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THE MONTH.

AMID the greatest buoyancy of production the mining industry of the province presents features which require the most careful and delicate consideration. The output of ore from Rossland is now over a thousand tons a day, and the output from the Boundary country is now over one thousand

tons a day also. It is only by a comparison with the output of last year that the significance of these figures is realized. The total output of gold-copper ore from both these districts during 1900 was in the neighborhood of 325,000 tons. If the present rate of output during the present year is maintained the total output should be not less than 750,000 tons, or 200,000 tons more than the total tonnage of ore mined in the Province of British Columbia during the year 1900. The other districts of the province would not be required to increase their tonnage much over last year to bring the total for the province up to 1,100,000 tons an increase in tonnage of 100 per cent. following an increase for the previous year of 93 per cent. In other words a

tonnage of 287,343 tons in 1890 should be increased to a tonnage of 1,100,000 tons in 1901 provided conditions remain normal. This is a rate of progress of a most remarkable character. It guarantees prosperity to the mining industry and if to the mining industry then to all the diversified interests of the province which are all dependent upon mining as upon their base.

The proviso, however, that conditions shall remain normal is a proviso which cannot be accepted as certain of fulfilment. The silver-lead and the gold-copper mines of British Columbia are confronted by conditions which, although different in their nature, present a problem similar in its bearings in both cases, a problem by no means certain of solution in the best interests of British Columbia's prosperity.

The silver-lead mines have to solve the problem of mining at a profit in the face of difficult conditions and in competition with other sources of supply in a market glutted with lead. The gold-copper mines, on the other hand, while they have a fairly steady market for copper and an absolutely steady market for gold, are nevertheless obliged, in order to make a profit, to handle a very large tonnage of ore and in order to handle a very large tonnage of ore they must cut the margin above the limit of bare cost of treatment as fine as possible. Both branches of our mining industry are face to face with the problem of economy of production in a tolerably acute form.

It is a noticeable fact that upon a rising market for the material produced, or where there is a wide margin between value and cost of production, the risk of disturbance in the relations between capital and labour is very slight. Labour finds comparatively little difficulty in diverting a larger proportion of the value produced into the wages fund, so long as there is still an extra margin of profit for capital. But the percentage of value diverted into the wages fund during good times is seldom or never restored to the necessity of maintaining an industry during bad times without a severe industrial struggle. The reason for this is, not that workingmen do not realize as much as anyone else that hard times sometimes most seriously injure the legitimate returns of capital, but because their added gains have been applied, and very rightly applied, to increase the standard of comfort in which they live and they will not submit to any curtailment without knowing the reason why. Not only so but the continual pressure of the wages fund upon the value produced in the industry is apt to be maintained at a time when the condition of the market or the resources of the pro-

ductive agency have already reduced the returns to capital below the normal. Then just at the very time when there is the greatest necessity for mutual understanding and forbearance the devils of prejudice, suspicion and distrust are let loose, our very imperfect machinery for the adjustment of the relations between labour and capital breaks down and waste and ruin are the results.

It is a danger of this kind which confronts the mining industry of British Columbia at the present time. How near, how imminent it is, was clearly demonstrated at Rossland last month when a strike was only averted by a narrow vote in the miners' union. Probably we have to thank the perception of the miners that the industry was in no condition to stand further drafts on the returns to capital to augment the proportion paid out as wages that no strike took place. It speaks highly for the moderation of the men that in the face of grievances, which they consider well-founded, (whether they are so or not) they came to the conclusion that the present time was not a suitable time at which to declare a strike. There are times when the advancement made by labour both in the matter of shorter hours and higher pay must come to a temporary halt. There is no danger of the process of advancement ceasing permanently. It has been going on for a long time, ever since the invention of machinery lightened the demands on the individual worker. Nor does this process seem to have reached its conclusion or to be anywhere near it. But it is a process which, like other developments, must be made in recurrent ebbs and flows. There are those who imagine that because labour is the originator and material foundation of all the energies of civilization, therefore civilization should be entirely subservient to labour. But why? The beauty and value of a house does not lie in its foundation, although without it the house could have neither beauty nor utility. So it is with labour the value of our civilization does not lie in ministering to labour, but in the complex energies and enjoyments to which labour ministers. This is quite as true of the labour of the individual working man as it is of the professional man or merchant or capitalist. The workingman it is true stands like Samson with his arms round the pillars of society, and like Samson he can bring down the whole fabric if he chooses. But if he does he must crush himself as inevitably as others. Unless capital is continually restored and added to we are shortly at a standstill and must revert to a simpler variation of human existence from which reversion the workingman is as heavy a sufferer as anyone. It is simply an impertinence to maintain that workingmen as such do not recognize their responsibility to the social fabric to which they are the foundation. They, themselves, form the largest and most important part of it. But in times of stress the limitations of circumstance which surround all human progress are apt to be lost sight of and there are always anglers in muddy waters who delight to stir up strife that they may gratify their vanity or advance their selfish interests by

so doing. In the progress made by workingmen, which has been so marked a feature of the last century, we may say, labour has shown an inevitable tendency to rush forward from one demand to another, until it was forcibly checked and in the process lost, for the time being, some of the gains it had made. When we say forcibly checked we do not mean by bayonets, courts of law or the combined power of capital, but by a force mightier than any or all of these, the limitations of productive resources to give labour more and at the same time replenish and increase the store of capital necessary to our civilization. Some people argue that if that store of capital were not controlled by individuals but by the state, labour could receive more than it does at present. That is more than doubtful, however, it is not the question we are discussing. If labour is not every now and again to butt up against the limitations of some one particular industry, and in doing so to lose ground, there must be a rational understanding of what these limitations are at any particular time. Let the limitations be understood, and in the organizations of the men themselves, the much maligned unions, will be found the authority to prevent strife and disruption. It is precisely here that the beneficial functions of boards of conciliation assert themselves. It is so often said that such tribunals are of no advantage because they possess no forcible sanction for their decrees. To argue thus is to entirely misapprehend the point. Nearly all the strikes and lockouts which have ever taken place could have been avoided by making clear one of two things to the disputants which must, one or other of them, be true;—either that the concession asked could be granted and the capital invested still earn a legitimate profit, or that the concession could not be granted without rendering the industry unprofitable. Prove the former of these two things to the masters and the concessions will infallibly be granted, prove the latter to the men and the demand will infallibly be postponed. In this respect boards of arbitration have been and can be of the greatest possible use, and it is high time some machines of the kind was established in British Columbia, lest our mining industry, face to face with by no means despicable difficulties and problems, should have added the terrible burden of continual industrial unrest, while across its path looms the shadow of a disastrous strike which at any moment may arrest its progress.

In our January issue we called attention to the extravagant methods pursued by the promoters of the Nimrod Syndicate to boom the issue in London, and we further pointed out how grossly the undertaking had been over-capitalized. We have since been placed in possession of certain additional facts in connection with this concern, which are particularly interesting and instructive. According to press announcements, and also, we are given to understand, to a statement which appeared in the syndicate's prospectus, one of the "valuable" assets of the Nimrod Syndicate in

Atlin was described as a rich quartz mine known as the "Imperial Group." The history of the acquisition of this property by Mr. Featherstonhaugh, the manager of the Syndicate, is interesting. The mine was bonded by Mr. Featherstonhaugh in June of last year and during the summer months operations were carried on. Towards the close of August, however, the miners were discharged on the grounds that the ore was no longer showing values and that the vein had faulted or pinched out. On the 1st of September \$3,500 was due on the bond, but the money was not paid over, and Mr. Featherstonhaugh procured from the owners an extension of fifteen days in which to make the payment, at the termination of that period no payment having been made the bond lapsed and the Nimrod Syndicate consequently lost all right or title to the property. In fact Mr. Featherstonhaugh is reported to have stated openly that the mine was valueless and that he wanted nothing more to do with it. He then left Atlin for London. Shortly after his departure the Imperial mine was bonded a second time to the Atlin agent of the Klondike Bonanza Company the original owners receiving a cash consideration to bind the agreement, which was duly and officially recorded, the manager of the Klondike Bonanza at Dawson at the same time notifying his directors of the provisional purchase. Shortly afterwards he proceeded to Victoria en route for London, but on his arrival at the former place was detained in quarantine for several weeks thus delaying considerably his arrival in London. And now we come to the climax of this extraordinary affair. About this time, the end of October, Mr. Featherstonhaugh, of the Nimrod Syndicate, returned to Atlin, having spent only a few days in England, but in the interval he or his syndicate *sold a half interest in the Imperial mine to the Klondike Bonanza Company for \$10,000* and Mr. Featherstonhaugh was entrusted with the direction of operations at the mine by the Klondike Bonanza prior to the arrival of the letter from their manager informing them of the purchase of the mine by him. How the matter was ultimately arranged when the Klondike Bonanza came into full possession of the facts we are not prepared to say, but very probably the Nimrod Syndicate was obliged to refund the \$10,000. The mine was worked during the winter by Mr. Featherstonhaugh, and when the second instalment was due under the conditions of the bond taken by the Klondike Bonanza, the vendors received payment from the Atlin office, while a few days later a remittance to apply on the same account was deposited with a Victoria bank and there it still rests, no instructions having since been received from London for its disposal. On the 31st March the third payment—a considerable one—on the property should have been made, but this was not done, and the original owners have determined to exercise their right to resell the property at the earliest opportunity. If, however, the shareholders of the Nimrod Syndicate could only have divided the \$10,000 handed over for the half interest in the

property they would after all have realized something on their "valuable asset." The only parties to the transaction who can not complain are the original owners, who have been drawing comfortable dividends in the form of payments on bonds which were never consummated; but the experience of the unfortunate Klondike Bonanza is sad to contemplate, for from first to last it seems to have had the worst of the bargain. As an example of the manner in which the business of the average English company is transacted in British Columbia the foregoing leaves little to be desired. That investors should lose their money in consequence would be a matter of indifference to residents of this country, but for the injurious effect that losses of this nature have in preventing the inflow of British capital that is required for legitimate enterprises and development. Fortunately, however, thanks to the awakening interest in the United States in the industrial possibilities of Western Canadian mining, lately intensified by our rapidly increasing metal production, British Columbia is not likely to be entirely dependent on British capital for the development of her resources.

The outlook for an increased production in silver and lead this year, or even for a return as satisfactory as that made by British Columbia mines in 1900, is far from promising. While it is true the average output from the Slocan from January to the end of March does not show a material decrease, lately production has been seriously curtailed by the closing down of several of the more important mines in that division and in addition to this, the recent suspension of operations at the two important East Kootenay mines, the St. Eugene, at Moyie, and the Sullivan, the monthly production from the former of which has of late been considerably greater than the aggregate output of the Slocan district for equal periods, renders the situation so far as the immediate prosperity of this industry is concerned, ominous to a degree. The reasons given as explanatory of the prevailing inactivity in the lead mining districts are several, the principal, however, being the low market prices of the two metals, silver and lead, the higher costs of smelting and transportation, the inadequacy of local smelting facilities and the lack of a market for the product. There can be no doubt that to a certain extent the recent action of the American Smelting Trust has exercised a prejudicial effect on the lead industry in British Columbia, but so far as the St. Eugene mine is concerned this hardly accounts for the sudden suspension of operations, as arrangements had seemingly been made to market the product in Europe. The manager, Mr. Cronin, is meanwhile reported in the local Moyie paper, as having stated that the mine was closed owing to the unsatisfactory state of the lead market. As, however, the St. Eugene earned sufficient profits to pay a dividend of \$105,000 for the first three months of the present year, under such unfavorable conditions as cited, when

the opportunities for lead mining are, as is hoped will soon be the case, more propitious, great developments may be expected from the operation of the property.

A letter contributed some weeks ago by Mr. A. C. Galt, of Rossland, to the local press has been published in a recent issue of the *B. C. Mining Review*, which is circulated in London. The publication of this letter was undertaken for the purpose of endeavouring to induce the government to lighten the taxation on the mining industry—a most praiseworthy object. Circulated as it has been in London, it is likely to have an entirely different effect, that, namely, of giving the mining industry of British Columbia a bad name in quarters where it is most desirable that the industry should have a good name. Mr. Galt draws attention to four categorical statements, the first two of which are true, the third of which is only partially true, the last of which is not true, while the cause, which he alleges for the state of affairs described in the third, is far from being the real and true cause. The statements are (1) that British Columbia is a great mining country; (2) that the mining industry depends on foreign capital; (3) that foreign capital has ceased to flow into British Columbia and (4) that the mining industry is retrograding. The reason, according to Mr. Galt, why foreign capital has ceased to flow into British Columbia mines is because the mining industry is taxed to excess. Mr. Galt adduces figures to show that mining has gone back instead of forward since 1896. Now, any comparison with the year 1896 is an unfair one. For this reason. The year 1896 was distinguished by a purely speculative boom in which vast sums of money were sunk not in mines, but in speculative companies and of course the government derived a temporarily augmented revenue from this speculation just as the British government does from a wave of speculation on the London Stock Exchange. There is only one fair method of estimating the progress of any industry and that is by the amount of wealth produced in that industry. It certainly is remarkable that anyone should be found, in a year when the output of our mines has increased by so tremendous a percentage, to argue that the industry has fallen back. During the year 1900 the output of gold from our metalliferous mines increased 21 per cent., silver 38 per cent., copper 19.5 per cent., lead 206 per cent. The value of our production of metals from lode mines increased from \$6,751,604 to \$10,062,052 or 49 per cent. This does not show any falling off in the industry. Speculation it is true, is not nearly so active as before, and we agree with Mr. Galt, John Stuart Mill and other authorities that speculation is a most valuable factor in obtaining and applying capital. Furthermore the grievances of which he complains such as the hampering of joint stock companies by excessive registration and license fees are real grievances and should be redressed. But when he claims that the taxation on the

mining industry is the primitive cause of the diminished inflow of capital into British Columbia we disagree with him altogether. The reason has rather been that much of the capital invested in British Columbia has never been given a fair opportunity of earning dividends not because of heavy taxation, but because it was either invested in worthless property or in what is almost as bad—grossly managed property. What a ghastly array of failures is represented by the English capital which has been invested (save the mark) in British Columbia mines! Is it any wonder that the English investor is at the present time distinctly chary of British Columbia investments? There is another reason, however. That is that there is at the present time no new excitement in British Columbia. The discovery of mining zones is to some extent an accidental matter. Let a new mineral belt, like the Slocan or Trail Creek, be discovered in British Columbia (such as undoubtedly will be) and there will be the same rush, same excitement, the same inflow of capital as before, because whatever has altered, human nature remains the same. The taxes at present levied upon the mining industry of British Columbia are certainly heavy. They are more oppressive, however, on account of their unequal incidence, than on account of the gross amount levied upon the industry. They have laid the foundation of a princely revenue to the province, and, as the country becomes more developed, may undoubtedly be largely reduced. Meantime there is no occasion for unreasoning pessimism with regard to the mining industry of British Columbia. The facts are all against the pessimists.

The circular issued recently by the Le Roi company must be a great disappointment to the shareholders of that company. Their hopes were buoyed up by the following statements of Mr. Whittaker Wright, at the annual meeting:—

"Within the current quarter we shall be able to pay our first quarterly dividend of a substantial character, and continue to pay dividends afterwards regularly every three months. . . ."

"It is a great pleasure to me to be able to state that, for several months past, and at the present time, after deducting all costs of mining, transportation, smelting, etc., you are earning profits at the rate of 33½ per cent."

"The entire financing of the company has been done by the Bank of Montreal. I believe, at the present time, we are practically even on the account, so that in future profits will be to the good, and, as I have already observed, will be available for dividend in about three months' time."

Yet when the end of the quarter arrived they received not a dividend, but the following circular:—

" In reply to the inquiries of many shareholders, I am instructed by the directors to express their regret that, owing to the non-delivery of machinery by the contractors, due to the severity of the winter, which not only affected transport, but also impeded the erection of the new plant, the completion of the Northport smelter has been delayed. Added to this a breakdown in the old shaft has cut off for the time being, that portion of the mine from which the ore was principally stoped. In view of these facts the company has not been able to liquidate its indebtedness to the Bank of Montreal, and the directors, therefore, feel that they have no alternative but to postpone for the present, the declaration of any dividend."

It is not our purpose to discuss how far Mr. Whittaker Wright was justified in making the statements he did at the annual meeting. That is a matter be-

tween the shareholders and himself, and not one in which the mining industry of British Columbia is greatly concerned, except inasmuch as the failure to justify dividend anticipations will undoubtedly affect the standing of British Columbia companies in an injurious way on the London market. Of course the English financial papers have been saying very harsh things about Mr. Whittaker Wright. One paper estimates the profit which the Le Roi must have earned and asks with dramatic emphasis, "Where is the money?" But there is, we think, a plausible explanation of the situation, in fact the circular of the company expresses it. The money is lying at Northport in the State of Washington in the shape of a large pile of unsmelted ore which, through the failure in the delivery of machinery, the company has been unable to smelt. During the last six months the Le Roi company has been very possibly applying the proceeds from the sale of matte to the following objects:—

1. Liquidation of the overdraft at the Bank of Montreal, in other words paying off the borrowed capital of the mine.

2. Paying the running expenses of the mine including the cost of mining and transporting a large tonnage of ore which it has not been possible to smelt for the reason given in the circular.

So that the ore pile at Northport owes the company not merely the profit which is in it, but also the cost of mining that ore already liquidated, a charge probably amounting to \$3.50 a ton.

Of course it might have been possible to borrow money on that ore for the purpose of paying a dividend but this would have been most unsound finance. The Bank of Montreal was in a position to prevent any distribution of as yet unrealized profits and has doubtless done so.

We fail altogether to see why, if a company is floated to work a mine with altogether insufficient working capital and the money subscribed all goes into the vendors' or promoters' pockets, the company's shareholders should expect dividends until the expenditure necessary to earn them has been met; nor why the financial institution, which has made the necessary advances, should postpone its lien upon the resources of the property to the payment of dividends to the shareholders, especially in view of possible labour troubles which may increase the demands upon that institution.

The position of the mine is perfectly sound. It is working on a very satisfactory margin of profit. Nor is it likely to cease working at a satisfactory profit for a very long time to come. There may be circumstances in connection with the Le Roi company which reflect upon the financial management of its promoters. But there are no circumstances in connection with the Le Roi mine itself which do not reflect the highest credit upon its efficient and economical management.

