, the value of the output has not been made public.

An important strike has just been reported from the Ymir mine, which will make a very large addition to the already immense resources of the mine. A body of ore eight feet wide and of good average value, has been encountered in the long tunnel which is being driven to tap the main ore body at the 1,000 foot level. This tunnel, which will have a total length of 2,100 feet, has been undertaken for the deeper development of the mine, and it was not expected that any ore of importance would be encountered until the shoot already under development was reached. A number of stringers of galena varying from one to twelve inches wide, however, were, ever, crossed between 500 and 900 feet, and the frequency with which they occurred gave rise to the supposition that there must be a

body of ore somewhere nearer than that constituting the known vein. The truth of this supposition was realized at a point nearly 1,000 feet from the mouth of the tunnel, where a body of ore, probably constituting a distinct, but "blind" vein, was broken into. The ore is a fine galena, and about eight feet wide. The actual values are not at present ascertainable, but it may be confidently expected from the appearance of the ore that they will not be less than those pertaining to the main ore body, from which a profit of \$35,000 per month is obtainable, by the 80-stamp mill. The last returns published, however, only reach about half this figure, in consequence of a succession of severe frosts, which entailed much extra work and expenditure. The official estimate of profit is \$16,500 from a total crushing of 5,500 tons. The Ymir company have recently purchased most of the timber lands on Wild Horse Creek, between the mine and Ymir town, and have thus secured a sufficiency of timber and fuel for many years to come. The land purchased is that through which the projected railroad branch from the mill of the Ymir mine to town, will pass.

The returns from the Yellowstone mine, ten miles south of Ymir, indicate that during the last year a total of 8,617 tons of ore was treated in the 10-stamp mill. The property being owned by a private syndicate, the value has not been made known.

The coming summer will witness a large addition to the number of reduction plants in the district. At the present moment there are four stamp mills within a ten-mile circuit about Ymir making a total of 165 stamps. Three new stamp mills will probably be erected this year, besides a concentrating plant which is to be erected on the Arlington mine. The machinery for this latter plant has already been ordered from the Gates Iron Co., and is expected to be delivered within a month. It will, in the first place, have a capacity of 50 tons per day, only, but will be so arranged that the capacity can be easily raised to a higher figure at any time.

The Finch-Campbell combination, of Spokane, have also announced their intention of putting in a 20-stamp mill this summer on their Second Relief mine. This property has been extensively developed, and has already shipped some 500 tons of ore to the Northport smelter.

Other mills which will probably be erected this summer will be for the Wilcox and Foghorn mines, both on Wild Horse Creek. The former is perhaps the best developed property in the district, outside of the Ymir mine, and has a large quantity of ore averaging about \$14.00 ready for treatment. The property is traversed by two distinct veins, both of which afford good pay ore, although of quite different character. The ore in No. 1 vein consists principally of oxides and carbonates and lends itself easily to treatment by amalgamation. This vein has been the most extensively developed, and the ore is found to average three feet in width. The No. 2 vein, which is considerably wider, carries a galena ore, a carload of which, recently shipped to the Northport smelter, returned \$57.00 per ton.

The Foghorn property, which is now being actively developed by the Golden Mounser Mining & Milling Co., of Spokane, is one for which a great future is predicted. It is situated in the great belt of free milling ore which traverses the divide between the heads of Wild Horse and Sixteen Mile Creeks, and is supposed to have the motherlode of this belt. Some of the finest specimens of gold rock ever encountered in the district have been taken from this property, and it is confidently stated that the showing at the bottom of the prospect shaft, which was sunk by the original locator, is unequalled in the Province. The vein will be tapped by a cross-cut tunnel at a depth of 500 feet below this shaft, and the vein being good and strong, there is every reason to believe that a large body of valuable ore will be opened up by this means. This company has also purchased a large area of timber lands in the immediate vicinity of its property.

TAXES AND THE MINING INDUSTRY.

(To the Editor, The B. C. Mining Record.)

SIR:—Thinking possibly that everyone is not as well acquainted with the mischievous system of taxation that is forced by our British Columbia legislators on the mining industry of this Province—of which, indeed, the said industry is the backbone—I have ventured to write the following brief notes.