What may be called the sudden liquidation of the Granite Mines Ltd., is a curious commentary on the

uncertainty of mining. The Granite Mines Ltd., is a subsidiary company of the Duncan Mines Ltd. The company operated a group of free-milling gold claims in the Nelson district and has only been in existence for two years. As a promotion it had the support of the critical financial press. It possessed every qualification on which the English investor is disposed to stake his money. It was favourably reported on by two experts of repute, one of whom was Mr. Hardman, of Montreal. It was found to work properties which were alleged to be not prospects but developed and proved mines. The supposed average of the ore was placed at somewhere in the neighbourhood of \$28 a ton and the demands made by the promoting syndicate upon the market were moderate. Yet in spite of all this an extraordinary general meeting of the shareholders has been called for May 6th, for the purpose of passing a resolution for the liquidation of the company on the ground that it has been proved "to the satisfaction of the company, that the company cannot, by reason of its liabilities, continue its business." Such a declaration, emanating from the management barely two years after the mine was floated, naturally gives rise to disappointment and disgust in the minds of the shareholders. This mine was subjected to an exhaustive report by Dr. John E. Hardman, S. D., of Montreal. Upon the strength of his report the public was invited to subscribe to the shares. We presume that an engineer may report upon a developed mine, may describe it in favourable terms and within two years that mine may be unable to continue in business without that engineer having been mistaken in his report. But if so the financial basis on which the mine was floated, must have been singularly inadequate or the management of the mine grossly incompetent.

In any case the concern has found its way into liquidation with inexplicable rapidity. After a painful interval the company may, perhaps, be reconstructed and the mine become a productive and profitable property. We sincerely hope so. There has, however, been something very gravely wrong. What that has been the indignant shareholders may be trusted to find out on the 6th of May.

The affairs of the Dominion Mining, Development & Agency Company do not appear to be, by any means, in a satisfactory condition. The directors are now endeavoring to obtain additional capital to the extent of £10,000 by an issue of debentures, but it is more or less doubtful whether the effort will meet with any response. In addition to operating in British Columbia mines among which, by the way, are one or two fairly promising properties—this company has also engaged in enterprises of a commercial nature in the Canadian Northwest. One of these enterprises was the purchase of reindeer skins with the hope of reselling at a large profit in the Yukon. Unhappily the remunerative side of the undertaking did not fulfil ex-

pectations, and instead of a profit the company was called upon to face a loss of nearly thirty-five thousand dollars. We do not say that the failure of the reindeer skin contract is entirely responsible for the company's present position, but we maintain that had this loss not been incurred it would have at least deferred the possibilities of liquidation, or at best reconstruction, until perhaps a more opportune moment. The proverb "It never rains but it pours" has lugubrious point in its present application to the affairs of British Columbia mines on the London market, though whether an unsuccessful deal in reindeer skins can rightly be ascribed to the worthlessness of mineral occurrences in the province can remain an open question. It is fair to add that the Dominion Mining Development & Agency Co. has a large holding of shares in the Kettle River Power Company, which may prove a very valuable asset while ultimately the Queen Bess may pay respectable dividends, and the prospects in Athlun are by no means unpromising. Hence it is quite possible that with ordinary luck and providing the present difficulties are tidied over, the chairman of this company may have a more satisfactory statement for the shareholders at the next annual meeting.

Mr. J. McEvoy, of the Canadian Geological Survey Department, has prepared an interesting and very complete report on the Crow's Nest coal fields. This report, which is the third that has been issued on the subject, justifies the estimation formed by Dr. Selwyn in respect to the enormous extent and value of the measures, it being computed that there are available 22,000,000,000 tons of possible working coal of exceptional coking character while the fields are so situated as to be in the centre of a metalliferous mining area whose boundaries are rapidly being extended. The report, however, proceeds to state that great skill and care will evidently be needed in properly developing and fully utilizing the field, which in some respects presents peculiar conditions. The highly bituminous character of the coal, already gives evidence that very effective ventilating apparatus will require to be installed as the workings extend, in order to avoid dangerous accumulation of gas. The great thickness of some of the seams, with the often tender character of the coal composing them, will present difficulties in the way of cheap and complete extraction; while the fact that levels run in the seams from the bottom of the intersecting valleys are at a depth of 3,000 feet or more below the general level of the intervening plateau-like areas, may probably render it necessary to contend with exceptional pressure upon the workings as these progress. The output of the Crow's Nest Pass coal mines is at present nearly 2,000 tons per diem. Coking ovens to the number of 360 are in operation and large additions are in contemplation.

The agreement between the Crow's Nest Pass Coal Company and the Dominion Government, in conse-

quence of which opposition was removed to the granting of a railway charter to the Crow's Nest Southern, is very wisely drawn and will undoubtedly effectively protect the British Columbia smelting interests against any possible discrimination on the part of the coal company. Under these circumstances the construction of the branch line from Fernie southward, to the international boundary, is desirable in the extreme and should be directly instrumental in creating an unprecedented industrial development and activity throughout that section of the country. Under the terms of the agreement the coal company is obliged, under a penalty of \$3 per ton of coal or coke sold for consumption outside of Canada, not to discriminate against the Canadian consumer, neither in regard to the prices at which coal or coke shall be sold, nor by the action of the railway company respecting the cost of transportation rates or otherwise. It is, however, provided that in the event of "effective and satisfactory" competition by other coal and coke producers in Canada, the agreement may be suspended.

In a bill, just brought down by the Hon. the Minister of Mines, amending the Mineral act, several important changes are introduced. One of these is drawn up on lines suggested in the MIXING RECORD some months ago, and provides against the immediate forfeiture of mining property by the failure either on the part of an individual or a joint stock company to renew a free miner's certificate at the time of its expiration. By taking advantage of the provisions of this clause, the individual owner of mining property may renew his certificate within six months from the date of the lapse, by payment of what amounts to a penalty or fine of ten dollars or in all fifteen dollars, purchase a special free miner's certificate which has the effect of reviving his title to property, which under the present law would be forfeited. In the case of a joint stock company the fee is placed at three hundred dollars. Another admirable substitution, manifestly in the interest of the prospector, provides that work on the construction of roads or trails in the immediate vicinity of a claim shall be allowed to apply in lieu of assessment on the property, if permission is first obtained from the gold commissioner or mining recorder of the district in that regard. The other proposed changes are not particularly important, though section 14 of the amending act is perhaps open to objection and criticism. It reads as follows:—

In every application for record of a mineral claim located by an agent on behalf of another free miner shall appear the following paragraph:—

"That on the _____ day of _____ 19____, a power of attorney authorizing me to locate and record the said claim on behalf of the said _____, was recorded in the office of the Mining Recorder at _____, and that I located and applied to record the said mineral claim in the name of the said _____, and that the said claim was located for his sole and only use and benefit, and that I have no interest, express or implied, therein."

The question is here raised, what constitutes an agent? In the case when a prospector is "grubstaked" to locate mineral claims for another, is he not

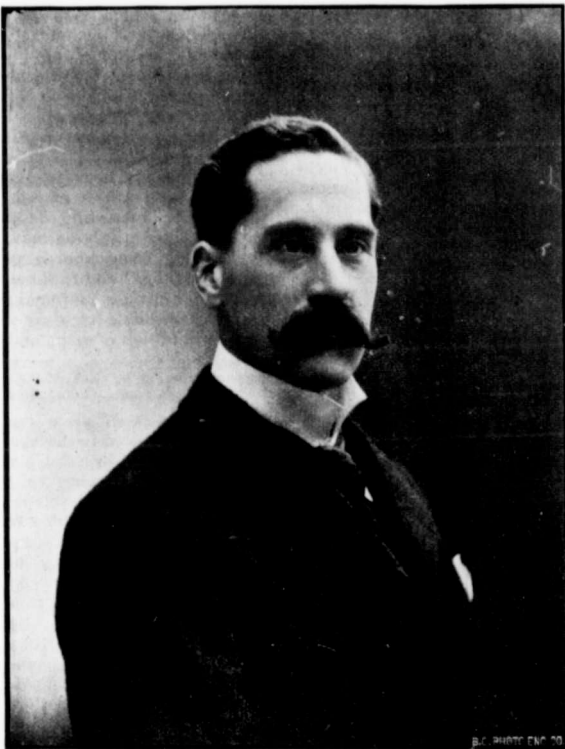
acting in the capacity of an agent, notwithstanding that the arrangement is invariably made on partnership terms. It seems to us that it is not desirable to limit the earning powers of the prospector, a result, which if this section is embodied in the act, it is likely to have. The object no doubt is to aim a blow at the promiscuous staking of claims in one locality and the holding of them under the present pernicious system of abandonment and relocation, whereby the requirements of the act in the matter of assessment work is avoided. But if this surmise is correct a less clumsy and probably more successful method could, we think, be devised to restrict the practice.

Mr. J. W. Astley, whose portrait we reproduce on this page, is a mining engineer of recognized ability and of extensive and varied experience gained during the past fifteen years in the mining states of Montana and Idaho and lately in British Columbia. For a considerable portion of this period, nearly a third, he was connected, in an important capacity, with the Drumlomond Mine, at Marysville, Montana, where the problem of the profitable operation of low-grade ores has been most successfully solved. In 1896 Mr. Astley came to Rossland to undertake the charge and administration of Mr. F. A. Heinze's mining investments in this country, and he also reported on mines and properties for that well-known mine operator and millionaire. After Mr. Heinze disposed of the Trail smelter and his other interests in British Columbia Mr. Astley accepted an appointment as consulting engineer to the British Columbia (Rossland and Slocan) Syndicate, Ltd., of London, one of whose properties, the promising Snowshoe mine, at Phoenix, was described at length in last month's issue of the MINING RECORD. Like the majority of mining engineers of real ability Mr. Astley has the reputation of being extremely cautious in his judgments and conservative in his utterances, and it is men

of this stamp that will be most useful in placing our mining industry in the sound and substantial position it is destined ere long to occupy.

The mining communities of not only the United States but of Canada have much cause to deplore the death, which occurred suddenly in New York on April 18th, of Mr. Richard P. Rothwell, editor of the *Engineering and Mining Journal*, a periodical which bears the reputation of being the foremost technical mining

publication of the world. Mr. Rothwell not only a successful journalist but was a mining engineer of distinguished attainments. As the organizer of the American Institute of Mining Engineers in 1871, and the editor and publisher of the annual publication, "Mineral Industry; Its Technology and Trade." His name and great services will long be held in grateful and appreciative remembrance by the mining world.



MINING MEN OF THE PROVINCE—MR. J. W. ASTLEY, M.E.

It is our pleasing duty to again congratulate the directors and shareholders of the Ymir Gold Mines on the close of another year of successful and, all things considered, eminently satisfactory achievement attending the operation of the Ymir mine. As will be seen from the report published elsewhere in this issue, during the past twelve months the capacity of the mill has been doubled and other plant installed, the entire cost having been defrayed out of profits. The balance sheet moreover shows that a net profit of £30,000 was earned after distributing £20,000 in dividends. The mine, too, is in a substantially better position than at any previous period, the development work of the past year having proved continuity of the vein at greater depth and added considerably to the ore reserves. An additional source of revenue may also be expected this year from the application of the cyanide process to the treatment of the tailings, experimental tests in this direction having

given excellent results. While the Ymir mine is undoubtedly a valuable property, its successful operation is in no small measure due to the fact that this has been conducted on businesslike lines and under the direction of capable and competent men. Were these requirements complied with in every instance there would be relatively few failures among London promoted undertakings in British Columbia.

RECENT PUBLICATIONS.

Chemistry, Its Evolution and Achievements. By F. G. Wiechmann, Ph. D., New York, Wm. R. Jenkins, 1899. 12 mo; Price \$1.00.

THIS little book is described by the author as a sketch. It is an appropriate designation. But though merely a sketch the lines have been drawn by an artist thoroughly at home and in love with his subject. As a brief history of the growth of chemical science from the earliest record of its inception to latter-day discovery and accomplishments, Mr. Wiechmann's work is deserving of unqualified commendation. While the book is written in a popular style and is therefore adapted to the limitations of the non-scientific reader, it contains much matter of value and utility for purposes of reference to the advanced student of the science.

Topographic Surveying, including geographic, exploratory and military mapping, with hints on camping, emergency surgery and photography. By Herbert M. Wilson, geographer, United States Geological Survey; member American Society Civil Engineers. Illustrated by 18 engraved colored plates and 181 half-tone plates and cuts, including two double-page plates. New York, Wiley & Sons. Pp. xxx plus 900. 8vo, cloth. \$3.50.

In the above work, an attractive volume of 900 pages, Mr. Wilson has laid before the public such a clear and exhaustive view of the theory and practice of topographic surveying as we might have hoped for from an adept in the art of grasping and representing the salient features of one's surroundings.

Adopting as his system the common-sense plan of advancing from the single to the complex he applies his opening chapters to a differentiation of the various classes of surveys—their uses costs and comparative values.

Having thus succeeded in capturing the interest of his reader, whether engineer, traveller, scout or prospector, he proceeds to unfold and explain in detail the methods of carrying to a completion the field work, office calculation and maps of surveys—introducing formulae, mathematical tables, descriptions of instruments, etc., as they occur in the scheme of operations, and not, as is often done, throwing them into an appendix to be listlessly scanned by the student when their *raison d'être* is forgotten.

Plain talk, stadia, barometric, photographic and geodetic surveying — map projection, astronomic observation including photographic lunars—all are treated and illustrated so fully as to make the work not only a valuable addition to the surveyor's library, but a guide and instructor that no enterprising trail blazer should be without.

It is almost matter for regret that so many well-executed plates, in black and colors, should be included in a volume which, despite its library binding and finish, is so evidently destined in the majority of cases to become a field book—but on the other hand the would-be F. R. G. S., calculating the latitude of his lonely camp fire, or reducing to diagram his track survey of northern

rivers and lakes, will not complain at finding the dry desert of mathematical tables irrigated by a pleasant flow of readable instruction and lucid diagram.

Among those features in Mr. Wilson's book which are not altogether indispensable but eminently interesting, we might mention a glossary of topographic forms, unfolding to Europeans the true inwardness of such terms as "Muskeg," "Gulch" and "Hog-back" and familiarizing the American with "Dune," "Fumarole," "Esker," etc.:

A list of works on surveying, topography and geodesy; a chapter on camp equipment and supply; a chapter on camp health, illness, accidents and surgery; a chapter on photography, and much to our delight a geometric demonstration with exhaustive diagrams, of the Diamond Hitch.

The whole carefully indexed and provided with a table of contents, and some 200 illustrations, leaves little to be desired, and so far the only faulty characteristic we have observed is a limiting of tabulated azimuths, etc., to 50° north latitude a species of snub to which the Atlin and Klondike traveller is hardened by experience.

In congratulating Mr. Wilson on his success and recommending his book to our readers we cannot too strongly urge on those travellers who are able and willing to write interesting descriptions of their explorations in comparatively unknown fields, the advisability of acquiring some knowledge of how and when to "shoot the sun" and to take such notes of the physical features of their journeyings as will enable them to crystalize the value of their written observations by a judicious addition of maps and sketches.

Summary Report of the Geological Survey Department for the year 1900, King's Printer, Ottawa, 1901. Price 10 cents.

This report is of more than usual interest, much space being devoted to the account of recent exploration in sections of British Columbia and the Northwest, concerning which, owing to the promising result of preliminary mining development, information is especially now desired. We refer particularly to Mr. McConnell's report of his investigations in the Yukon territory, the valuable data he supplies in respect to the coal areas near Dawson and in the White Horse district; and also the information on the copper deposits in the latter region. Speaking of the possibilities of mining at White Horse, Mr. McConnell thus sums up: "The district, taken as a whole, may be characterized as one of considerable promise and as being well worth the attention of mining men. It is situated only 110 miles from the sea, with which it is now connected by rail, and the expenses of mining need not be much greater than in the camp of Southern British Columbia." The report on the Yukon is followed by one on the Atlin district by Mr. J. C. Gwillim, and this by a report by Mr. W. R. Brock upon the work done by the survey during last summer. The only portion of West Kootenay now remaining unsurveyed includes the area lying between the longitude of Rossland and lower Arrow lake, the north fork of Kettle river, the head of the main Kettle river and part of the area east of Kootenay lake. Mr. J. McEvoy's interesting report on the Crow's Nest Pass coal area is commented on elsewhere in this issue. In addition to the reports on the geological work carried on in the other provinces, an interesting account is also given of the Canadian mineral exhibit at the Paris exhibition and we note that Mr. A. K. Stuart's article, which appeared in the January and December issue of the *MINING RECORD*, on this subject receives appreciative mention, an extract therefrom being included in the departmental report.

THE AURIFEROUS QUARTZ DEPOSITS OF SOUTHERN BRITISH COLUMBIA.

(Written for the B. C. Mining Record by J. D. Kendall.)

BRITISH COLUMBIA possesses valuable deposits of this character, but, hitherto, very few of them have been worked with either energy, capacity or adequate capital. A number have been operated in a small unworkmanlike way, for stock purposes, but these should not be considered as mining ventures — for really they are not — and therefore their failure is no reflection on this division of the mineral resources of the Province.

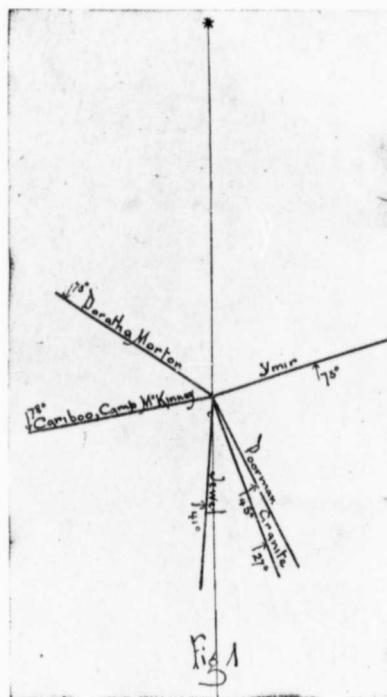
The chief hindrance to the development of deposits of this class in B. C. has been lack of capital. Unfortunate British investors will, on reading this, probably exclaim "What has become of all our money? We have subscribed to numerous British Columbia mining enterprises at different times, but in only a few instances have we been successful." By way of anticipation let me say that relatively little British money has been lost in auriferous quartz mining, and even that little must be debited to bad management or something worse rather than to lack of opportunity. Strange as it may seem, the losses that have been incurred by investors from this side of the Atlantic were in connection with minerals and districts out of which Americans have made large sums of money. I have in a previous *communication, pointed out why the latter are often successful where Englishmen fail, and I would here further remark that British Columbia, as a field for British mining investment, stands on quite a different footing from other important fields, such as Australia and New Zealand or even South Africa. In these the English investor has matters very much his own way, but in B. C. it is not so. There he has to compete with the American who had the important advantage of being first in the Province, is always on the spot, and who, besides, is keener commercially, though less thorough technically, than the Englishman. If we are to survive in such a struggle for existence we must improve our commercial methods. We must not send men out to purchase mining properties who are utterly ignorant of mining, as we have done. We must not buy on vendor's reports, as we have done. We must not build mills and smelters, when we have not sufficient money in hand or at command for mine development, as we have done. We must not build mills before we have a mine, nor leave the selection of treatment processes to men who are mill builders only, as we have done. We must not send out to manage properties, men in whom we have so little confidence that they are little more than puppets worked from this end, as we have done. Even if it be from a School of Mines. Mining can only be learned in the mine although a knowledge of it is more rapidly and thoroughly reached if the preliminary training has been of the right kind. We must pay more attention to mining and less to the share market, think more of dividends earned from the sale of mineral and less of those realized by the manipulation of stocks. The man who says "Oh, damn dividends, I want a quicker way of making money than that," will probably disagree with the last remark, but for the benefit of the community, it should never be forgotten that in stock transactions money simply changes hands — " 'twas mine, 'tis his" — whilst by the opening up of a mineral deposit which can be worked at a profit, new wealth is created and the country, as well as the shareholders, to that extent benefitted.