When an able-bodied man comes first into British Columbia he is promptly taxed \$3.00 annually for the privilege of living here; and another \$2.00 is added for "Road tax," although roads are chiefly conspicuous by their absence. Possibly our able-bodied friend may have a taste for minerals—or thinks he has, much the same thing. He must then take his prospector's license, costing \$5.00, and with his pack on his back, is free to examine the country. Let us suppose he is so lucky as to find indications of mineral; he must stake his claim in a certain way, (chiefly by guess), and record it, for which he will pay \$2.50. During the following year he must do \$100.00 worth of work on the claim, swear that he has done so, and record the assessment—\$2.50 more. While at the office he may as well take his new miner's license, as the old one will have about run out, costing \$5.00, as before. This goes on for four or five years, by which time he should know whether his claim is worth anything or not, but during this time he must not use one stick of timber from his claim for mining purposes, without being taxed for it at the rate of 50 cents per cord—surely a high figure. He may burn, waste, or otherwise destroy all his own timber and that of half the country besides if he likes, for nothing, but if he dares to put the timber to its natural and legitimate use, he has to pay the government for it. And when at the end of the four or five years he crown grants the claim, he is again taxed 25 cents per acre, and though he has legally acquired possession of the land, the act does not permit him even to use the timber on it for mining purposes without taxing him. (If this statement is incorrect I shall be glad to be put right, but the wording of the act makes no exception.)

Well, our friend having probably, during all these years of hard work been compelled to ask his friends' assistance in money matters, is now anxious to see what the mineral he has extracted is worth, and to recompense himself and his partners for their labor to some extent. So he sacks it up and sends it to the nearest smelter, which often costs \$25 to \$40 per ton to accomplish. The smelter company samples it, knocks off from it any possible loss they might sustain by imperfect smelting—10 per cent. of the lead, 5 per cent. of the silver and gold, and about 1½ per cent. of the copper—leaves the unfortunate owner for nearly all the remaining minerals, and finally charges him a good round sum for smelting. If the ore is exceptionally rich, there will be even then a little profit left to counterbalance the cost of mining and other expenses. Then the government steps in again and remarks, "Hand over two per cent. of that to us." Now, why? What has the government done during the whole time to help the mine owner? Nothing at all, but has been bleeding him for fees continually, and even declared that neither he nor his men shall work more than eight hours a day, whether they want to or not.

On the other hand, what has the prospector and mine owner done for the government? He has showed up the value of the country, has been the pioneer settler in the "primeval forest" and has been the means of many small towns springing up all around, all of which contribute heavily to the government through their own licenses and fees. I would then ask why, in the name of common sense does not our government encourage the mining industry, instead of eternally worrying it and hampering it with mischievous laws and fines. For British Columbia has mineral resources which are probably unequalled elsewhere on the earth, and it is to those resources that we must look for our wealth; surely then the development of them should be a source of the greatest anxiety to the government, that nothing should be allowed to hinder, but everything to assist it. Unfortunately, but few members seem to know what a mine means, they think apparently it is a spot of land where you go with a pick and shovel and get out bushels of gold coin ready made; and, consequently, the wildest suggestion respecting drawing taxes from the mine is promptly made law, to the infinite and lasting harm both to the country itself and to its mainstay, the mining industry. My sincere hope is that this plain recital of facts may help to amend our condition.

Revelstoke.

A. H. HOLDICH, R.S.M., Etc.

RECENT PUBLICATIONS.

SHEPARD'S map of Boundary, B. C., by A. E. Ashcroft, P. L.S., D.L.S.; Randolph Stuart, Greenwood, 1901.

This is certainly the most accurate and complete map yet issued of the surveyed mineral claims of what is known as the Boundary district, including Deadwood, Smith's, Providence, Skyline, Central, Greenwood or Phoenix, Wellington and Summit camps. The location of the C. & W. railway, roads, trails, creeks, rivers and town and smelter sites are also given. The map is drawn to a scale of two and a half inches to the mile.

"General Index to the Reports of Progress of the Geological Survey of Canada," compiled by D. B. Dowling, B. Ass. Sc.; Queen's Printer, Ottawa, 1900.

The early reports of the Geological Survey were published under the title of "Reports of Progress," the first appearing in 1845. In 1863 the reports up to that date were brought out in a condensed and summarized form as one volume. The present general index embraces the succeeding reports from 1863 to 1884 inclusive, thus covering sixteen volumes and two short summaries, or 6,585 pages of text, to which more than 41,000 entries are given. The index will be extremely valuable as affording a ready means of reference to practically the entire body of observations published by the Geological Survey up to the year 1884.