To some it may seem as if several of the errors above

* Southern British Columbia, as it appeals to and affects the Prospector and Miner, the Speculator and Investor.

alluded to are technical rather than commercial. In certain cases the final and decisive error is technical, no doubt, but the initial and controlling mistake is commercial as, for instance, in the selection of an incompetent manager who, when installed, acts in ignorance, or regardless, of regular recognized methods.

But to return to the alleged neglect of auriferous quartz mining. The successful mines of British Columbia, speaking generally, have been largely developed by men of small capital. In order to make the little money they had go as far as possible, they confined their attention to deposits yielding mineral that could be marketed without treatment, so that all the ore got in development was at once converted into money, to assist in further development. In this way Le Roi, War Eagle, Payne, Ruth, Idaho and Whitewater were



developed, as well as many others that might be named. Auriferous quartz veins were more or less neglected because their product must be milled before it can be sent to the market and therefore a much larger capital is needed to work them than in the case of high-grade silver-lead or gold-copper, sufficient in fact for both development and equipment. This is the only reason for the past comparative neglect of the deposits under consideration, by the class of men who have done so much toward opening up the silver-lead deposits of the Slokan. Capital properly expended has an extensive and profitable field of operations in the auriferous quartz deposits of British Columbia.

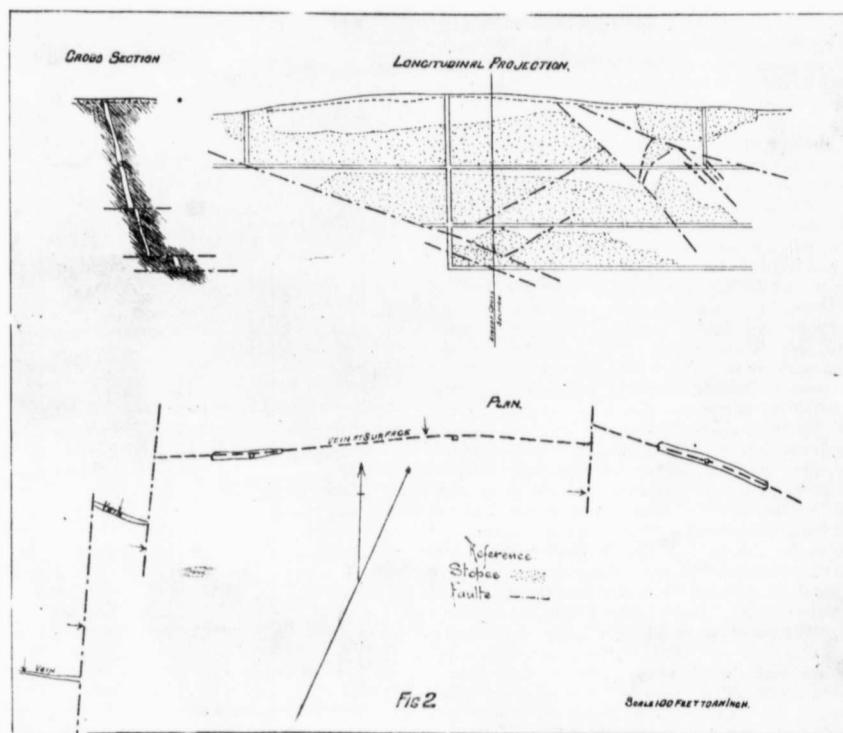
THE EARLIER LOCATIONS.

The first claims of any importance that appear upon record are the Cariboo and Amelia, located in the district now known as Camp McKinnon. The former claim was recorded on the 3rd May, 1887, by A. McKinnon and F. Rice, the latter on the same day by W.

J. Burnham and G. LeFevre. The Okanagan, Alice and Emma, adjoining were recorded on the 9th May in the same year. On 29th April, 1888, McKinney and Rice sold the Cariboo claim to James Monaghan for \$50,000 who also, about the same time, acquired an interest in the Amelia. The first assessment of work on the Cariboo was recorded 24th Oct., 1887.

The opening up of the vein on which these claims were placed was slow, mainly on account of the lack of capital, but also because of the inaccessibility of the district at that time. In the report of the Minister of Mines for 1892, it is stated that "nothing more than assessment work has been done in this camp during the season—owners are awaiting the construction of a wagon road across the mountain to Kettle River, when

ing Co. have five claims—Poorman, Hardscable, Eagle, Hardup and Kootenay. A tunnel has been run for 130 feet, intersecting the lode at 87 feet from the surface. The machinery, comprising a 10-stamp mill and four free (Frue?) concentrators of five tons capacity each, was floated down the Kootenay river on rafts, as far as the natural obstructions of the river would permit, to a suitable place for its landing, whence a wagon road $2\frac{1}{2}$ miles long was constructed to a site prepared for its erection. The building is being put up and the machinery, which will be worked by water-power will be in a position to commence work in the spring." The mill above referred to was built in 1890 and has been operated at more or less protracted intervals since, as the mine was worked by fits and starts. Recently the



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machinery can be brought into the camp and work commenced at once." The same authority, in the 1893 report says: "At this camp about \$1000 have been expended in sinking an air shaft 61 feet deep, to tap the tunnel on the Cariboo, by Messrs. James Monaghan & Co., of Spokane, and it is reported they intend bringing in a mill to work their property." The mill was built shortly afterwards and the first shipment of bullion took place in April, 1894. Since that time the Cariboo mine has been a regular producer.

Another early location was the Poorman on Eagle creek, which enters the Kootenay river about six miles west of Nelson. That claim was recorded on the 7th May, 1888, and several adjoining claims were recorded about the same time. In the report of the Minister of Mines for 1889, it is stated that "the Eagle Creek Min-

ing Co. have five claims—Poorman, Hardscable, Eagle, Hardup and Kootenay. A tunnel has been run for 130 feet, intersecting the lode at 87 feet from the surface. The machinery, comprising a 10-stamp mill and four free (Frue?) concentrators of five tons capacity each, was floated down the Kootenay river on rafts, as far as the natural obstructions of the river would permit, to a suitable place for its landing, whence a wagon road $2\frac{1}{2}$ miles long was constructed to a site prepared for its erection. The building is being put up and the machinery, which will be worked by water-power will be in a position to commence work in the spring." The mill above referred to was built in 1890 and has been operated at more or less protracted intervals since, as the mine was worked by fits and starts. Recently the

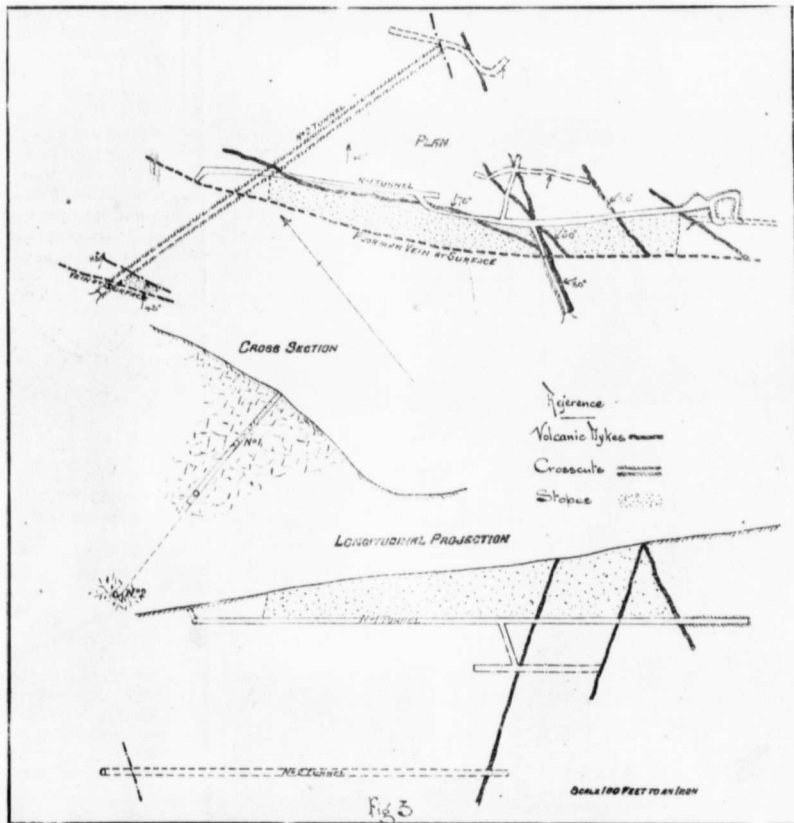
mine has been acquired by the Granite Co., so perhaps it may be developed on a scale more likely to bring commercial success than the petty pottering of the past. The O. K. claim near Rossland, was recorded on the 12th July, 1890, a 5-stamp mill was erected on it in 1894, and in 1896 10 stamps were going, but the mine was abandoned in 1898.

In 1892 a 5-stamp mill was erected at Fairview by the Rattler Co. and ore tested from the Brown Bear, Stemwinder, Wyn M., Silver Crown, Morning Star, Wide West, Joe Dandy and Rattler. Since then the Fairview mines have been worked very irregularly and in a small and unsatisfactory way. At no time have they been taken in hand with the energy and capacity likely to produce an economic success. Several mills have been erected but not one of these was justified by

the mine development at the time and they now stand idle, serving merely as monuments of technical rashness and incapacity or as costly reminders of the reprehensible methods of stock boomers and their so-called expert allies.

More recently, and in other parts of the Province, a number of veins have been worked. Some have been opened up satisfactorily, others have been great disappointments. Both kinds will be dealt with in the sequel because even in failures there is usually something to be learned, often more than from the greatest success, technical or commercial.

less than 1 to 8 per cent, considering each deposit as a whole, but there are limited parts of some of the deposits in which the percentage of the base metal sulphides is very much larger. In one case the percentage was so high in the part of the vein first opened up that, in the usual haste to have a mill, it was almost decided to build a coarse concentration plant for the treatment of the ore, when, fortunately for the company concerned, more judicious counsels prevailed and further development was undertaken before coming to a decision as to treatment. The additional work shewed conclusively that the great bulk of the ore was of such



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SOME GENERAL FEATURES OF THE DEPOSITS.

Form.—All the deposits hitherto worked are either what are commonly called true veins or bedded veins, the latter, when they happen to have a low inclination, being known in the Province and adjoining areas as "blanket" veins.

Direction and Hade.—These are quite as variable as in the deposits of silver-lead and auriferous and argentiferous copper ores, already noticed by the author. Fig 1 will make the variations evident at a glance.

Inner Nature.—The bulk of the deposits consists of quartz, with which are associated sulphides of one or more of the base metals, in proportions ranging from

character that it could be best treated by amalgamation and fine concentration, the relatively small proportion of ore which, in the early days of development, suggested coarse concentration being afterwards hand sorted.

Here we have an additional reason for delaying the erection of a mill until the deposit it is intended to serve has been adequately developed. It cannot be too often asserted—at least to those whose aim is legitimate mining—that the erection of treatment plant before there is a sufficient quantity of ore blocked out to pay for it, is simply a form of gambling. We know it is sometimes said that all mining is a gamble, but that is a libel. Mining is certainly not free from gambling, nor is

fact is any other form of business. When a man opens a grocery or other store—even in a good thoroughfare and with capable management—he cannot be sure of securing sufficient custom to make a profitable business. To that extent he is gambling and all kinds of business afford similar and other instances. If any ordinary business is started in an altogether unsuitable locality, or is directed by someone who does not understand the elements of the business, the gamble is so much more great and failure consequently more probable. So it is with mining. But the most reprehensible and deplorable gambles connected with mining have been those entered upon in that spirit of recklessness which leads men to pay down large sums of money for mere prospects, to invest then investigate, to buy on vendor's reports, to enter upon costly schemes of development that are not justified by facts of either observation or interference, to erect treatment plant before they have a mine and to do other similar acts of foolishness. Most mineral districts furnish examples of such methods, some more than others.

not entirely free, whilst that in some of the base metal minerals is very often so.

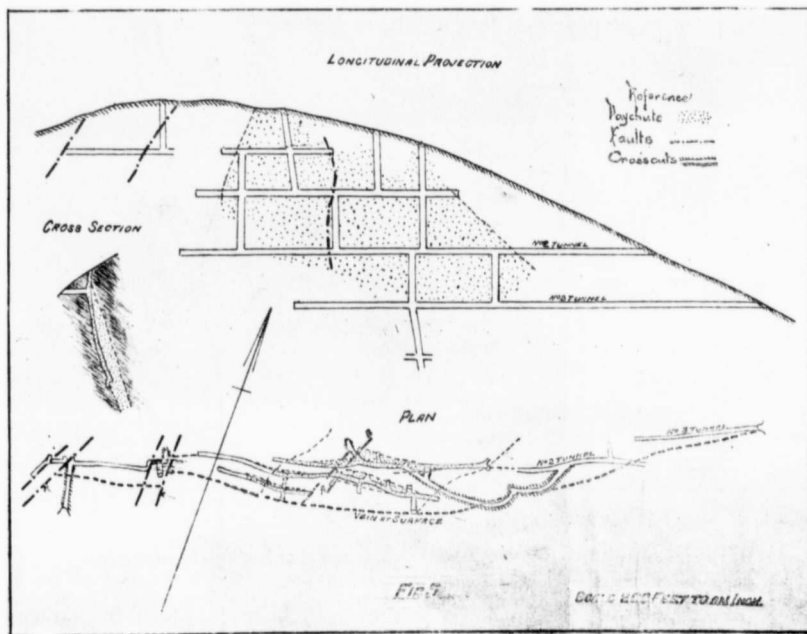
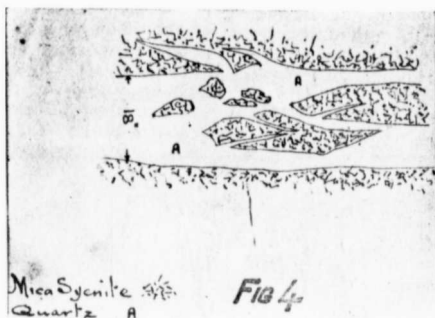
Country Rock.—Here also great variation is found, as will be seen when we come to details. The prejudice, which often exists in favour of a particular kind of country rock finds no encouragement here, acid and basic, volcanic and plutonic, crystalline and classic rocks in different areas, forming one or both of the walls of auriferous quartz deposits.

SOME MORE OR LESS DEVELOPED MINES.

In selecting examples, the object is rather to illustrate geological features of the deposits than their commercial importance, although as a matter of fact two of the mines to be noticed are most important of their kind in the Province.

Cariboo Mine.—This mine is in Camp McKinney, at an

altitude of about 4600 feet, and, as already pointed out, is the oldest mine, yielding auriferous quartz, in the Province. The deposit occurs in the form of a vein. Fig. 2 gives a plan of part of the vein shewing its direction and the manner in which it is faulted. The longi-



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It need not therefore surprise us that mining is, in some minds, more or less synonymous with gambling.

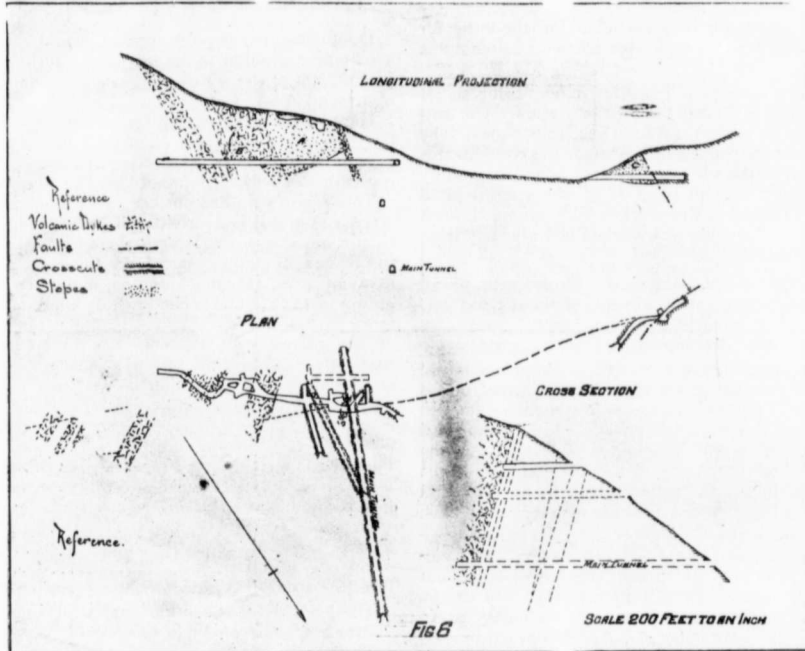
But to return from this digression, the gold in these deposits occurs partly in the quartz and partly in the sulphides of the base metals, in varying proportions in different deposits. The gold in the quartz is mostly if

tudinal projection and the cross section shew a number of other faults not seen on the plan, and also the extent of the stopes at the time the writer last saw the mine. Since these drawings were prepared the workings have been carried much deeper and more to the east, the operations being confined to the down side geologically

(the upper side absolutely) of fault B. The country rock is an altered argillite. In the area shown in the longitudinal projection in Fig. 2—to which the following remarks more particularly refer—the vein varied in width from 12 to 96 inches, the average being about 50 inches

give precise figures. The value of the ore obtained from the area shown in the longitudinal projection was :

	Gold, Ozs. per ton.	Silver, Ozs. per ton.
Amalgamable .....	.699	.40
In concentrates .....	.093	.12



Reduced one-third from original drawing.

es. The base metal minerals accompanying the quartz were pyrite, galena and blende. Prior to 1897 they formed about 2½ per cent. by weight, of the total contents of the vein. Since then they have increased as the mine was deepened. In 1898 they were 3.4 and in 1899 4.8 per cent. About 90 per cent. of the vein was quartz, the remainder being inclusions of country rock. The sulphides of the base metals were in the following proportions : Pyrite 10, blende 2, galena 1. The gold occurs partly in the quartz and partly in the base metal sulphides. 15,915 tons of ore yielded by amalgamation 17,751 ozs. bullion, of an average fineness of 627 gold and 364 silver. The concentrates as shipped gave : Gold, average 3.72 ozs. per ton (variations 3.04 to 4.69) and silver, average 4.89 ozs. per ton (variations 3.9 to 6.2) iron 35 per cent. zinc 10 per cent. and silica 9 per cent., or, per ton of ore, gold .003 and silver .12 ozs. per ton. The loss in tailings would be probably be about .13 ozs. of gold per ton and .16 ozs. silver per ton. No account was kept of the value of the tailings so that it is impossible to

In tailings (estimated) .....	.130	.16
	.022	.08

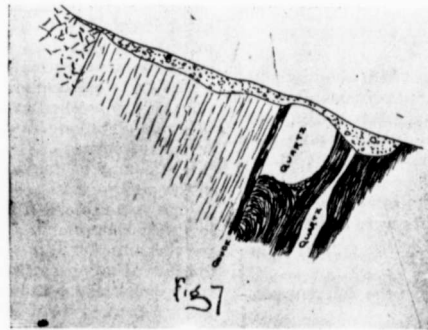
The gold associated with the base metal minerals was largely free as shown by the following assay results of concentrates after amalgamation :

	Gold ozs. per ton.
Concentrates which stood on 60 mesh sieve contained	5.0
Concentrates which passed 90 mesh sieve contained	1.5

By way of throwing additional light on this matter a quantity of ore, taken at random, was crushed in the laboratory to pass 20 mesh and concentrated. The concentrates that would pass 100 mesh and 40 mesh were afterwards sieved out and the three sizes thus obtained subjected to amalgamation with the following results :—

	Gold ozs. per ton.
Between 40 and 200 mesh yielded	1.5
Finer than 100 yielded	4.0

The concentrates before sieving and amalgamation contained 6.75 ozs. of gold per ton and 5.75 ozs. of silver per ton so that the pulp, finer than 100 mesh, yielded to amalgamation over 59 per cent. of its gold contents.