While the past year showed a total output of coal from all countries of probably not less than 775,000,000 net tons, the largest amount ever produced in a period of twelve months, the price of the commodity increased nearly all over the world. In Great Britain the rise in prices is attributed largely to the Transvaal war, the government being forced to use a considerable part of the merchant marine for purposes of military transportation, so that the big liners had to draw for their coal exclusively on the domestic supply, and the activity in the British arsenals, gun factories, and other establishments engaged in the manufacture of war supplies tended to enhance prices of coal in the British market, while a decrease in the number of vessels formerly engaged in the coal carrying trade acted indirectly in the same direction, so far as importing countries were concerned, by raising freight rates. Labor troubles in France and strikes in Moravia, Liberia and Bohemia also helped to raise the price of coal in Europe. In the report before us it is pointed out that while the United Kingdom was until last year the largest coal producing country in the world, its exports have always amounted to a considerable proportion of this production, and the amount consumed in this country has not been as great since 1891 as that in the United States. Since 1891 the United States has maintained an increasing lead in the amount of coal consumed, and its total consumption has, in the absence of either a large export or import, kept pace with its production, its consumption increasing far more rapidly than that of the United Kingdom. Thus, from 1883 to 1897 the consumption of coal in the United States increased from 102,000,000 gross tons to 173,400,000, an increase of 72 per cent., while the increase in the United Kingdom was only from 134,500,000 gross tons to 154,000,000 gross tons, an increase of less than 12 per cent. The United Kingdom, however, maintains its second place as a coal-consuming country, and it seems probable that it will maintain this position for a long time.

The third country in the rank of coal-consuming countries is Germany, with a total consumption of 84,700,000 metric tons. The consumption of this country has increased very rapidly, and has promoted the immense industrial extension which has marked the last twenty-five years of German progress. The increase in production in Germany during the fourteen years from 1883 to 1897 was from 48,400,000 to 81,700,000 tons, an increase of about 75 per cent., while in France during the same period the increase has only been from 30,890,000 to 32,690,000 metric tons, or an increase of about 29 per cent. The countries next in order of coal consumption are: Austria-Hungary, with 16,400,000 metric tons, marking a very rapid increase since 1883; Belgium, with 17,807,000, and Russia, with 11,561,000, in 1896. The growth of the consumption of coal in Belgium, like the growth of its production, has been considerably retarded, and during the fifteen years under consideration the amount of coal consumed increased only from 14,000,000 to 17,800,000 tons, an increase of only 27 per cent. The increase in the output of Russian coal has been more remarkable the consumption being about twice as great in 1896 as it was in 1884.

Other countries with a large consumption of coal are: Canada, with 6,035,000 tons, or almost double the consumption of 1883; British India, with 4,127,000, or more than double the consumption of 1883; Italy, with 4,237,000 tons, which is five-sixths more than the consumption of 1883; Spain, with 3,839,000 tons, or about two-thirds more than the consumption of 1883; Sweden, with 2,524,000 tons; and Japan, with 2,936,000 tons, in 1896. The consumption of coal in Japan has been remarkably rapid, its consumption in 1895 amounting to 3,044,000 tons, or almost three times the consumption of 1888, and almost five times the consumption in the early eighties.

The report contains besides voluminous information on the coal trade of the world, very complete comparative and statistical tables of coal production of the different countries from 1848 to last year.

TECHNICAL PERIODICALS.

THE ENGINEERING MAGAZINE.