The base metal minerals are distributed through the quartz in more or less regular bands parallel to the walls of the vein.

A little coarse visible gold was met with in the area shown in the longitudinal projection, Fig. 3.

As a rule there is a well defined and regular line of separation between the vein matter and the country rock, but in places the former extends into the latter for several feet, either as simple branches or as complex reticulations.

There is a 20-stamp mill on the mine. Prior to 1st Oct., 1898, only 10 stamps had been erected. The output for 1898 was 7,530 tons, for 1899, 12,670 tons. The ore is amalgamated and concentrated, the concentrates being shipped to the smelter. Dividends were paid by the old company prior to June, 1897 which aggregated \$188,965. The recent financial results are not known to the writer. The mine has worked continuously from 1894 to the present time.

Poorman Mine.—This mine is on Eagle creek, about six miles from Nelson, at an altitude of about 3,200 feet. It was worked in a most irregular manner by its late owners and neither developed nor equipped properly.

The country rock is mica-syenite. Three veins have been worked on the property. The principal one is known as the Poorman. Another lies about 140 feet to the west of the Poorman and parallel to it. The third is called the White and is about 1100 feet east of the Poorman and nearly parallel to it. The White is in the same line as the granite vein and may be part of that vein, but their identity had not been demonstrated when the writer last visited the mines.

The Poorman vein is intersected by several small volcanic dykes some of which shift it, whilst others cut through it without affecting it in any other way. The work done on the Poorman vein is shewn in Fig. 3. In that part of the vein, there shewn as opened up, its width ranges from a fraction of an inch to about 5 feet, the average being about 26 inches.

There does not appear to be any complete account of the bullion obtained from this mine, but the 1892 report of the Minister of Mines stated that "\$10,000 has been taken out of this mine in free gold during the last summer" and from assay certificates seen by the writer it appears that \$27,980 worth of gold and silver was obtained from the mine between July, 1892, and Dec. 1893, but no mill records were kept. It is therefore impossible to give reliable details as to the average results obtained in milling.

The ore consists mainly of quartz with about 2.9 per cent. of sulphides—mostly pyrite, but occasionally some galena and blende occur. In the quartz of the upper part of the vein a considerable quantity of visible gold was found.

From a number of assays made of samples taken at points where the ore was accessible in the upper tunnel the average gold and silver contents were as under:

Gold, .95 ozs. per ton, ranging in the different samples from .17 to 4.75.

Silver, .64 ozs. per ton, ranging in the different samples from .08 to 2.99.

A sample of the tailings of this ore (from dump as the mill was standing) gave .22 ozs. gold.

A sample of ore taken from the short length of vein exposed in the lower tunnel gave:

Gold, .625 ozs. per ton; silver, .575 ozs. per ton.

An amalgamation and concentration test (30 mesh pulp) on the latter gave the following results:

	Gold.	Silver.
	Ozs. per ton.	Ozs. per ton.
Extracted by amalgamation.....	.291	.112
In concentrates .....	.112	.160
In coarse tailings.....	.108	.153
In fine tailings.....	.114	.150
	.625	.575

Doubtless further pulverization would have released a little more bullion to the mercury, but the high metallic contents of the slimes suggests some supplementary treatment.

Here we find the vein matter branching into the country rock in the same way as in the Cariboo vein and occasionally some very interesting inclusions of country rock are met with. Some of these are shewn in Fig. 4.

The White vein has not been very much worked. As already stated it is nearly parallel to the Poorman, but occurs at a less angle with the horizon (27 degrees) 513.86 ozs. of bullion sent from this mine to the U. S. assay office at Helena, Montana, had a fineness of 579 gold and 131 silver. The lowness is probably due, in large part, to unskilful milling and the removal of part of the plates with the amalgam. 4.045 lbs. of hand-sorted pyrite from this vein was sent to the Hall smelter. Its silver and gold contents were as follows: Gold, 4.72 ozs. per ton; silver, 3.5 ozs. per ton.

	Gold.
	Ozs. per ton.
Passed 30 mesh, stood on 40 mesh, yielded on amalgamation .....	.02
Passed 60 mesh, stood on 80 mesh, yielded on amalgamation .....	.35
Passed 80 mesh, stood on 100 mesh, yielded on amalgamation .....	.05
Passed 100 mesh, yielded on amalgamation.....	.65

The pyrite tested contained 3 ozs. of gold per ton so that only a small per cent. of the latter is amalgamable.

There is an indifferent 10-stamp mill on the property but it has only been worked spasmodically, a sort of summer amusement for its owners in the intervals of fishing and shooting.

Ymir Mine.—This is the most extensively developed auriferous mine in B. C., although one of the youngest. It occurs on the north fork of the Salmon river at an altitude of 4,400 feet. One vein only is worked, or known. The distribution of gold in it is interesting, not because there is anything unusual in it, but simply because it emphasizes a fact of great importance to the prospector, viz: that a strong vein containing in parts of its course ore too low in grade to work, may elsewhere carry one or more paychutes of much higher value than can be worked at a profit. A strong vein should never be abandoned until the grade of its ore has been tested throughout.

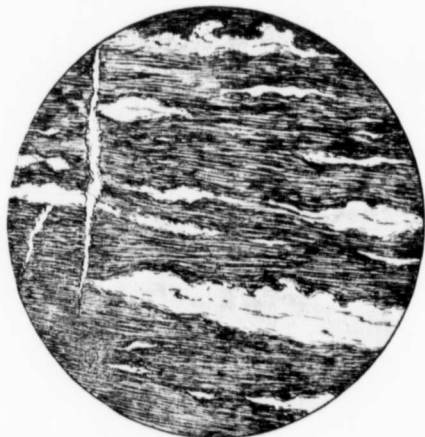
The course of the Ymir vein on the surface is shewn in the plan in Fig. 5. The paychute and the workings on the vein are also shewn on the plan, as well as in the longitudinal projection. The vein on either side of the paychute carries some gold and silver but very little.

In prospecting such veins much money is often wasted in unnecessary and expensive drifting before proper surface explorations, which are much less costly, have been made.

The country rocks are argillites and porphyrites. The vein belongs to the so-called true fissure kind. At present only one paychute is known, it has the form of a lense. Its greatest width is about 30 feet and its average width about 11½ feet. It is intersected at A. B. by a cross fault, at which the width changes very suddenly. S.W. of the paychute several faults cross

and shift the vein. The bulk of the vein is of quartz, carrying about 8 per cent. of the following base metal sulphides, pyrite, galena and blende. The galena in one part of the vein greatly predominates, in other parts pyrite is the most abundant metallic mineral.

The average assay value of the ore as ascertained by the writer before the mill was erected was: Gold, .68 ozs.; silver, 5.06 ozs. per ton. The average yield of 17,137 tons of ore milled and 385 tons of ore hand sorted prior to December, 1899, was: Gold, .4812 ozs.; silver, 1.425 ozs. per ton and lead 1.863 per cent. 1026 tons of concentrates from the milled ore yielded gold 1.173 ozs., silver 11.16 ozs. per ton. and lead 18.61 per cent. They were, however, poorer than the average because the hand-sorted ore contained a large proportion of the sulphides. The yield of the 385 tons of hand-sorted ore was: Gold, 4.251 ozs.; silver, 25.05 ozs. per ton and lead 35.2 per cent. This ore comes mainly from an irregular chimney on the footwall near the widest part of the paychute. It contains over 40 per cent. of galena as is evident from the assay results. The dis-



tribution of the precious metals from the sulphide minerals is indicated by the following assay results:

	Gold.	Silver.
	Ozs. per ton.	Ozs. per ton
Galena.....	.25	32.75
Pyrite.....	1.2	1.8
Blende.....	1.6	7.9

The published monthly mill returns do not give the value of either the ore milled or the tailings so that it is not possible to give the actual extraction, but if the value of the ore, as determined by the writer, is correct, over 30 per cent. of the gold must be carried off by the tailings.

An 80-stamp mill is erected at this mine. The treatment hitherto has been amalgamation and smelting of concentrates and crude ore, but it is said to be the intention of the owners to erect a cyanide plant for the purpose of extracting the values at present left in the tailings. The output to the close of 1899 was 17,522 tons. The output for the last five months has averaged 5,080 tons per month, or about 270 tons per day, a little over two tons per 24 hours.

Doratha Morton Mine.—This mine is on the sea coast about 140 miles northwest of Vancouver. The outcrop of the vein has an average altitude of about 2,500 feet. The milling plant is situated close to the sea shore in Fanny Bay and is connected with the mine by an aerial tramway about $1\frac{1}{4}$ mile in length.

The vein is of the bedded variety. The rock in the hanging wall in mica-syenite and diorite, that in the footwall partly diorite and partly aplite, locally called white granite.

The work done on the vein and some of the features of the latter are shewn in Fig. 6. Several powerful volcanic dykes cross the vein and greatly interfere with the working of it. At some of these the vein is shifted. In a length of 400 feet on the vein, 5 dykes cross it, having an aggregate width of 115 feet. A still more unfortunate occurrence was met with, the width of the quartz suddenly contracted at the level of No. 1 tunnel and continued so to below the main tunnel, as shewn in the cross section. That led to the abandonment of the mine. Along the outcrop of the vein, about $\frac{3}{4}$ mile S.E. of the mine, a section is exposed which shews very clearly a sudden contraction of the same kind. It is reproduced in Fig. 7.

This property affords a good illustration of the risk attending the premature erection of treatment plant. Had the mine been so far developed before a mill was decided upon that the ore in sight would pay for the mill it is quite certain that neither the mill nor the tramway would have been made.

The average length of the paychute at A was 140 feet. That at B 50 feet, at C 87 feet. The average



width of the vein where stoped at A was 6 feet, at B 4 feet, at C 4.9 feet. The ore was almost entirely quartz there being only about 1.6 per cent. of sulphides, mostly pyrite. Thin flakes of metallic copper have been found on the joints of the quartz, but very seldom.

The average assay value of the ore was: Gold, .557 ozs.; silver, 1.63 ozs. per ton, or 2.92 of silver to 1 of gold. The extraction by direct cyanidation, to which all the ore was subjected, was about 81 per cent. being 86 per cent. of the gold and 70 per cent. of the silver. The fineness of the bullion was: Gold, 228; silver, 587, or 2.58 of silver to 1 of gold. The value of the bullion was \$5.47 per oz.

The output from Dec. 1898, to Nov. 1899, when the mine was closed, was 10,385 tons.

The mill contained 10 1000-lb. stamps, 6 settling tanks, 7 percolating tanks and 3 solution tanks, etc. The consumption of cyanide was 2.50 lbs. and of zinc .44 lbs. per ton of ore. The loss by slimes was 6.53 per cent. when crushed to 20 mesh.

THE RUBBISH HEAP.

This is large in proportion to the amount of work done, but not unusually so. Still none the less is it to be regretted. The existence of these huge piles of refuse in mining districts is most annoying, for they are often viewed as reflections on the areas in which they occur, when really they are simply a measure of the ignorance, or the crookedness—to employ an expressive westernism—of some of the people operating in it. Even in these days of the utilization of what in other times were called waste products, the only way one can see of extracting any value from these waste heaps is the old process of exposure. But to expose all the

methods of stock boomers is rather a serious undertaking. It may perhaps serve the present purpose to reproduce here a short notice (from the pen of the writer) which appeared in the B. C. MIXING RECORD about two months ago, of some of these methods as practiced "out West."

"There is no valid reason why stock companies properly conducted should not be as successful in their mining operations as either close corporations or individuals, but we know that they are not so, generally speaking. Why is this? The answer is somewhat complicated but is mainly included in the statement that frequently stock companies do not pursue mining for their own sake, but look upon it merely as a peg on which to hang their crooked stock operations. The evil flowing from the pernicious proceedings of such companies is often enormous. In the first place, honest mining is greatly interfered with and retarded both directly and indirectly, but what is vastly more important and serious in its direct consequence is that ample scope is afforded for the employment of all those "smart" practices that, by a perversion of ideas, are sometimes looked upon as evidences of ability, this, too, notwithstanding the fact that such practices very frequently involve in serious financial difficulties—perhaps in temporary ruin—their innocent and confiding victims. Money that is won from the earth by the miner—like that produced by the agriculturist—is a distinct addition to the sum total of available wealth. That which is taken from other men's pockets by the dishonest promoter or company operator is also a gain of a kind, but only to a few heartless schemers, whilst it is a loss—often very serious—to the de-luded many. The evil and misery that result to the losers is, as a rule, infinitely greater than any gain that accrues to the gainers, so that the effect of the practices alluded to is a serious net loss to the welfare and happiness of the human race. Such practices ought therefore to be prohibited, condemned and exposed by everyone who knows of them and who 'above himself can uplift himself.'"

It is sometimes said that mining is all a gamble. When the management of it is in the hands of unprincipled men, such as are above indicated there is no doubt that mining—so called—is very much of a gamble, the chances of winning by those on the outside, being much more remote than at either faro or roulette. But honest mining, capably conducted, is no more a gamble than carrying on a grocery store. The sums of money involved are greater in the former than in the latter but then the possible returns are much greater also.

Let us now glance at a few of the methods of unprincipled promoters and trustees or directors of what may properly be called "fake" stock companies. The first object of the dishonest promoter is to procure an invertebrate expert, or one who has an elastic conscience and a profound disregard for facts. It is important therefore that the public should see that the properties in which they are asked to invest are vouched for by men of good repute, morally as well as technically. How important the expert's report is to the promoter is partly indicated by the remarks of a London promoter to a B. C. option holder: "Have you any favorable expert report," asked the promoter. "No," replied the man from B. C. "Then, I am afraid," said the promoter, "I cannot do anything with your property. We never buy mines; we only buy reports, the mines are thrown in."

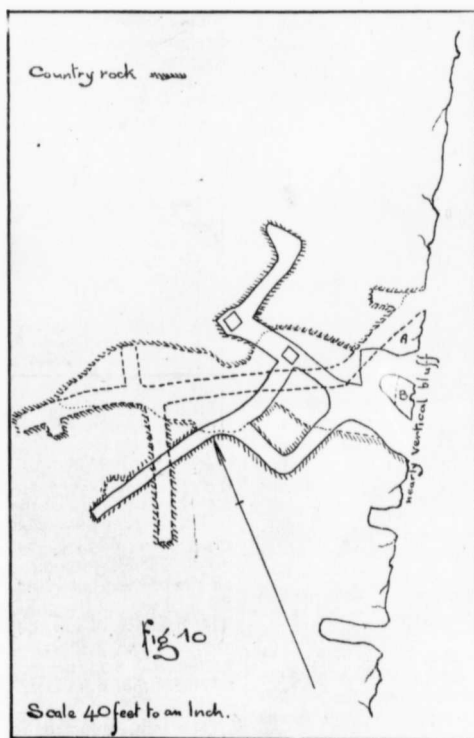
Having launched their company the promoters perhaps retire. In their place come the trustees or directors. Their object—if they are among those to whom conscience is less than gain—is to boom their stock regardless of the appearance or prospects of their property, and for that purpose they employ many artifices, some of which may here be mentioned.

Selected samples of the most valuable contents of a vein are submitted for assay and the results published broadcast, without the slightest indication that such results merely refer to an infinitesimal part of the vein, the balance of which may be utterly barren. Such assays are valueless, except to the swindler.

The exhibition in some conspicuous place, of rare samples—especially those shewing gold—is another favorite method of booming. Most people who are interested in mining or in mining investments will be able to recall samples of this kind they have seen in certain office windows not

many miles from Vancouver, and perhaps they have not forgotten the miserable fiasco—from a miner's point of view—that followed these glittering exhibitions. Beware of this kind of show. Men who have found, or otherwise come into possession of, such good things don't want to part with them—least of all to the unknown multitude.

The suppression of unfavorable reports from the superintendent is another way of deceiving shareholders and the public. This breach of trust on the part of directors is now punishable by imprisonment. Had it been so earlier many people in B. C. and elsewhere would now have had what rightly belongs to them, but which unfortunately is in the hands of a few others, who it is too much to suppose will feel they ought to be in prison.



Reduced one-third from original drawing.