IN the Engineering Magazine for March, first place is given to an article entitled "The Coming Industrial Empire of Puget Sound," by Mr. D. B. Bogle, who, by the way, has been for several months one of the principal contributors to our editorial columns, and acted as editor for the past three months. In the article under review, Mr. Bogle discusses the future industrial and commercial development of that portion of the Pacific Northwest, having for its centre the nearest economic shipping point to the Orient and the watershed of the Rocky Mountains, forming an Eastern radius, while he leaves undetermined the northern and southern boundaries, with the addenda that "the completest development, industrial and social, is only to be expected within the limits of the temperate zone." After showing that the developments of a new country follows a well-defined course, marked by regular and clearly differentiated stages of progress, certain facts are adduced as affecting the future of the Pacific Coast. "The first of these is, that however rich it may be in natural resources, the exploitation of these will never support a very large population, or build up great cities, so long as all the raw wealth produced is exported and all the finished products required are imported. The second of these facts is, that while a great trade may be built up by way of the Pacific Coast with foreign countries, that of itself will not build up great cities on the Coast, because modern commercial methods will prevent these cities being sellers, purchasers, and changers of this commerce, and leave them in the condition of outsiders merely. Consequently, the future of the Pacific Coast, if it is to have any worthily of the name, is dependent on the manufacture of the raw materials produced within its limits and drawn from outside, to supply the wants of its own population and those of the available foreign territory." This is obvious economic truth, tersely put, and it is matter for congratulation that the people of British Columbia in the present agitation for redress have already begun to recognize its force and applicability. Granted great natural wealth, Mr. Bogle considers the possibilities of manufacturing finished products out of raw material at a maximum of economy compared with other manufacturing countries, which depend on the questions of transportation of raw material to an economic centre, the proximity of iron, ore and coal, the availability of power, and the efficiency and cost of labor. He states that as regards the products of the "territory under consideration already produces an inconsiderable proportion of the world's annual supply of gold, silver, copper and lead, and is besides, infinitely rich in iron, coal and petroleum, of which its stores are hardly yet comprehended, much less utilized. * * * while as to power, the same excessive humidity which has clothed the Pacific Slope in the temperate zone with inexhaustible forests, makes those mountain ranges vast reservoirs of water, of which the overflow plunges down in a thousand cataracts to the sea, forming an available source of power unmet, and probably not even approached, in any portion of the world. In all this territory it would not only be unnecessary—it would be almost impossible—to establish any manufacturing industry beyond the radial limit of electrical energy generated by water." On the subject of labor the question whether or not its rate of remuneration will permanently remain higher in the West than it is in the East, is not answered, though it is confidently asserted that the industrial and commercial development of the Pacific Coast must be postponed until the labor cost of the articles produced is as low as, or lower than, it is in other parts of the world. The commercial territory available to the Pacific Coast is, the writer goes on to state, of vast extent, "wide as the periphery of the Pacific Ocean," though there are certain peculiarities about the character of this tributary territory, which make the conditions of development entirely different from those which have contributed to the manufacturing supremacy of the Atlantic sea-board. Mr. Bogle classifies this territory under three heads: 1, Alaska, Northern British Columbia, the Canadian Northwest and Siberia; 2, Southern American Pacific States, the Dutch Indies, Borneo, British India, China and Japan; 3, Australia and New Zealand; with all of which important and profitable trade relations are being and may be established; but the greatest part of the markets for exports and import foreign trade, it is pointed out, open or valuable to North America must be reached through the ports on the Pacific, for "surely North America's trade opportunities lie where East and West are merged, where there is a market for manufactures, and whence may be drawn commodities differing in utility as one hemisphere differs from another. Mr. Bogle brings his admirably clever paper to a close in a regular burst of eloquence; he says, "I have tried to show that the Pacific Coast possesses the necessary resources in a pre-eminent degree, but that their development is yet postponed awhile by a number of present day disabilities. These, how-

ever, are likely to be removed at least as rapidly as the foreign market is opened to its fullest capacity. The North American continent does not as yet fully recognize its destiny as arbiter of the future commercial life to which the myriads of population, and countless agencies of production lying dormant in the Orient must awaken. But the day will come when the ports on the Pacific Coast are not only engaged in a great trade in the export of all classes of manufactures, but form a reservoir into which the untold wealth of Oriental nations is poured, then to be manufactured and transferred and adopted to the needs of a great and rich population extending from the Pacific to the Atlantic shore, to the refinement of whose mode of living the world is laid under tribute. Then, indeed, will great cities, rich, crowded, laughing with the spoil of continents, be built up upon the North American shores of the Pacific Ocean, cities resounding to the hum of commerce, of manufactures, and of ship-building, and forming the ganglia of the commercial nerve-system of the world. Here, indeed, will the impulse of Western civilization be realized in its most glorious, perhaps its final, consummation. Here, in this Imperial situation, holding in one hand the keys of all Europe and America, and with the other embracing the commercial destinies of all Asia and Oceania, Western civilization, in its peculiar industrial features, will attain a magnitude and a character of demarcation superior to every phase of it that has gone before, as such of these has been superior to precedent variations." We can only express the hope that Mr. Bogle may live long enough to see his magnificent predictions verified, and that his faith may be rewarded by a proportionate share of that wealth and prosperity which in the fulfillment of her destiny, "The Coming Industrial Empire of Puget Sound" is to enjoy.

SCHOOL OF MINES QUARTERLY.

The last number of this magazine contains several valuable papers, including "Electrochemistry and Electrometallurgy," by F. B. Crocker; "The Analysis of Slags and Cinders," by Cavalier H. Jonet; "Notes on the Assay of the Zinc Precipitates Obtained in the Cyanide Process," by C. H. Fulton and C. H. Crawford, and "A Method of Cyclic Analysis of Heat Engines," by Charles E. Lucke.

RAILWAY AND ENGINEERING REVIEW.

The "Special Maintenance of Way Issue" of this periodical, which appeared on March 16th, is a very handsome, well illustrated number of over two hundred pages, much space being devoted to the reports of the committee of the American Railway Engineering and Maintenance of Way Association on bridges and trestles, highway crossings, rails, and other subjects of interest to railroad engineers. Among miscellaneous articles is a paper on "Switchback" cantilever bridge to span over a canyon two miles south of the summit of White Pass, on the White Pass & Yukon Railway. To construct an ordinary bridge under the difficulties encountered would have seriously delayed the work of extending the road. As an alternative, therefore, a switchback was run 2,200 feet beyond the site of the proposed bridge, returning on the opposite side of the canyon at such an elevation as would permit the construction of a bridge on a grade which would not be prohibitive. The width of the canyon beyond the site of the proposed bridge is too narrow to make room for a curve, and therefore the only scheme for returning out of the canyon, on the opposite side, was by means of a switchback.

"In operating trains over this switchback it has been necessary to break the train at the end of the switchback and turn the engines, for which purpose a turntable had been installed on the north side of the switchback. The switchback was otherwise bothersome through inability to operate the rotary snow plow around the same, resulting in an annual expense of about \$20,000 for shovelling snow, notwithstanding that a snow shed of considerable length had been erected near the end of the switchback. Aside from these matters of maintenance expense there was a delay of about a half hour to every train in turning the engines and breaking the train to get the engines to the head end after passing the switchback. The cantilever bridge which has been built at this point is a structure of considerable interest. The clear span of the bridge is 240 feet, and the length of the cantilever structure is 400 feet. There is a wooden trestle approach at either end of the cantilever, making the total length of the bridge 850 feet. At the centre the bridge stands 275 feet above the canyon. One of the principal difficulties experienced in the work of construction was the building of the foundation piers, which are of concrete. These piers had to be built on the steep sides of the canyon, and in digging for the foundations large quantities of ice were struck in the crevices of the rocks, which had to be removed.

MINES AND MINERALS.

In Mines and Minerals for March an exceptionally able

article is contributed by Mr. R. B. Brinsmade, B. S., E. M., entitled, "Mining Practice at Rossland." The writer describes the methods of diamond drilling, shaft sinking, drifting, raising, blasting, tramping, hoisting, ventilation, lighting, pumping, air compression, etc. employed, and also refers to working costs and the labor conditions in this district. Space forbids a review of the article this month, but we hope at an early date to reproduce extracts from it in the next issue of the Mining Record.

TRADE NOTICES.

THE Hendrie & Bolthoff Manufacturing & Supply Co., of Denver, Colorado, announce that while one of their warehouses was recently destroyed by fire, the five remaining warehouses, full of material, were unharmed, and that fifty cars laden with machinery and supplies from their works are now on the road, while other consignments will immediately follow.

The A. Van der Naillen School of Engineering, San Francisco, request us to state that the school, the attendance to which is largely on the increase, has been moved to the company's own three-story building, No. 113 Fulton Street.

Mr. A. G. MacDonald, late of the Royal Electric Company's engineering and sales department, has been appointed to represent the Fairbanks' Company, of Montreal, in British Columbia.

We are in receipt of catalogue No. 13, describing the Jackson hand power rock drill and equipment, manufactured by the sole licensee, Mr. H. D. Crippen, 52 Broadway, New York, and Denver, Colorado. This catalogue is well illustrated, showing the drill mounted at different angles, and adjusted for either sinking, tunnelling or quarrying. The Jackson hand-power rock drill is the result of many years' experimenting by the inventor who has had over twenty years' experience as a miner and mine operator. It is so simple that it can be operated by a person without previous experience in rock drilling or with mechanical devices of any nature, and can be set up for work and operated by one man, though two can work it with proportionate increased efficiency. The drill consists of two principal parts, the carriage and body, which can be instantly separated and readjusted. The total weight of the machine being less than 140 pounds, the parts can be readily transported over rough or mountainous country by mule or man pack. This drill has been on the market four years. It is not an adaptation or change from any of the old forms of hand power drills, its principle and mechanism being entirely new. It is extensively used in the United States and in foreign countries, and is giving universal satisfaction, as evidenced by the many testimonials received and printed in the catalogue. When width of workings is five feet or more, two drills may be operated at the same time to good advantage. The manufacturer, furthermore, guarantees to replace all broken parts within two years from date of sale, free of charge.