The proposal to erect, or the actual erection of mills and smelters, are also used as "springs to catch wood-cocks." It is generally assumed when people propose to erect either or both of such works, in connection with a mine they must have something to justify the expenditure. Alas, there could be no greater mistake. Where was the justification at the Morning Glory, at the Golden Cache, at the Strathyre, at the Lanark, at the Tinhorn and many other mines that might be mentioned in British Columbia. The erection of mills for which there is nothing to do, is sometimes due to errors of judgment, but in other cases it is part of a boom scheme contrived solely with the object of putting money into the pockets of the designers—no matter from whom that money may be taken. When people talk about putting up mills or smelters don't rush in and buy stock. Try first of all to find out from some disinterested source whether there is anything to mill or smelt or whether the sporting directors are simply fishing for "suckers."

Other snares and traps might be pointed out to the uninitiated but these will perhaps be sufficient for ordinary mortals. There are some men so foolish that all the warnings in the world will not prevent them committing acts of rashness. For such these lines were not written. Men of that stamp never profit by the experience of others. They must put their finger into the fire before they will believe it burns. It is to be hoped they may never know of some of the stock fires that are now being lighted to enable them to experiment.

Perhaps the most glaring instance of stock booming in B.C. was that practiced in connection with the Golden Cache mine, and it may be of interest to look at some of the facts connected with that property as learned from an inspection of the mine, etc., by the writer after the collapse of the company, when the shareholders had been told some of the truth that had been kept from them so long.

Golden Cache Mine.—This mine is situated on the northwest of Cayoosh creek, 11 miles southwest of Lillooet, at an altitude of about 3,700 feet. The country a schistose argillite, in places rock is much altered, the original rock having been more or less replaced by quartz along the schist planes as shown in Fig 8, which is a microscopic section of the rock, magnified eight times, linear. It would be misleading to speak of a vein here, for there never was one. What was dignified by that name was a local enlargement of the quartz lenses along the schist planes. In places these lenses coalesced and formed aggregations of quartz sometimes reaching a foot across, but the lateral extension of any one lense was not great, so that there never was a continuous quartz rib for more than a few feet. The outcrop of the deposit was in the face of a nearly vertical bluff of rock and it presented the appearance shown in Fig. 9. When worked it died out in all directions as will appear from Fig. 10, which is a plan of the workings.

A quantity of coarse gold is said to have been found in some of the quartz lenses and also in the schist. These specimens did yeomen service when exhibited in Vancouver, but the writer could not find any coarse gold in the mine. A and B, Fig. 10, were parts of the so-called vein. An average sample taken by the writer from them, which was considered the best part of the ground in the mine at the time of his visit, yielded on assay: Gold, .05 ozs. per ton; silver, .50 ozs. per ton.

A sample of the quartz lenses alone, that is without any of the country rock associated therewith, gave: Gold, .075 ozs. per ton; silver, .475 ozs. per ton.

2,075 tons of rock yielded by the mine (the total output) and put through the mill, yielded on the average: Gold, .168 ozs. per ton; silver, .036 ozs. per ton, or \$3.37 per ton.

The company was incorporated on the 10th July, 1896. Mining operations were commenced by it some time after the 23rd of the same month. On the 11th Dec. of that year a report was made on the property by Mr. J. A. Macfarlane to the directors which gave the following list of values obtained by him:

	Sample.
Inside tunnel, east side	1 \$2.50
" " " "	2 .62
" " " "	3 .25
" " " "	4 .25
Inside tunnel, west side	1 1.25
" " " "	2 .25
" " " "	3 .50
" " east side	4 .25
" " west side	5 .75
" " " "	6 .25
Outside sample from east	1 5.50
" " " "	2 1.50
" " " "	3 2.25
" " " "	4 1.50
" " " (over tunnel)	5 3.00
" " " west	1 2.50
" " " "	2 .50
" " " "	3 19.50
" " " "	4 1.25
" " " "	5 .25
" " " (over tunnel)	6 1.50
Face of tunnel	9.25
Roof of tunnel	5.50

This report was said to have been sealed and put away on receipt without being read. At least that is what the directors told the shareholders at a meeting on the 7th Dec., 1898. Credulity may go astonishing lengths in matters that are difficult or impossible to understand, but in an ordinary every-day affair like this it is appealed to in vain. That particular document was probably not seen, but what about the copy in the engineer's office.

Only one or two independent persons who knew anything about mining were ever allowed to examine the mine and one of these, although there for the purpose of advising intending purchasers, was not allowed to sample the ground.

On the 26th June, 1897, Mr. Macfarlane reported again to the directors and this report was read at their meeting on the 27th July, but was not made public until the collapse of the company at the close of 1898. Inter alia Mr. Macfarlane said: "I have still a good deal of sampling, assaying and calculating to do before I can give full and fairly definite figures, but, so far, the results of my investigations are in the highest degree disappointing. As you are aware, we have on various occasions found free visible gold in numerous places, in the faces of the galleries which made us hopeful that we would strike a good body of milling ore, but assays, more particularly of average samples have disappointed me completely and I now feel that the state of the mine and its financial prospects are even worse than what I stated to you in my first examination. As you see, from the assays, the only ore that will pay the expense of milling is such as contains visible gold (a very small total quantity of ore) and the best of the pyritic slate. This latter will give up some of its gold to direct amalgamation, and the rest as concentrates on the vanners. The total amount of millable ore in sight is so small and its grade so low that I do not see how we can manage to run the mill for any length of time

and I beg, therefore the directors' serious consideration of the matter, and that they favor me with their instructions." "Why did the directors not look at Mr. Macfarlane's first report then?" At the meeting of the 7th Dec., 1898, the secretary said in reference to the first report, "He knew nothing of the contents, but believed, under the circumstances, that it would be a good report." Surely the second damning report should have aroused sufficient curiosity to have caused the exhumation of the first. At the time this second report was received the directors were spending large sums of money in building a stamp mill, etc., which of course led the shareholders and public to believe they had a mine, instead of which they had only a worthless little hole in the ground; but which was most carefully guarded lest its real value should become known.

Below are some extracts from the reports of Superintendent Rives, who followed Macfarlane:

Nov. 18, 1897.—"The ore is peculiar and mystifying, it is idle to attempt to be guided by assays, the only thing to be relied upon is the mill returns. The battery assays are exceedingly low."

Sept. 4, 1898.—"I have dismissed—and will endeavour to prevent letters from being written that relate to the mine so far as I can do."

Sept. 5, 1898.—"The great bulk of the ore sent to mill since this starting has been of an exceedingly low grade, lower than heretofore reduced, and much lower than I have ever known to pass through any mill where labour and material is as high as it is here."

Sept. 15.—"I have actually extracted all the ore obtainable in the mine."

This information was not imparted to the shareholders any more than that contained in the two reports of Mr. McFarlane. But during the whole of the time covered by these extracts, samples of very rich gold ore were exhibited in the company's office window in Vancouver.

The following are some of the superintendent's reports which were made public:

Jan. 21, 1898.—"I am again in the same ledge I passed through on the 15th inst. It has been followed like the waves of the sea—up and down. In the face of the tunnel last night, it had widened out to two feet, with indications that it will yet increase in width. I picked down a sample from the face, which assayed \$822.98. This was one foot in width. I then had a hole put through two feet of this quartz and the drillings assayed \$101.98 per ton. The other four feet of face matter assayed \$15.07. It is my opinion that I have encountered the main ledge of the mine, and we have only to follow it to obtain glorious results."

Jan. 24, 1898.—"Five samples of ore from tunnel now being driven taken to-day, assays average \$97.00 per ton."

About £7,795 were spent in mining and about £13,760 in plant and machinery. Only 779 feet of drifting was done so that it cost about £10 per foot. A usual price for the same kind of ground is £2 per foot. The men must have sat a long time in the faces admiring the free gold when they happened to strike any.

At the time the mill was built there was not in sight 1000 tons of the low-grade stuff, by courtesy, called ore.

THE FUTURE.

If the auriferous quartz and other mineral deposits of British Columbia be worked efficiently and fairly for the metal or mineral value in them, they will yield handsome returns. Much disappointment has no doubt naturally been felt with the results hitherto obtained. The fault however, does not rest with the mineral resources of the Province, but here. If any other business were

managed with the reckless incompetence that has characterized by far the greater part of the so-called mining enterprises of British companies in Western Canada its results must of necessity be equally unsatisfactory.

NOTES ON ZINC SMELTERS IN CONJUNCTION WITH THE REFINING OF LEAD AND SILVER.

(By Ronald C. Campbell-Johnston.)

BOARDS of Trade, City Councils and other public bodies in British Columbia are petitioning government to offer a bonus to bring about the establishment of a desilverizing plant for the pig lead produced. It is the common belief that by the establishment of a refinery the interests of the lead miner will be best protected against the rapacity of the American Lead Trust. It is not considered that the lead mines by building their own smelters can save treatment costs and transportation rates to a large extent, as the copper mines in the Boundary country are doing.

Also through the want of metallurgical advice the general public is ignorant of the methods, costs, difficulties, etc., in desilverizing lead. There are only two methods employed at present to desilverize lead. Both were invented in Britain, one by Hugh L. Pattinson, a mechanical ladling process, and nearly obsolete by reason of its excessive costs; the other by Alexander Parkes. Parkes' process, and its modifications employ zinc, for which silver has a greater affinity than lead. Roughly speaking, one pound of spelter is required to extract each ounce of silver from a ton of pig lead. This brings the question of a lead refinery down to the point, that a zinc smelter plant must first be established near the lead smelters. This is a fact since spelter to-day is quoted in the vicinity in value round \$4.00 per cental, or \$80.00 per short ton in New York, to over \$100.00 per short ton delivered in the Kootenays. Is a zinc smelter practical in the Kootenays to-day with high cost of labor and material? A metallurgist will say, No! Let us look over the different methods of zinc smelting.

Take the Belgian and Silesian methods adopted at Swansea, in Europe, and the States.

The mixtures to make the retorts or pots used, has long been a jealously guarded secret, and the pots cost in Swansea £3 10 (\$17.50) apiece. From the number used in a total furnace, say 160, or whatever the metallurgist may design, and from the comparatively few reheatings they will last through, hence expense renders these methods impossible in British Columbia. In Swansea lately they have gone back to the old English method, with modifications, and use pots similar to those utilized in the melting of steel. These cost £2 (\$10.00) apiece there, and would have to be imported to the Kootenays. We hear a rumour of a new method being perfected to-day at Joplin, but have as yet no details of success. This is an enameled iron tube, which is claimed to halve the cost of zinc metallurgy. Anyhow, these few references to zinc metallurgy will point to the costs being too great at present to allow of the erection of a zinc refinery in the west.

Next, supposing we could erect a zinc smelter and overcome these difficulties, what about our zinc ore supply? Swansea for their zinc works try to procure carbonates and silicates of zinc free from silver. Failing this they take the sulphides (blendes) free from silver.

Rates used to allow them to buy the Missouri ores concentrated to from 54 to 60 per cent zinc. Rates are now nearly prohibitive and these ores are locally smelt-

ed at Joplin and St. Louis. The Swansea smelters are short of supplies, and have to take blends carrying silver. This is why they have gone back to the old English method, leaving five per cent. of lead in their mixtures, to partly obviate the loss of silver in the volatilization of the zinc.

Now, what class of zinc ores would B. C. supply and how are they being treated in Britain and the European continent? All zinc ores in B. C. are sulphides, highly argentiferous, considered by metallurgists unadaptable for saving zinc.

These ores are bought and Mr. A. S. Murray's process of salt caking is used. This is to melt the ores with salt cake, and so throw a zinc top and lead bottom, the lead, after repeating the process many times, taking all the silver, and the zinc is thrown away in the slag. The zinc contents are not paid for. This shows how the leading metallurgists treat our class of zinc ores where the alkali and labor are cheap.

THE ANALYSIS OF FURNACE GASES.

(By A. W. Watson, B. Sc., Provincial Assayer at Vernon, B. C.)

IN endeavoring to obtain the maximum working effect from a boiler-furnace, one of the most essential points to study is the composition of the chimney gases. If the gases from the furnace show a large percentage of carbonic acid and a relatively small proportion of carbon monoxide and hydrogen the combustion will be shown to be satisfactory because the carbon of the coal will have taken up all the oxygen from the air that it possibly can do, and will have therefore produced the greatest amount of calorific effect; if on the other hand the proportion of carbon monoxide and hydrogen are relatively large, the carbon and hydrogen of the coal have not been completely consumed, and have passed up the chimney without having given out as much heat as they ought to do. Most manufacturers consequently make a point of having their chimney gases analyzed in order to find out whether their furnaces are working well or not.

Another important point to study in connection with the analysis of chimney gases is the percentage of oxygen. The percentage of carbonic acid may be quite satisfactory, and yet the furnace may be too cold. A determination of the percentage of oxygen contained in the chimney gases will show the reason at once. The oxygen, on analysis, showing too great excess, indicates that too much air has been introduced into the furnace. The advantage of having the chimney gases analyzed is that nothing is left to chance or to opinion, but it can be known with absolute certainty what is wrong.

Hempel's apparatus is the one generally employed by analysis. It consists of the burette and the pipette. The burette consists of two tubes, the pressure tube (A) and the measuring tube (B).

The pressure tube is nearly filled with water, and by raising it and turning the stop-cocks (C and D) the air is driven out of the measuring tube, the two tubes being connected at the bottom by a piece of india-rubber tubing. To fill the measuring tube with gas the end (C) is connected with the gas holder and the pressure tube (A) is lowered. The water in consequence rushes from B back to A and draws the gas into B. The stop-cock (C) is then closed and the water in A and B brought to the same level to make the pressure in both equal, and the reading is then taken of the amount of gas in the measuring tube.

The pipette consists of an apparatus similar to the sketch on following page:

The end (E) is connected with the measuring tube of the burette. The part (F) is half filled with the particular absorbent used for the particular gas to be estimated. The gas is driven into (F) by raising the pressure tube of the burette. It cannot escape from the pipette, as it is locked by the liquid in (F). The stoppers (H) and (C) are then closed, the pipette is well shaken to make the liquid absorb the gas, connection is again made with the burette, the gas is drawn back into the measuring tube, the water is again brought to the same level in both, and a reading taken. The difference between this reading and the original one shows the amount of gas absorbed from which we obtain the percentage by volume of the particular gas examined.

Chimney gases usually contain carbon dioxide, oxygen, carbon monoxide, hydrogen, and marsh gas and nitrogen.

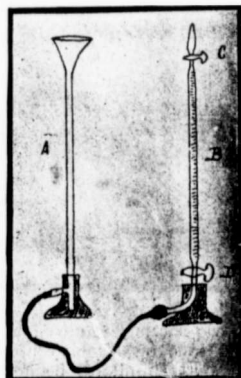
For the estimation of carbon dioxide a strong solution of caustic potash is used, the oxygen is absorbed by pyrogallol, the carbon monoxide by a solution of suprous chloride, hydrogen by that peculiar metal palladium, with which it proves its metallic character by forming an alloy, the marsh gas is exploded with oxygen in a measuring tube, and the nitrogen is estimated by direct measurement after all the other gases have been got rid of.

Hydrogen is often determined by mixing it with the necessary amount of oxygen in a eudiometer or mercury vacuum tube, exploding it and measuring the contraction due to the formation of water. With chimney gases this method cannot be used as hydro-carbons are usually present to vitiate the result. Advantage is therefore taken of the fact that palladium absorbs hydrogen. It is generally used in the form of palladium asbestos. A solution of palladium-chloride is made, long threads of asbestos are placed in the solution and sodium formate is added to precipitate the palladium on to the asbestos in a finely divided condition. The asbestos is now dried, washed, dried again and placed in a small bent tube.

To obtain the gas from the chimney a gas holder is used as shown in the sketch on following page:

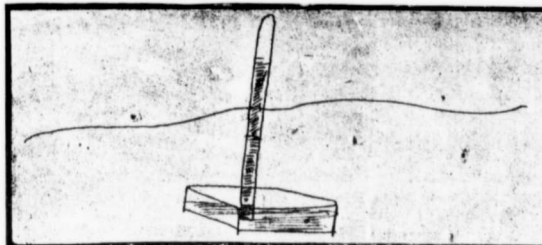
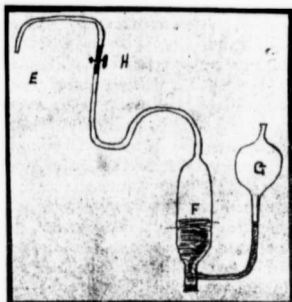
(J) consists of a glass jar filled with water and connected with the gas holder at the stop-cock (M). To fill the holder the vessel (J) is raised, the stopper (R) opened and all the air driven out by the water rushing into the holder (K), which it entirely fills. The stop-cocks (M and R) are closed, the long tube (L) placed in the chimney, and the stop-cock (S) opened. The water rushes out at (S) and draws the chimney gas into the holder.

To analyze the gas in a chimney the gas holder above described is filled with the gas and placed in connection with the measuring tube of a Hempel's burette. The pressure tube is lowered and the gas drawn in up to the 100 degrees mark. The stop-cock (C) is then closed and the pressure tube raised until the water in it is at



the same level as in the measuring tube. A reading of the water level in the measuring tube is taken, giving the amount by volume of the gas taken for examination. The pipette (F) is now half filled with a 7 per cent. solution of caustic potash in water connected with the measuring tube of the burette. The stop-cock (C) is opened and the gas passed into the pipette as described before. Supposing the original volume of gas taken to be 100 cubic centimetres, and after passing into the pipette and back again it has diminished to 9 cubic centimetres then the amount of carbon dioxide in the gas is 5 per cent.

We now have our gas back again without the carbon



The reading of the measuring tube is now 83 degrees, showing 1 per cent. of hydrogen. The marsh gas and nitrogen are now the only remaining gases to be estimated. The gas is removed to a pipette and the stop-cock (H) is closed. A eudiometer consisting of a tube closed at one end and immersed mouth downwards in mercury, is used for the estimation of the marsh gas, as shown below.

The weight of the mercury in the tube is noted, and the gas introduced by holding the pipette in the mercury with the stop-cock (H) open exactly under the mouth of the eudiometer. A volume of oxygen of approximately about twice the marsh gas is introduced and the mixture is exploded by an electric spark. The diminution of volume is a measure of the volume of marsh gas.

dioxide. To determine the amount of oxygen we take a litre of a one-to-four solution of caustic potash and dissolve in it fifty grammes of pyrogallol. The pipette is half filled with it as before, and upon passing the gas into it the oxygen is absorbed by the pyrogallol exactly in the same way as the carbon dioxide was absorbed by the solution of caustic potash. Drawing the gas back again and taking another reading we find the volume of gas to stand now at 85 degrees, showing that oxygen was present to the amount of 10 per cent.

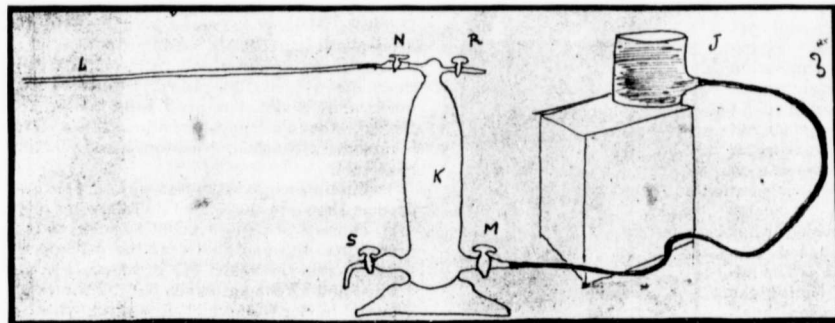
To determine the carbon monoxide the gas is now passed into a pipette containing a solution of cuprous chloride. The residual volume of gas is now at the 84 degree mark, showing that carbon monoxide was present to the extent of 1 per cent.

The volume of gas in the eudiometer is 83 cubic centimetres; oxygen is passed in to the amount of 15 cubic centimetres, making the new volume 98 cub. centimetres.

Now, when marsh gas is exploded with oxygen, one volume of marsh combines with two volumes of oxygen, leaving one volume of carbon dioxide and two volumes of steam, which condense to water and are neglected in analysis.

After explosion therefore, the volume is reduced to 88 cubic centimetres. Therefore 10 cubic centimetres of the oxygen were used corresponding to five cubic centimetres marsh gas. The marsh gas is therefore 5 per cent. The residual nitrogen is therefore 78 per cent.

Before the explosion then, we had 78 cubic centimetres nitrogen, 5 cubic centimetres marsh gas and 15 cubic centimetres oxygen. After the explosion we had



To determine the hydrogen a bent tube containing the palladium asbestos is connected with the pipette at (H). The pipette is half filled with water to prevent the gas from escaping, the tube is warmed to a temperature of 100 degrees centigrade, this being the temperature at which the palladium absorbs hydrogen, and the gas is passed several times backwards and forwards over the asbestos by raising and lowering the pressure tube.

78 cubic centimetres nitrogen, 5 cubic centimetres carbon dioxide, or 88 cubic centimetres of gas, the missing 10 cubic centimetres being the condensed aqueous vapor. The analysis will then be:

Carbon dioxide	5.0	Marsh gas	5.0
Oxygen	10.0	Nitrogen	78.0
Carbon monoxide	1.0		
Hydrogen	1.0		100.0

COMPANY MEETINGS AND REPORTS.

THE WAR EAGLE MINE MANAGER'S REPORT.

THE following report of the operations of the War Eagle mine, for the year ending Dec. 31, 1900, prepared by Mr. Edward B. Kirby, the general manager, was submitted at the fourth annual meeting of the shareholders held recently in Toronto:

The past year has been devoted to the securing of new equipment, of improving the efficiency of labor by the adoption of the contract system, and of advancing the development work; which, as explained in the last annual report, was then exhausted. The condition of the mine made it necessary to follow down and expose the main ore shoot as rapidly as possible, and every effort has been made to this end. The first two undertakings occupied the first half of the year, during which time little could be done towards the downward extension of the mine workings. Since that time shaft-sinking and the opening of new levels have progressed at a rate unequalled in the history of the district. The shaft (Feb. 1st) is 1,307 feet deep, 79 feet below the 9th level. The development work of the year amounts to 4,428 feet, including the extension of the main shaft 355 feet. Ore shipments were resumed January 4th of this year.

The prominent feature of the situation just now is that the present date happens to be too early for decisive results from the extensive plan of deep development begun last June. These results from an extent of ore shoot 624 feet deep, extending from the 6th to the 10th levels, are expected to come in rapid succession during the next six or seven months. The 7th level work, though not satisfactory so far, is not yet completed. The 8th level has not progressed far enough to give information, and the 9th level has just begun, while the shaft is half way down to the 10th, or 1,378 foot level.

As explained in the last report, the vein at the 5th level split into branches, the pay ore of the main shoot being found at the junction and for some distance along each branch. The same condition was found at the 6th, or 745-level, which, now that it is opened up, proves to be specially productive, and is a great improvement upon the 5th and 4th levels. On the new 7th level crosscutting developed a third vein or possible branch, and a like structure is found at the new 8th level. On the 9th, or 1,228-foot level, the station is being cut. The splitting of the vein increased the amount of drifting necessary on the 7th level. The structure here was further complicated by two heavy faults and a large dike which has effected the ore shoot. The exploration of this level is not yet completed, although the work done up to date covers its main chances. The ore in the veins is low grade. Upraises to the large pay ore masses of the 6th level above show that the pay extends only part way down to the 7th level. Such interruptions in the pay ore bodies are characteristic of this ore shoot, and it is assumed that new bodies will be found lower down.

The 8th level crosscut from the shaft has cut the three veins. They carry ore but are low grade at this place. Drifting has progressed a short distance upon them, but has not yet reached the region where it is expected to find the pay shoot. The shaft is expected to reach 10th level at a depth of 1,378 feet, before April 1.

The ore bodies of the 6th level, which were only partially exposed at the time of the last annual report, have since been opened, and with those of the 5th level, have been prepared for stoping. This, with remnants in the upper levels, including the smaller ore body of the cross-

vein, make an estimated ore reserve of about 35,000 tons, averaging \$14 per ton.

The 7th level in contrast to the 6th, has been low grade, but there is still a chance that it may carry pay ore which will be exposed by the completion of the work here. The new complications of structure mentioned have caused delay and expense in its exploration. There is, however, no structural or other reason to believe that a large ore shoot which has been practically continuous for 754 feet from the surface to the 6th level, and which there carries one of its largest and richest ore bodies, has terminated on the 7th level. It will require the evidence afforded by several levels to determine the future of the ore shoot, and the probabilities are that beyond this impoverished spot it will continue as usual. The fact that the 4th level was poor, the 5th better, and the 6th one of the most productive in the mine, proves that depth has so far shown no change in the conditions of ore deposition. At the 6th level they were such as to permit the formation of large and high grade ore bodies. There is, therefore every reason to believe that the ore shoot will average up as well in the future as it has in the past.

The plan of deep and large scale development now being carried out is exposing in one year's steady work a length of ore shoot which in the past history of the mine it has taken five years to develop. The significance of this high-pressure development will be clear from the following statistics. The entire production of the mine up to date (i.e., the main shoot only, excluding the small cross vein) is 131,976 tons, with a smelter's gross assay value of \$2,646,612. Adding the present ore reserves (also excluding the cross vein) gives a total production from the main ore shoot of approximately 165,000 tons, with a smelter's gross assay value of \$3,100,000. This is the contents of 754 feet of shoot down to the 6th level. If the new stretch of 624 feet down to the 10th level—averaging rich and poor spots together—is as productive, it should contain a smelter's gross assay value of \$2,500,000.

Now that the machinery troubles are over, the mine well equipped, the speed of work doubled, radical economies effected in the cost of mining, and others expected in the cost of ore reduction; ordinary good fortune such as there is every reason to expect, is all that is necessary to make the business successful.

DETAILS OF DEVELOPMENT.

Fifth Level—629 feet in depth measured on the vein.

Development work on this level has been confined to the north branch west of the main shaft, the heading having been extended to the 425-foot point. In addition to the 120 feet of stoping ground (see 1899 report) ore five feet in width, averaging \$10.50 smelter's gross assay value, has been exposed from the 160-foot to the 190-foot point. From the 190-foot point to the 220-foot point, the ore averages five feet wide and \$17.00 smelter's gross assay value. From the 220-foot to the 235-foot point, no value. From the 235-foot to the 260-foot point the ore is five feet wide, and \$20.00 smelter's gross assay value. Beyond this the vein is barren. At the 145-foot point, raise No. 591 follows the vein to a connection with the 4th level above. It shows pay for 70 feet above the 5th level, averaging five feet wide, and \$20.00 smelter's gross assay value. For the remainder of the raise the ore is low grade, averaging \$8.00 smelter's gross assay value.

Sixth Level—754 feet in depth measured on the vein.

South Branch.—The level west has been extended an additional distance of 255 feet, or 285 feet in all from

the crosscut. From the 30-foot point to the 90-foot point the ore body averages five feet wide, \$11.80 smelter's gross assay value. The remainder of the level is low grade or barren. At the 20-foot point raise No. 687 connects with the stope at a distance of 69 feet above the 6th level. For this distance it exposes ore averaging five feet wide and \$14.20 smelter's gross assay value.

East of the shaft crosscut the level has been extended 85 feet to a junction with the north branch at a point 100 feet east of the shaft. From the 40-foot to the 55-foot point the ore is eight feet wide, averaging \$20.00 smelter's gross assay value. From the 55-foot point to the 80-foot point the level is in low-grade ore, the pay being in the hanging wall, where it is exposed at the 80-foot point by a crosscut showing it to be five feet wide, averaging \$20 smelter's gross assay value.

North Branch.—West of the shaft the level has been extended to the 180-point, but no additional pay ore has been developed beyond that mentioned in the report for 1899.

The level east has been extended to the 290-foot point, but without adding to the pay ore formerly exposed. Eighty feet east of the shaft, raise, No. 653 extends 45 feet above the level connecting with the stope above. For this distance it exposes ore five feet in width, averaging \$24.50 smelter's gross assay value.

Seventh Level.—81 feet in depth measured on the vein.

A crosscut located 70 feet east of the main shaft cuts three veins, denominated the South, Middle and North veins.

South Vein.—The level east from the crosscut to a point 21 feet distant shows five feet of ore averaging \$5.17 smelter's gross assay value. From the 21-ft. point to the 68-foot point the ore is four feet wide, averaging \$5.50 smelter's gross assay value. From the 38-foot point on, no values. At the 35-foot point raise No. 753 is being extended to the large ore body of the 6th level above. It has not yet reached the ore.

The level west from the crosscut to a point 90 feet distant shows 4½ feet of ore, averaging \$5.60 smelter's gross assay value. From the 90-foot point to the 136-point the ore averages five feet wide and \$6.40 smelter's gross assay value. Beyond the 136-foot point no values. At the 100-foot point raise No. 752 has followed the vein to a connection with the 6th level above. For 80 feet above the 7th level the ore exposed was five feet wide, averaging \$6.09 smelter's gross assay value. From the 80-foot point to the 100-foot point the average was four feet in width, and \$9 smelter's gross assay value. From the 100-foot point on the 6th level the ore is low grade.

Middle Vein.—This vein at the crosscut shows seven feet of very low grade ore. It has been explored by a level extending 100 feet east from the crosscut. The vein, as exposed by this work, is broken and shattered, and showed no improvement in the values. At the 110 foot point a north crosscut 45 feet in length exposes the north vein, showing three feet of ore, averaging \$5.00 smelter's gross assay value.

North Vein.—The level east from the crosscut to the 26-foot point exposes ore averaging six feet wide, and \$6.70 smelter's gross assay value. From the 20-foot to the 80-foot point the vein is low grade or barren.

The level west from the crosscut to the 60-foot point exposes ore five feet in width, averaging \$8.06 smelter's gross assay value. From the 60-foot to the 120-foot point the average is five feet to eight feet in width, and

solid sulphide ore averaging \$5.20 smelter's gross assay value. At the 120-foot point the vein is shifted by a fault, but its western continuation was reached again at the 220-point. From the 220-foot point to the 280-foot the ore averages four feet wide and \$6 smelter's gross assay value. At the 20-foot point raise No. 751 extends 37 feet above the level. It exposes ore averaging five feet wide and \$2 smelter's gross assay value.

Eighth Level.—1,057 feet in depth measured on the vein.

A crosscut from the shaft cuts three veins, which, for the present, are denominated the South, the Middle and the North veins.

South Vein.—The level east from the crosscut is 63 feet long. For the first 25 feet the ore is eight feet wide, and averages \$2.50 smelter's gross assay value. At this point the ore is cut off by a large dike and fault, and its extension has not yet been reached.

The level west from the crosscut has been advanced 40 feet. For the first 20 feet the ore is eight feet wide, averaging \$2.50 smelter's gross assay value. From the 20-foot to the 27-foot point the average is five feet wide, and \$12.75 smelter's gross assay value. From the 27-foot point to the 40-foot point, eight feet wide, average \$4.70 smelter's gross assay value.

Middle Vein.—A level east from the crosscut has been advanced 64 feet, but without finding any ore of value.

North Vein.—A level west from the crosscut has been driven 62 feet, but the ore exposed is too low in grade to be of any prospective value.

GENERAL REMARKS.

As explained in the last annual report, the unfortunate machinery difficulties during 1899 made it necessary to suspend production and cease dividends in order to catch up the exhausted development and put the mine and its equipment in proper condition for economical work. This step was taken on Feb. 6, 1900.

It was decided to take advantage of the opportunity afforded by the stoppage to make a radical change in the method of employing labor. The costs of mining during the past history of the mine were very excessive, and it had long been apparent that the principal cause of this unusual expense was due to the inefficiency of wage labor under the conditions prevailing in Rossland. The quantity of work done per man for the wages paid was not satisfactory. Repeated efforts had shown that it was impossible to make any satisfactory improvement under this system, and it was therefore decided to introduce the contract system whereby miners would be paid according to the quantity of work performed instead of by the time spent in doing it. On March 12th this system was presented to the War Eagle, Centre Star and Le Roi mines. At first many of the miners opposed the change, fearing it would be injurious to their interests. The issue remained unsettled for several weeks, during which the mines were closed. On April 5th the question was settled amicably with the miners, who decided in favor of adopting the new arrangement proposed. As the new system has to be inaugurated by degrees, it was some time before the development headings were fairly under way.

At first the development work was confined to opening out ore above the 6th level, and preparing it for stoping. After the new equipment was ready, and timbering caught up, the work of deep development was begun June 14, by starting the 7th level and the shaft.

TABLE OF MINE CONTENTS.

For year ending December 31st, 1900.

	DEVELOPMENT WORK.			
	Sinking Main Shaft.	Sinking Winze.	Raising.	Drifting.
Total advance, feet	355	26	569	3378 1-2
Cost per Foot.				
Drilling and blasting	\$21.51	\$22.82	\$11.08	\$7.49
Explosives	4.03	4.80	2.86	2.47
General mine supplies	2.99	1.78	1.67	1.10
Mine lighting, candles	67	59	34	24
Mine lighting, electric	1.97	50	70	61
Smithing	1.58	1.88	1.25	82
Shovelling, direct	15.96	2.79	38	91
Shovelling, apportioned	4.22	...	2.07	1.45
Timbering, labor	13.70	2.81	4.17	25
Timbering, material	5.01	62	75	07
Machine drill fittings	1.40	4.08	1.80	02
General mine labor	8.93	2.60	3.46	2.90
Hoisting, underground	11.96	8.44	...	93
Hoisting, main shaft	7.37	...	2.01	1.92
Compressed air	2.30	1.46	1.83	1.26
Mine ventilation	2.32	65	82	72
Assaying	11	27	43	31
Surveying	1.82	38	58	51
General expense	20.21	2.52	6.47	6.01
Total	\$128.06	\$58.99	\$43.57	\$30.05

The reduction of costs effected by the contract system will appear in the cost sheet for the coming year. It does not show in the table of average costs for the year, published herewith. These are excessive because much of the work represented there was done under the old wages system. Moreover, it includes the fixed and general expenses during a more or less complete stoppage of nearly three months, and a subsequent period during which no ore was produced, and these expenses were borne entirely by the development work. The results of the new system are now clearly established by the work of several months, and the improvement shown is even in excess of what was expected.

In shaft sinking 326.5 feet of contract work compared with the last 100 feet, under the wages system, shows that the average rate of advance has been increased from 31 feet per month to the present rate of 68.5 feet per month. This is exclusive of the stoppages for cutting stages, which have also been greatly reduced, and under the present system does not exceed 18 days. The cost for drilling, blasting, shovelling and timbering shows a reduction from \$69.25 per foot of advance to \$49.07 per foot. This comparison is on a basis of three shifts (12 men) daily, and a 30-day month.

In drifting, the rate of advance of headings has been increased from the former average of 49.7 feet per month during 1899, by the wages system, to the present average of 101 feet per month by contract. The comparison is on a basis of two shifts (4 men) daily per heading, and a 30-day month. The cost of drilling and blasting shows a reduction from \$8.45 per foot of advance to \$6.05 per foot.

In stoping, it is impossible to give any figures for the present year because the work done prior to the suspension of shipments was performed by the wages system. A certain amount of ore was broken later in development, and by stoping, but this was stored in the stores so that its quantity cannot be measured until later on.

The results of the new system have been equally satisfactory to the contractors, who have averaged good pay, considerably above the standard rate of daily wages.

By the latter part of the fall the ore reserves were ready for a moderate rate of production. Negotiations for a reduction of smelter rates were then in progress, and shipments were therefore postponed in the expecta-

tion that some satisfactory arrangement would soon be made. As these negotiations were further prolonged, it was decided not to wait, and shipments began on January 4th, 1901.

The main features of the mine equipment are now completed. They include a 200 h. p. steam-gear hoist, with accessory apparatus, and a steam line connection with the Centre Star boiler plant at the foot of the hill. The construction of the head works was completed, the steam compressor overhauled and repaired, and accessory appliances, water supply plant for fire protection, timber yard, etc., provided. The electric air compressor which had caused so much trouble in 1899 was kept in partial service, with frequent stoppages for repairs until the completion of the new Centre Star compressor in the early part of August. As this was able to supply the War Eagle temporarily with air, the electric compressor was shut down for radical reconstruction, which work is still under way. On May 7th, the large ore bins at the head of the tramway, together with the tramway headgear, were destroyed by fire. The flames were drawn into the head works, which, with its machinery, was saved only by the energetic efforts of the members of the War Eagle and Centre Star force. This part of the plant was then without fire protection, as the present fire plant, then under construction, had not been completed to this point. The origin of the fire is unknown, as the building was without fires or live electric wires. There was no need of immediate reconstruction, so that this work was deferred until later and is now under way.

In conclusion I must add that we are fortunate in having the aid of an unusually able and energetic staff, and I take pleasure in expressing my appreciation of their earnest co-operation. The chiefs of departments are Mr. Carl R. Davis, M.E., mine superintendent; Mr. Alfred C. Gardie, M.E., mechanical engineer in charge of construction and machinery, and Mr. Chas. V. Jenkins, in charge of accounting and purchasing.

Yours respectfully,

EDMUND B. KIRBY,

Manager.

The smelters net value of the War Eagle ores in 1894 was \$24.42 per ton, and each successive year it has fallen, the net average for last year being \$8.40. This decrease was due to the fact that lower grade ore was extracted as cheaper treatment facilities were afforded.