The annual meeting of the Canadian General Electric Company was held in Toronto this month. The report showed that the net profits on operating accounts had been \$262,003, and the premium on the new stock \$75,000. These items, with the \$58,437 balance from last year, make a total of \$396,340. The dividends, 10 per cent. on the common stock, and 6 per cent. on the preferred stock, absorbed \$127,623; \$125,000 has been added to reserve, making that fund now \$265,000, and a further sum of \$12,601 was placed at the credit of profit and loss. Directors were re-elected as follows: W. R. Brock, president; H. P. Dwight, first vice-president; Frederick Nicholls, second vice-president and managing director. The company's business is large and active.

Messrs. Pellet-Harvey, Bryant & Gilman, the well known metallurgist firm of Vancouver, have been appointed provincial agents of the Smelting Corporation, of England, which operates large reduction works on the Manchester Ship Canal at Ellesmere Port. The corporation purchases zinc-lead ores in all quantities, a fact which is of substantial interest to those who have refractory silver-lead ores, containing much zinc. Messrs. Pellet-Harvey & Co. have already sent a purchasing agent to visit West Kootenay, in order to make contracts for their English principals.

Mr. Charles H. Unverzagt, formerly president of the Hooper Pneumatic Milling Co., 517 W. 30th street, New York City, engaged in the business of milling and the concentration of ores without the use of water, has sold out a 51 per cent. interest in said company for a large figure with a special reservation of a number of machines for his own use, and proposes to shortly remove West. The reservation of machines will require \$1,000,000 to capitalize the same for use in milling plants and a company for which purpose will be formed by Mr. Unverzagt in the fall, after he has given attention to certain mining interests which he is developing. We understand that there are a number of capitalists ready to go in on the matter. The successors to Mr. Unverzagt propose developing the Hooper pneumatic milling system for the dry concentration of ores on a large scale, not only in its sale and introduction, but, also in its use in personal mining operations of the syndicate. The Hooper Pneumatic Company have recently closed a con-

tract in Mexico for the exclusive license to manufacture, sell and use the process in Mexico at good royalty and large guarantee. The contract is undertaken by representatives of the large iron and steel works at Burango, Mexico. The company has recently shipped nine machines to the Eagle Fluor Spar Company in Kentucky, who have been using three machines for some time. Shipments have also been made to Colorado, Pennsylvania, Indiana, and a considerable order is being finished for a copper company. The company maintains a large-testing works in New York City, and is receiving ores from all parts of the world. Their process seems indispensable in countries where water is scarce, but, they claim it is a superior one to use without the question of water.

An order was placed with the Edward P. Allis Co., of Milwaukee, through their Spokane office, by the Mountain Copper Co., Ltd., of Keswick, Cal., for machinery for a copper converting plant, consisting of three stands of converters, blowing engine, electric crane and all the necessary appurtenances belonging to a converting plant. It is expected that the plant will be in operation in about six months. The total shipping weight of the machinery sold is approximately 500,000 pounds.

The Vancouver Engineering Co., the new concern which is about to take over the works of Armstrong & Morrison, expects to fully complete the transfer of the business by the end of this month. The new company has placed large contracts for new machine tools and a complete iron and brass foundry, with all necessary equipment. The foundry, which will be a new iron building, will shortly be erected. New draughting offices have already been built, with every accommodation. It is the intention of the Vancouver Engineering Co., with an efficient staff of consulting engineers and draughtsmen, to undertake all sorts of design work. In addition to the general lines of manufacture that have been carried on at the works, the company will undertake all kinds of marine work, with every facility for the successful handling of this important industry. It is gratifying to learn that Messrs. Armstrong & Morrison will still retain an interest in the business, and their influence and ability as well known engineers and contractors will go a long way to ensure the prosperity of the new concern.

The Gates Iron Works, of Chicago, have recently sold a complete copper smelting and converting plant to the Granby Mining & Smelting Co., of Grand Forks, this being a second order from the same concern. This will complete one of the largest copper smelting and refining plants built in the United States or Canada. The success obtained by the Granby company with its initial plant has been unequalled. It consisted of two rectangular water-jacketed furnaces, 44x160 inches, with all the necessary appurtenances incident to a modern copper smelting plant, and was installed at Grand Forks, British Columbia, to handle the low-grade copper ores in the Boundary district, and was designed to handle 500 tons per day. Under the direction of Mr. A. B. W. Hodges it has actually averaged 600 tons per day, and has reached as high as 763 tons. The Granby company has, within the last month, completed smelting its first 100,000 tons, attaining a cost of mining and smelting that has made a new record. To complete their plant, the Granby people have just placed this second order with the Gates Iron Works, consisting in part of two more water-jacketed furnaces, 44x160 inches; a complete ore crushing and sampling works, with No. 5 style "D" crusher; one 9x15 in. Blake crusher, one "P" Gates crusher, one sample grinder, three sets of rolls, elevators, etc.; a complete silica crushing mill, including a Dodge crusher, dry pans, elevators, etc., and the following converting machinery: One tilting reverberatory furnace complete, one converter stand complete, cars, a complete hydraulic system, blowing engine, one 10-ton electric crane, one 40-ton electric crane, with everything to make a perfect plant.

MINING RETURNS AND STATISTICS.

THE COAST.

UP to the third week in March 111,867 tons of ore, averaging \$20.70 per ton were shipped.

LILLOOET.

The completed returns from the Ben d'Or mine of operations since August, 1899, are as follows: Mill has run 247 days, 19 hours, 5 minutes; crushing, 5,020 tons; saved by amalgamation, 2,671.34 oz.; realizing, \$60,878.19; value of tailings saved for treatment at \$1.49 per ton, \$22,539.80; total value of ore crushed, \$83,417.99; value per ton, \$16.61; cost of mining and milling, \$5.15. Since the commencement of the year over 300 tons of ore have been crushed, but no clean-up has as yet been made.

BOUNDARY CREEK.

The British Columbia Copper Company's smelter at Greenwood turned out 13 cars, or about 360 tons, of 50 per cent. copper matte during the first month's run to the 22nd inst. The Granby smelter at Grand Forks continues to be operated at its full capacity.

ROSSLAND.

Our Rossland correspondent telegraphs that the production from this district for March is approximately 39,000 tons. The following is a comparative table of production to date:

| | 1901. | 1900. | Tons. |
|------------------------------|--------|--------|--------|
| Shipments for January | 28,000 | 24,933 | 3,067 |
| Shipments for February | 27,695 | 6,960 | 20,735 |
| Shipments for March | 39,000 | 270 | 38,721 |

Shipments for 1st Quarter

94,695 32,172 62,523
An interesting report was lately received from the manager of the Le Roi mine for the month ended 31st December, 1900. This states amongst other details that the shipments then made to the Northport smelting works from the mine totalled 11,431.00 dry tons of 2,000 lbs. each.

| | |
|----------------------|----------|
| 200 foot level | 371.18 |
| 300 foot level | 696.78 |
| 350 foot level | 8.11 |
| 500 foot level | 2,489.72 |
| 600 foot level | 3,639.14 |
| 700 foot level | 5,529.70 |
| 800 foot level | 1,696.37 |

Total

14,431.00
The details of these shipments are recorded as follows:
7,743.19 ozs. gold at \$20.00, \$154,863.80 or \$10.73 per ton;
15,530.14 ozs. silver at .60, \$9,330.08 or .65 per ton; 488,804
lbs. copper at .16 $\frac{1}{2}$, \$80,652.66 or \$5.59 per ton. Making the
total gross value \$244,846.54 and the average value per ton
\$16.97.

An appended summary shows as follows the total aggregate tonnage and the average value per ton for the ore shipped during the six months ended 31st December, 1900:

| Month. | Tons. | Gross value. | per ton. |
|-----------------|--------|--------------|----------|
| July | 17,301 | \$243,576.44 | \$14.03 |
| August | 19,302 | 238,427.06 | 12.34 |
| September | 15,831 | 184,563.00 | 11.65 |
| October | 16,115 | 222,752.20 | 13.82 |
| November | 14,958 | 218,644.79 | 14.61 |
| December | 14,431 | 244,846.79 | 16.97 |

Totals

97,938 \$1,352,810.27
Average value per ton, \$38.81

THE SLOCAN.

The ore shipments from Three Forks during January and February was 62 $\frac{1}{2}$ tons; from McGuigan 354 $\frac{1}{2}$ tons; from Sandon, 2,682 tons.

From Slocan Lake points the shipments from January 1st to March 21st have been as follows:

| From New Denver | Tons. |
|-------------------------|-------|
| Hartney | 120 |
| From Bosun Landing | |
| Bosun | 180 |
| From Silverton | |
| Hewett | 520 |
| From Enterprise Landing | |
| Arlington | 120 |
| From Slocan City | |
| Arlington | 840 |
| Two Friends | 40 |
| Black Prince | 60 |
| Bondholder | 50 |
| Chapleau | 15 |
| Speculator | 20 |

Total

1,965

EAST KOOTENAY.