THE WINNIPEG MINES, LIMITED.

The statutory meeting of the Winnipeg Mines, Limited, was held in the office of the company in this city yesterday and considerable business was transacted.

The following board of directors was elected: John Mack of Spokane; W. W. Gibbs of Portland, Richard Plewman of Rossland, Alfred McMillan of Rossland, R. Elgood Plewman of Rossland.

The report of Nick Tregear, the superintendent, showed that since the reorganized company began operations, on Jan. 1, 222 feet of drifting and crosscutting, 25 feet of upraising and 109 feet of sinking had been done. Twenty-two men have been employed continuously since the new company assumed charge of operations. The report was adopted.

Mr. Richard Plewman, the managing director and secretary-treasurer, submitted his report. The Winnipeg Mines, Limited, was organized on Dec. 11, 1900, and the provisional directors on the 13th of that month entered into a contract with the old company, through Mr. Plewman, as liquidator, for the transfer of the property. A conveyance was executed and the property has since been registered in the name of the new company. In taking over the property the new company

assumed the liabilities of the old company, consisting of an overdraft at the Canadian Bank of Commerce to the amount of \$7,208,51, and also allotted 989,426 shares, with 95 per cent. paid up, to the liquidator in trust for the shareholders in the old company. Of the latter 940,774 shares have been surrendered and exchanged for shares in the new company. To meet this indebtedness and provide for the further development of the property five calls in all have been levied by the directors, and of these three calls, amounting to 2 cents per share have become due. The sum of \$17,706.79 has been received on account of calls up to March 31, 1901. Of this amount the sum of \$9,281.24 was received on account of the first call of 1 cent and represents almost 95 per cent. of the total shares of the old company. With respect to these outstanding shares the directors, while recognizing the fact that it is unfair to the great majority, who have paid their assessments, to allow any shareholders to have their shares carried for them, are averse to sacrificing the stock of any who have paid, solely on account of having no knowledge of the assessments being levied. The directors have therefore, passed a resolution declaring forfeited all shares that are delinquent in respect to the first assessment, unless it can be shown to the satisfaction of the secretary-treasurer, that the default has been unintentional and that forfeiture would work an undeserved hardship. No shipments have been made by the new company and until these occur the calls are the only source of revenue.

From the funds thus received the liabilities of the old company have been entirely liquidated, the reorganization and the incorporation expenses have been met and the payrolls and bills for supplies for December, January and February have been paid, leaving a balance of cash in the bank of \$1,734.66.

The expenditure on account of improvements and increase of plant were necessarily large. These consist mainly of a new hoisting cable, sheave and bucket, No. 2 Cameron sinking pump, 5 x 5 hoisting engine, three $\frac{1}{4}$ in. machine drills, 2,000 feet of rails and some minor articles. At the time of the reorganization all the plant was carefully overhauled and all known defects made good, but since then the boilers have unexpectedly shown signs of breaking down and will necessitate considerable expense in renewals. New flues were at once imported from Spokane and a boiler-maker is now engaged in both boilers.

The development of the property has proceeded very satisfactorily. The sinking of the winze on the second north vein, 300-foot level, in which so far very encouraging results have been obtained, will be continued with the utmost vigor for say another 55 feet, thus making it 150 feet in depth from the collar of the winze. At a depth of 88 feet solid ore, 12 feet in width, was met. When a depth of 150 feet is gained on the winze it is the intention to crosscut and drift on the ore. The management considers it in the best interest of the shareholders to proceed with purely development work, and for that purpose to continue levying the assessments as required, rather than to attempt stoping for shipments permanently.

In the matter of expenditures the utmost economy has been observed.

DOMINION MINING, DEVELOPMENT AND AGENCY.

The report of the directors of the Dominion Mining, Development and Agency Company, Ltd., for the eighteen months ended 31st December last, states that after charging expenditure on properties abandoned, loss on shares sold and after writing off the balance of

the Reindeer skin contract and the whole of the original purchase account, and after making a reserve of £24,162 against various shares held by the company, there remains a profit of £1,257, which is subject to the realization of the various shares held at the prices at which they are taken for the purposes of the account. The Kettle River Power Company, Ltd., has been formed to take over the Cascade water rights and interest, and the Dominion Company has received its proportion of the fully-paid shares and part of the cash consideration for the sale. A company under the title of the Gilbert River Gold Fields, Ltd., has also been formed to take the property hitherto worked on a small scale by the Beauce Syndicate Ltd., and the Dominion Company has received part of the fully-paid shares coming to it under the terms of the sale. The latest reports from this property are stated to be most satisfactory. The Queen Bess Proprietary Company, Ltd., has been engaged upon the driving of the main tunnel at a much lower level, to meet the shaft sunk from tunnel No. 5, and the proceeds of all the ores mined have been used for the development of this work. According to latest cable advices, the connection between the shaft and the main tunnel has now been made. No. 6 level has been opened up in good ore for a considerable distance, and the engineer in charge of the mine intimates that the shipments from the mine will be greatly increased, while the expenditure on development will very materially decrease. With regard to the Atlin Lake Company, Ltd., the shareholders have been advised from time to time of the development in connection with the property. It is expected to commence washing the pay gravel in Birch creek by June next. Mr. C. K. Milbourne, one of the directors, has resigned his seat upon the board, and the vacancy has not been filled up. Capt. R. B. Needham, Mr. James Halcrow and Major-General E. H. Steward have also resigned their seats upon the board and Mr. George May and Mr. J. R. Murray were elected directors in their stead. In order to carry through the various contracts in which the company is interested, to provide for the liabilities and to finance some of the subsidiary companies, the directors deem it necessary that further funds should be raised, and they have decided to issue at par debentures to the amount of £10,000 lbs. in bonds of £10 each or multiples thereof, for the term of two years, bearing interest at 10 per cent. per annum, payable half yearly, secured upon the whole of the assets, with liberty to the company to redeem at any time after twelve months from the 31st March, 1901, on giving six months' notice. The holders of these debentures may at any time during currency of same and prior to notice from the company to redeem same, exchange the said debentures at par for shares in the company or in the Atlin Lake Company, Ltd., or the Gilbert River Gold Fields, Ltd.

BOSUN MINES.

The report of the directors of the Bosun Mines, Ltd., covering the period from November 8th, 1899, to December 31st last, states that up to March, 1900, no mining was in operation at the mine, owing to a general labor strike in the district, and therefore, the returns have been from only about 10 months' workings, although maintenance charges have been incurred for the whole fourteen months. In the accounts submitted the entire preliminary expenses of formation have been written off, together with 10 per cent. depreciation on all buildings and plant. Also all cost of development of levels that are ore-producing has been charged to revenue. A question has arisen between the local

smelters and the lead mining industry generally in British Columbia and the manager has advised that it may be advisable to reduce operations, and perhaps, to close down temporarily pending a settlement. The directors have, in the meantime, left this to his discretion. The directors recommend a dividend of five per cent. on the amount of all capital paid up.

YMIR GOLD MINES—QUARTERLY DIVIDENDS ANTICIPATED.

The second annual general meeting of shareholders of the Ymir Gold Mines, Ltd., was held at Cannon street hotel, on Monday, Mr. Montagu F. Armstrong (chairman of the company) presiding.

The secretary, Mr. E. R. Tasman, read the notice convening the meeting, and also read the auditors' certificate, as follows:—"To the shareholders of the Ymir Gold Mines, Ltd.—In accordance with the provisions of the Companies' Act, 1900, we certify that all our requirements as auditors have been complied with, and we report that we have audited the London books and have checked the incorporation therein of the accounts received from British Columbia, certified by the general manager, from 1st January, 1900, to 31st December, 1900, and the above balance sheet in our opinion is properly drawn up so as to exhibit a true and correct view of the state of the company's affairs as shown by the books of the company. (Signed) Monkhouse, Stoneham & Co., chartered accountants, London, E. C., 7th March, 1901."

The Chairman: Gentlemen—It is about a year since I last addressed you, when our mine was a far less important undertaking than it is to-day. We then had only a 40-stamp battery, and that solely dependent upon water power, and consequently liable to interruptions caused by the severe changes in the weather which are so common to British Columbia. The full capacity of the mill at that time did not exceed 35,000 tons per year, whereas we now have a complete milling equipment sufficient to deal with double that amount of ore—namely, 70,000 tons per annum, not dependent upon water power—as the old one was—but supplemented with steam power capable, when requisite, of doing the entire work, and thus always ready to provide whatever power may be required over and above that available from the water power. Naturally, water power can be worked at a much less cost than steam, and consequently the latter is only brought into operation to supplement the former when a shortage of water occurs. We have also introduced a complete 10-drill air compressor plant and several other improvements—all tending to the reduction of working expenses, and so adding to the value of your undertaking.

Mr. Fowler has furnished a very full report upon last year's operations, together with a plan of the mine workings and some interesting photographs, copies of which form part of the report which you now have in your hands. Upon reference to this report and plan, you will find that the main shaft had, at the commencement of this year attained a depth of nearly 650 feet, of which short drives have been put in, revealing the vein at that depth to not only correspond in width with the ore above but to contain similar value. In other words the ore at that depth is just as rich as it was above—a uniformity the importance of which will be apparent to you, and from this I think we can assume that the mine at the end of last year was proved to the depth of 650 feet. Mr. Fowler also states that no signs of geological disturbance have yet been met with which would indicate any change or cause him to doubt the continuity

of the mine at even greater depth. Work at the main shaft is being continued for another 350 feet, when it will reach the 1,000 feet adit tunnel now being driven in from the surface. With the aid of the air drills this No. 10 adit tunnel is at present being driven at the rate of 125 feet per month, and having reached a point 596 feet in at the end of last year, it should reach the vein at the end of this year. Mr. Fowler estimates that at the end of last year there remained above No. 3 level ore reserve to the extent of 97,600 tons, from which you will see there is more than sufficient ore to keep the mill going, above No. 3 level, until the 1,000 feet adit connects with the vein and becomes the main working level of the mine. This is important as showing you how completely all the working arrangements of the mine have been made to harmonize with each other so as to avoid any such circumstance occurring which one notices so frequently in many British Columbian mines of having to curtail the output owing to development work not having been pushed sufficiently ahead. To sum up the position, I think I am right in saying that the Ymir mine operates the largest and best equipped stamp battery in British Columbia, the character and style you can judge for yourselves from the photographs appended to the report. For some time past Mr. Fowler and his staff have had under consideration the most advantageous process to adopt for extracting the gold remaining in the tailings as they pass from the mill, and, finally, after extensive tests, the cyanide process was selected as likely to be the most satisfactory. This being so, your directors gave instructions for a cyanide plant of 10-ton daily capacity to be erected without delay, and this plant commenced operations on the 10th of this month, and we shall know the result by the end of the month. Mr. Fowler, in his report, refers to the ore being slightly less amenable to amalgamation in the lower part of the mine than is the case above, which, while tending to reduce the extraction by means of the amalgamation table, increases the amount of concentrates derived from it. It is, however, very satisfactory to learn from Mr. Fowler that he considers whatever loss there may be from this cause will be more than compensated for by the gain derived from the use of cyanide, and that should the ore at that depth prove slightly more refractory than it is above, no reduction of profit is likely to arise on that account. As explained in the report, the net profit shown in the accounts before you for the last year amounts to £30,928 5s. 7d., after writing off considerable amounts for development, depreciation, and other charges which, considering that during last year work was interfered with, and fraught with many expenses which are not likely to occur again, is a result which, I think, can only be regarded as extremely satisfactory.

The accounts furnish every detail, and explain themselves, but I must draw attention to the heavy general expenditure in British Columbia, the whole of which, you will observe, is charged against the year's revenue. Of course, the government tax accounts partially for this, but the greater portion is due to the extra expense thrown upon the administration by the purchasing of the machinery and material and other work in connection with it. The interest on loans also arose entirely from the same cause. Apart from these extraordinary expenditures I must admit that the working costs have been somewhat higher than your directors had expected, but when due allowance is made for interruption and disorganization arising from the introduction of the new arrangements for doubling the output, I think you will agree with me that they are not unduly so. Until the commencement of July the 40-stamp mill, being actuated by water alone, was to a certain extent de-

pendent upon the thermometer and consequently suffered considerable interruption. The connecting up of the new mill also caused nearly one month's delay, and again, the whole mill was shut down for two periods since then owing to the accidents which are so very liable to occur with new machinery at the commencement of operations. Upon connecting up the new mill with the old one the opportunity was taken to thoroughly overhaul the old battery and to put it in first-class repair, the whole cost of which was debited to the past year's working expenses. In fact, it is only right for me to explain that our general policy is to charge all repairs against revenue, which, for last year were so heavy as to appreciably affect the working expenses. Under these circumstances I feel confident that we can rely upon the working expenses for the current and future years being less than those of the year 1900, and, consequently, for that reason alone we may expect that our profits will be proportionately larger, apart from the fact that the mill equipment is capable of giving 55 per cent. better output than it did last year. You will doubtless have noticed from Mr. Fowler's report that little or no rich carbonate ore was shipped from the mine during 1900, which, to an important degree, accounts for the average value per ton of ore produced being less in 1900 than it was in 1899. These rich carbonate deposits only occur at intervals, and the fact is that practically no fresh deposits of this character have been opened up during the past year. Whether there are any more or not is a question which can only be known as the stoping proceeds. Without these deposits of very rich ore, and with the excellent arrangements now made for treating the main ore body the accounts before you must be convincing that the Ymir mine is one which can not only be worked at a profit but at a very large profit indeed. It admits of the cheapest possible mode of working, it has been proved to a depth of 650 feet, and can be worked to a further depth of 350 feet, or 1,000 feet in all, by means of level adits, and how much further the vein will maintain itself below that depth is a matter upon which I hope to be able to give you some information at our next meeting. I feel that I should not close my address without congratulating the shareholders upon the very much improved position of the company, resulting from the reinvesting of the profits in the mine for the purpose of doubling the output, instead of increasing the capital of the company. This policy, though somewhat taxing your patience in not receiving dividends upon the profits made has practically doubled the value of your holdings. From the accounts before you you will perceive that at the end of the year, after paying off all liabilities, and upon receiving payment for the product in transit, the company was in the position of having cleared off all debts and liabilities, and had a credit balance of some £7,500 to its account, which, with profits made during January, enabled the directors to declare an interim dividend of 1s. per share, free of income tax, at the end of January.

TWENTY PER CENT. AND BONUS.

Although the Ymir mine possesses the element for a more regular return than most gold mines do the directors hesitate to state what the yearly profits are likely to be, but I think I might go as far as to say that they have at the present time in their minds the practicability of quarterly dividends of 1s. per share, which, it is hoped, will still permit of an additional balance being distributed at the end of the year.

It would not be right that I should close my remarks without referring to the services rendered by your

managing director in London, Mr. Popkiss, and of your staff in British Columbia. I can assure you that the shareholders are greatly indebted to Mr. Popkiss for his unremitting attention to their interests, and I can speak with knowledge of the advantage which has accrued from his unceasing watchfulness and careful study of the position. No item is too small, no trouble too great, if he thinks that effort on his part will conduce to the advantage and value of your property. Your very hearty thanks are also due to your general manager in British Columbia, Mr. Robertson, and your engineering chief, Mr. Fowler. These gentlemen have from the commencement done their very best to make the Ymir property one of the best, if not the best, in British Columbia, and I feel that their efforts are being crowned with success. (Applause). I will now move: "That the directors' report and statement of accounts to the 31st December, 1900, now submitted to this meeting, be and the same are hereby adopted."

Mr. Richard Popkiss seconded the motion, which, after a short congratulatory discussion, was agreed to unanimously.

The retiring directors Mr. Edward Heasman and Mr. R. C. Ogilvie were then re-elected, the auditors re-appointed, and a vote of thanks to the chairman, directors and staff terminated the proceedings.

MONTH'S MINING.

BOUNDARY DISTRICT.

(From Our Own Correspondent.)

BEFORE this letter appears in print the aggregate tonnage of ore shipped from the Boundary district will have exceeded 200,000 tons. As the quantity shipped to the end of April, 1900, was less than 2,500 tons, this means that 200,000 tons, about, represent the output of the district during twelve months ended 30th ult. This is a creditable showing, but since the output for the four expired months of the current year, has equalled that of the whole of last year, it is evident that 1901 will make a much bigger showing than did 1900, should nothing occur to interfere with the increasing progress now being made. The average daily output, during the three weeks ended 21st ultimo, was 1,100 and 1,200 tons. Should there be no decrease in the quantity being shipped—the prospects are reasonably favorable rather for a gradual increase—this year should easily treble the tonnage of last year, and there is a strong probability of its doing so. Five-sixths of the ore the mines are now shipping are being treated at local smelters, in the proportion of rather more than three-sixths at the Granby Company's works and the remainder at those of the British Columbia Copper Company, both of which continue to run most successfully.

Taking the daily average tonnage for April as 1,100 tons the output for the month should total 33,000 tons, as under:

Old Ironsides and Knob Hill group	18,500 tons
Mother Lode	10,000 "
B. C.	4,500 "
	<hr/>
	33,000 tons

The actual tonnage of the Old Ironsides and Knob Hill group, for the first seventeen days of April, as given by smelter returns was 10,558 tons, or an average of 621 tons a day. Later smelter weights are not available at the time of writing, but as the minimum

daily output is 20 cars, running about 30 tons each, there is no good reason to suppose that the total given above will not be reached. The Mother Lode and B. C., respectively, averaged about 340 and 190 tons per day during April, up to the time returns were received by the writer, so the estimated totals for the month given above will most probably be reached. There will be several small shipments to add, so the month's aggregate is more likely to be somewhat larger than smaller than the estimate given.