At Moyie the St. Eugene is working a full force and the usual tonnage of ore is being shipped regularly. At Kimberley the North Star is maintaining an output of from 60 to 70 tons daily.

COAL EXPORTATIONS.

THE foreign coal shipments from the Vancouver Island collieries to March 1st aggregated 179,454 tons.

The output for foreign market of the New Vancouver Coal Co. for the three weeks ending March 20th was as follows:

| Date. | Vessel. | Destination. | Tons. |
|-------|-------------------------|------------------------|-------|
| 5 | SS. "Milton" | San Diego | 4,801 |
| 7 | SS. "Minicola" | Port Los Angeles | 3,263 |
| 9 | SS. "Titania" | San Francisco | 5,716 |
| 11 | SS. "New England" | Alaska | 85 |
| 13 | SS. "San Mateo" | Port Los Angeles | 4,292 |
| 15 | SS. "San Jose" | Acapulco, Mexico | 1,768 |

Total

19,925

EAST KOOTENAY.

The output from the Crow's Nest collieries shows a daily increase of 250 tons, of 4,500 tons per month.

THE METAL MARKET.—MARCH.

Compiled from the Engineering & Mining Journal and Weekly Reports.

SILVER.

THE silver market has been dull in the absence of any demand. The price has ranged between 60 $\frac{1}{2}$ ¢ and 61 $\frac{1}{2}$ ¢. The average price of silver last month was 61.06.

COPPER.

The market is very quiet, buyers having covered themselves for the moment, and transactions have consequently been restricted. Reports from Europe are somewhat unfavorable, and the market in general has become rather nominal. The latest quotations are: Lake copper, 16 $\frac{1}{2}$ ¢ to 17 $\frac{1}{2}$ ¢; electrolytic in cakes, anodes and ingots, 16.35¢ to 16.45¢; in cathodes, at 16.10¢ to 16.20¢; casting copper at 16 $\frac{1}{2}$ ¢.

LEAD.

There has been little change in this market during the month, though sales are reported from day to day at low prices, 4.22 $\frac{1}{2}$ ¢ to 4.32 $\frac{1}{2}$ ¢; St. Louis: 4.32 $\frac{1}{2}$ ¢ to 4.37 $\frac{1}{2}$ ¢; New York,

SPELTER.

The market is dull; consumption is good, but buyers are covered and are not purchasing to any extent. The St. Louis quotation is 3.75; New York, 3.90.

THE LOCAL STOCK MARKET.—MARCH.

While this month the Western markets have shown signs of much greater activity, there has been but little response from the East, and to all appearances it will be yet some time before the Montreal and Toronto markets recover from the depression following the over-speculations of 1899-90.

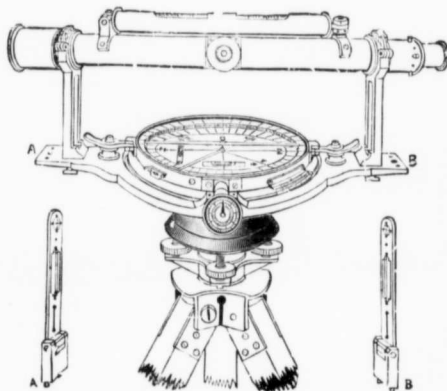
Since our last report, Crow's Nest has been in great demand, the price having advanced from 870 asked and 864 bid, to 885 asked and 880 bid. The majority of this stock is now held by Messrs. Cox, Pollard, Jaffray and Hill, and comparatively few shares are in the hands of the general public.

On the resumption of work on the Noble Five and the reported strike of rich clean ore in the "Last Chance" workings, some demand was occasioned for these shares, and sales are reported as high as 4 $\frac{1}{2}$ ¢.

Winnipeg has advanced, in consequence of the uncovering of eight feet of soft ore in the winze on the second north vein in the 300-foot level, from 6 to 9, with one sale at 10.

A circular having been issued by the directors of the Waterloo Company, suggesting a voluntary assessment of one cent per share in four calls, created a slump in this stock.

There have been no other particular features in the market, prices having remained practically unchanged.



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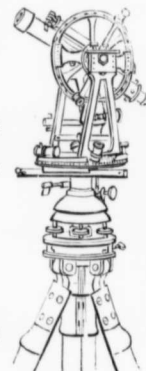
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