The following table shows the shipments during 1900, and for three months ended March 31, of the current year:

	1900 Tons.	1901 Tons.
Old Ironsides and Knob Hill group...	64,535	54,618
B. C.	19,494	9,852
Mother Lode	5,504	9,540
City of Pearls	2,000	.....
Golden Crown	1,800	.....
Winnipeg	1,200	.....
Athelstan	1,200	150
Carmi (West Fork) .....	.....	1,000
Sundry Shipments:—		
North Fork Kettle River.....	800	
Boundary Creek.....	1,000	1,000
Total.....	97,593	76,160
Summary:—		Tons.
Ore Shipped during 1900.....		97,593
Ore Shipped during 1901 to March 31.....		76,160
Ore Shipped during April, 1901.....		33,000
Total.....		206,753

No addition has been made to the number of mines regularly maintaining shipments to the smelters. Small shipments of ore are occasionally made from other properties, but the only three mines in this district that have as yet fairly become entitled to be designated "shipping mines" are the Old Ironsides and Knob Hill group, the Mother Lode and the B. C. When it is stated that the quantity of ore received by the smelters from all other sources in the Boundary district during the current year, even including about 1000 tons delivered and enroute from the Carmi on the west fork of Kettle river, aggregates, less than 1500 tons, it becomes quite apparent that the inflated statements of "boom" correspondents, who last year indulged in frequent and gross exaggerations relative to shipping mines, were entirely unwarranted. The latest bubble to be pricked is that of the Morrison, in connection with which it was given out a few weeks ago that a contract had been entered into for the supply of 100 tons of ore daily from this property. The further statement was made by one who claimed to speak with authority that definite arrangements had been made with the C. P. R. to put in a railway spur to the mine. Probably the intention was to make this connection, but it appears that it has at last been realized that the mine is not opened up sufficiently to maintain so comparatively large an output for a small property, nor is it yet equipped with drilling and hoisting machinery that will admit of that quantity of pay ore being got out every day. Slowly it is dawning upon those who heretofore have been misled by reckless misstatements, that to ensure a continuous output of 100 tons daily something more than the doing of a few hundred feet of underground work and the provision of a small hoist, and two or three machine drills

THE
MORRISON
BOOM.

are required. In order to be in a position to economically mine and ship that quantity of ore daily, stopes in a sufficiently large body of pay ore must first have been opened, development work been pushed ahead and power appliances installed to handle it. It is simply surprising how easily and frequently many people are misled by exaggeration of, it may be ignorant or it may be designing, persons on whose assertions they should know little or no reliance may be placed, but time and again they allow themselves to be deceived and then, not to their own folly, but to the mining industry is attributed their losses. But such experiences are by no means peculiar to this district; they are repeated in connection with every mining district of importance and so may be regarded as an inevitable accompaniment of mining. Except in a few instances this district has not occasioned much loss to those who have bought stock in mining companies, but it can well dispense with such experiences as, for instance, resulted last year from exaggeration and misrepresentation in connection with the Golden Crown and Winnipeg claims. Probably the few benefitted monetarily, but the many suffered loss, what is more serious from a district point of view, mining in the Boundary received a set-back. However, such a large measure of success has been attained by the three mines first mentioned above, that the mining industry must flourish in the district in spite of loss occurring to some by reason of the incompetence or selfish scheming of others.

Besides the old Ironsides and Knob Hill group, on which development is being kept well ahead of ore stopping, the properties at work in Greenwood camp are the Brooklyn, Stemwinder and Idaho, owned by the Dominion Copper Company, of Toronto, and the Snowshoe, which was the subject of a special article in last month's RECORD. On the three first-named claims a comparatively large number of men are employed, but particulars of the work in progress are not being made public by the management. At the Snowshoe good progress is being made with the raise from the railway tunnel to the surface, and a shaft is being sunk to meet this raise. Several carloads of ore, taken out in the course of development, have lately been sent to the Greenwood smelter for test purposes. No work, other than a few assessments, is being done east of the Snowshoe until the Winnipeg, in Wellington camp, is reached. Here the winze is still being sunk on the second north vein at the 300-foot level, and it is intended to continue it until a depth of 150 feet below the level shall have been reached. It is stated, officially, that there were 12 feet of solid ore in the vein when the workings were narrowed to the ordinary width of the winze, which is now more than 100 feet in depth. The prospects of the Winnipeg are now more encouraging than at any previous time since the shareholders in the old company first realized that they had been misled. This is the more gratifying, since, for a time, the efforts of the present managing director, and those who pluckily backed him up, were regarded as something of a forlorn hope. Now, thanks chiefly to the persistent energy of Mr. R. Plewman, of Rossland, who led this forlorn hope, and the competent mine management of Mr. Nicholas Tregear, there is good reason to hope that the property will yet develop into a mine, and that a few months hence there will be sufficient ore in sight to warrant a larger power plant being put in and other steps being taken preparatory to sending out ore regularly.

In Summit camp the B. C., R. Bell and Blue Bell, continue at work. The B. C. has entered into a new arrangement with the Trail smelter under which it has

THE
WINNIPEG.

already materially increased its shipments, as evidenced by its enlarged output for April. A diamond drill has been obtained for use in the mine, and prospecting with it is now proceeding. The vertical shaft of the R. Bell has been deepened to about 250 feet, and a crosscut is now being run at that depth with the object of cutting the ledge, which it is thought will be reached within 150 feet from the shaft. The manager is sanguine that this crosscut will open up

SUMMIT
CAMP.

a good-sized body of ore. A crosscut from the shaft of the Blue Bell encountered the ledge in a very short distance, and a drift along the footwall soon ran into about five feet of ore. By the time the news reached Rossland, between the managing director and an overcredulous interviewer, the ore shoot had grown to 15 feet, which was the size given by a Vancouver newspaper, in its ignorance of the claim and of the elastic ideas of the managing director. The importance attached by the boomer to the sending out of a few cars of ore from an open cut on the Emma claim, also in Summit camp, seems to have dwindled away before the test of the smelter's sampler, for nothing is now heard of this claim as a "shipping mine." Probably the cost of learning the lesson that it is a risky thing to send surface rock to a custom smelter, has been greater than was looked for, so it may be expected that the next shipment, when made, will be from the bottom of the shaft, stated to be 100 feet in depth. Several men have lately been doing some surface prospecting on the Oro Denoro, situate close to the Emma, and owned by the King Mining Company, of Rossland, but no work has been done for a year or more underground on this once promising property, which a couple of years ago had more than an ordinary share of "boosting." The few hundred tons of ore lying on its dump, however, have such a good looking appearance as to suggest that capital and competent management should make a paying mine out of this stranded property.

Outside of the Mother Lode there is no considerable amount of work being done in Deadwood camp. No information relative to work on the Morrison has lately been given out but it is probable that some is still being done. The vertical main shaft of the Sunset is being deepened and is now down between 350 and 400 feet. It is proposed to sink 500 feet before the Sunset lead will be reached and 600 feet further to tap the ore body in the adjoining Crown Silver, owned by the same company. The most important feature in connection with the Mother Lode is the substantial increase in the output of the mine during the past month. A reference to the statement of ore shipments given above will show that this mine sent out 10,000 tons of ore during April as against 9,450 tons for the three months to March 31. Satisfactory as this progress is it is still more gratifying to have good reason to look for a further enlargement of output to at least 400 tons a day. Even this larger quantity will not leave much of a margin for accumulating a reserve supply at the smelter, which the management desires to do, so that it is quite probable it will ere long be exceeded. The ore supplies are being drawn from three stopes on the 300-foot level and a similar number on the 200, these together at present giving about 300 tons daily, which quantity is supplemented by about another 100 tons from a surface opening or quarry in the big outcrop. Two more similar quarries are being opened and it is estimated that these will increase the surface output to an aggregate of 140 to 175 tons per diem. Tenders have been invited and arrangements are being made to deepen the main shaft, now 325 feet in depth, to 500

DEADWOOD
CAMP.

feet, the intention being to run levels at both 400 and 500 feet depth. Work has been suspended on the Ah There, Greyhound, Marguerite and Great Hopes claims, all in Deadwood camp.

The installation of machinery at the No. 7, in Central camp, is about completed, so that the work of getting out ore should soon be in progress. Nothing has lately been heard of the City of Paris, on which work was suspended several months since, it is stated that some work is being done on the Republic group, in Smith's camp, but operations here are not yet of much importance. The only thing of interest to mention in connection with Long Lake camp just now is that an endeavour was made in London last month to sell the previously unissued shares in the Wallis-Haultain Syndicate, Ltd., which last year put in an adit tunnel on the Ethiopia 255 feet, tapping No. 1 vein at 52 feet from the mouth of the tunnel and at a depth of 40 feet and No. 2 vein at 211 feet in, and at 150 feet depth. These veins vary in width, from one foot to two feet, and their ore contents consist of tellurides, galena and iron and copper pyrites, in a quartz gangue, values being chiefly in gold and silver. The capital of the syndicate is £12,000, in 12,000 £1 shares, divided into 10,000 ordinary and 2,000 deferred shares. Of the deferred shares 500 appertain to the 10,000 ordinary shares (being in the ratio of 1 to 20), 500 belong to the founders of the syndicate, and 1,000 are the property of the managing director, Mr. C. S. Wallis, of Rossland, who in consideration of this allotment receives no salary, and provides the services of an efficient engineer. The ordinary shares are entitled to a cumulative preferential dividend of ten per cent. per annum, and have a preferential claim for capital; thereafter the profits are divided equally—one half belonging to the ordinary, the other to the deferred shares. The unissued ordinary shares offered last month numbered 5,417. It is not yet known in the district what success, if any, the effort to obtain additional capital met with.

The references already made to the Granby smelter, at Grand Forks, and the British Columbia Copper Co's smelter, at Greenwood, will have shown what these works are doing in the direction of reducing ore. It may added that grading and other preliminary construction work is being done at the Granby smelter, preparatory to increasing the number of blast furnaces to four and adding a copper converter to the plant of this, the largest smelter in the Boundary district. The Standard Pyritic Smelting Co's smelter, at Boundary Falls, is not yet completed, but it is expected that some additional plant will shortly be sent in and some alterations be made in the arrangement of the works. Reports, which appear to have been much exaggerated,

THE
SMELTERS.

to the effect that serious mistakes have been made in connection with construction, have been widely circulated, but the writer has received positive assurance, from an authoritative source, that these reports are not warranted by the facts of the case. One thing appears certain, though, viz., that this smelter will not be started up until the management is convinced that a sufficiently large and continuous supply of ore will be forthcoming. This was in a large measure taken for granted in the past, but the superintendent, Mr. E. J. Wilson, is not going to take any unnecessary chances in this direction. Hitherto there has been a tendency to neglect definite and positive arrangements for an ore supply, but Mr. Wilson knows his business too well to overlook this essential, no matter what others have done in the past.

ROSSLAND.

(From Our Own Correspondent.)

The failure of the Le Roi Company to declare the expected and long looked for dividend, and the combined drop in the price of War Eagle and Centre Star stock in the east, are two of the unpleasant features of the past month in mining circles. Incidentally the Payne Company also decided to pass the current quarterly dividend, and the shares have suffered accordingly. The reason for the passing of the expected Le Roi dividend is open to conjecture, but as the shipments have been unusually heavy for the past six months, and as the Great Western mines and Le Roi No. 2 have become substantial shippers of late, it can only be supposed that the Le Roi Company, in addition to meeting the heavy outlay for the new machinery at the mine, is also financially supporting the Northport smelter improvements and additions, as well as carrying the three other properties, viz., the Le Roi No. 2, Great Western mines and the Kootenay mines, until these properties get upon a firmer footing.

PASSING OF
LE ROI
DIVIDEND.

The non-payment of the dividend is, of course, a great disappointment to many mining men, with new and struggling properties, and who were looking to London for additional capital. Considering the advanced and improved condition of the Le Roi and the steadily increasing shipments, it can not be long before regular dividends are declared. At the present moment the Payne mine stands at the head of the dividend payers in British Columbia, it having paid \$1,438,000 to date, as against \$1,305,000 paid by the Le Roi.

It seems the rule at the present time that the announcement of any favourable news concerning a mine undoubtedly causes a drop in the companies shares.

This is particularly true regarding the War Eagle and Centre Star. It is pretty well known that the extension of the lower working of the War Eagle below the barren 7th level has resulted very favorably, the ore body having come in again and rather higher values than were expected have been obtained. The electrical compressor has been got in running order and shipments have been resumed over the big tramway from the shaft head, and generally that portion of the mine is distinctly improved.

The Centre Star Company has declared its 6th dividend of \$35,000 payable May 1st, making \$210,000 paid to that date and everything is said to be running smoothly at the mine, even possible friction with the miners having been successfully bridged over during the month, notwithstanding all these facts Centre Star stock has gone down far below par, while the once famous \$3.90 per share stock of the War Eagle has been hovering around the 30-cent mark and has gone even lower than that. Distrust of the mine management and of those who control it is probably responsible for a good deal and in addition the high price of all industrials in New York, as well as the many enterprises successfully seeking investment in Eastern Canada at the present time help to explain the situation. All B. C. mining ventures and stocks are correspondingly depressed, and in many instances good opportunities are now offered to shrewd and careful investors to make big money if they have a real belief in the permanence and the future of the mining industry and are prepared to back their views.

Three of the experimental properties in Rossland:—Homestake, White Bear and Green Mountain have come on very well within the past 60 days. The upper workings of the Homestake have been successfully unwatered, and work is being pushed to connect the main shaft with the lower tunnel, where the ore body

was discovered early in the season. The successful work of the diamond drill at the White Bear and the Green Mountain has been followed up with very good results in both properties, and, as the season advances further development, it is confidently asserted, will disclose a very fine amount of shipping ore on all three properties.

The camp has had a somewhat unexpected fright over labour troubles, during the month. In March it

THE
LABOUR
SITUATION.

was stated that no move would be made by the unions this season to disturb the good understanding arrived at last year. The miners, however, formulated three grievances: muckers wages, which are \$2.50 per day here and \$3.00 in other B.C. mining camps; the right of the union to canvas non-union employees, on the grounds of the mines, and the dismissal of union men without cause. The men alleging that foreign non-union men were being brought in to take the place of the discharged union miners. The managers of the Le Roi, War Eagle, Centre Star, Great Western, Le Roi No. 2 and Kootenay mines refused to increase the muckers wages claiming that the condition of the mines did not warrant it and added that if there was any trouble the present scale would be undoubtedly decreased or the mines closed down. The right to canvas or to interfere with employees during working hours, or on the mine property was also refused and the managers asserted that they were not unduly interfering with the union in so refusing, and declared that dismissals were only made for a cause, membership with the union not being one. For two weeks the union debated the matter and the camp generally was uncomfortable over the possible result. Finally a vote was taken and a strike was voted down. Manager Kirby of the War Eagle foolishly kept up the agitation by interviews and remarks in the local paper, but the whole matter has passed off and will not come to the front again this season, or until the mines commence to pay big dividends when doubtless the question will be reopened.

The annual statement of the War Eagle Company, in printed form, has been circulated here and as expected has come in for a good deal of unfavorable comment. Mr. Kirby lays stress upon the barren zone encountered in the 7th level, and while expressing a hopeful view about the future of the mine, remains silent concerning the lower levels alleging that sufficient development has not been accomplished to demonstrate their value. As the management there refuse all information at the present time it is impossible to obtain an official statement regarding the result of opening up the lower workings, but enough information has leaked out to justify the statement that pay rock has been again encountered in very satisfactory quantities and doubtless, sooner or later, the manager will relinquish his present methods and allow the outside shareholders and the public generally to know the real facts. Meantime the chief result of the "silent policy" is to play directly into the hands of bear speculators who are pounding the shares to their hearts content, while the bona fide investor pockets his losses with the best grace he can, and mining men generally say unpleasant things.

Messrs. A. R. Ledoux and W. B. Devereux, of New York, who examined the Trail smelter, at the instance of the Gooderham Syndicate, have sent in their report, but, as yet, no word has been received from Toronto or Trail as to the result. It is openly stated, however, that the main features of the sale of the plant, from the C.P.R.

PROPOSED
SALE OF
TRAIL SMELTER.

to the Syndicate, have been arranged, and the announcement of the transfer may be expected at any time.

The fifth stack of the Northport smelter, as well as the other improvements, are nearly completed and the shipments to this point, during May, will be considerably increased.

Over in the Nelson district the Ymir mine is making a great showing, and the annual report of the company makes interesting reading. The Tamarack in the same division has decided to ship a sample lot of 100 tons to the Silicia reduction works in order to ascertain the cheapest and best mode of treatment.

The ore shipments from Rossland continue to maintain a very good average, but until ownership of the Trail smelter is settled, and the additions at Northport are completed no great advance need be expected. Up to the end of April about 127,000 tons of ore has been sent out this year, so far, so that, bar accidents, we should reach the 400,000 ton mark by the end of 1901.

Mr. John Morrish has been succeeded at the Velvet mine, by Mr. Saurensen, an Englishman, sent out this year. Mr. Hopkins, formerly manager of the Silicia reduction works, has been transferred to the Yellowstone mine in place of Mr. H. E. T. Haultain, and a new man will be placed at Silicia.

Le Roi.—The second hoist at the head of the new five compartment shaft has been assembled and is now in running order. The original two-compartment shaft has been straightened out and repaired and is now used for timber. The aerial ore way has been working satisfactorily, but some changes will be necessary before quick work is attempted. All the output is handled by this means now, the old tramway not being used. No attempt has been made to move the great second-class ore dump of over 100,000 tons to the smelter, nor can this be done until the output already at Northport is reduced. Some 500 tons of the dump in question was sent to the Trail smelter recently, where it was wanted as a flux, and it is worthy of note that the ore was found to run as high as \$18 per ton. All this ore was taken out in the early days, when freight and treatment rates were very high, and when only rich ore could be profitably treated. Now that \$8 rock can be made to pay, it will be seen that the Le Roi would have a pretty snug sum available as soon as the smelter can treat this at one time valueless dump. The mine is being extensively developed, shipments continue about the same.

Iron Mask.—The average weekly shipments of assorted ore has been maintained during the month there are no new developments in the mine workings.

Homestake.—The upper workings have been successfully unwatered and the men are at work connecting the main shaft with the lower tunnel; about 100 feet of work will complete the shaft. Manager Hall's report on the value and extent of the ledge discovered early in the year is now awaited with interest.

Green Mountain.—The boring of the diamond drill has disclosed a ledge over 100 feet in width. The ore is of shipping quality and is said to run about \$10 per ton, as shown from assays taken from the borings. The ore is identical with that of the Giant on the west side of Red mountain about a mile away. As the ledge located is some 200 feet in from the point in the shaft where the diamond drill commenced work, it will be some weeks yet before it can be uncovered.

White Bear.—Work on the ledge recently discovered by the aid of the diamond drill has been in progress all month but the management is reticent about making any official statement as to the extent and value of the discovery.

Great Western.—Superintendent Desmond has resigned and has gone over to the Velvet mine, on Sophie Mountain. The new 40-Rand drill electrical compressor, recently erected, is in running order, and has commenced to supply air. The compressor system has been connected with that of the Le Roi, on the Black Bear ground. The new compressor forming part of the system, whereby the B.A.C. mines are all supplied. The output for the month shows a slight increase, but no new developments in the mine have been announced.

War Eagle.—Shipments from the mine head over the big tramway have been resumed and the electrical compressor is running again after being taken apart and made over. The report is current in the camp that the lower levels have disclosed plenty of ore below the barren zone in the 7th, but as the management decline to give out any information for publication, the fact cannot be officially ascertained. The shipments for April are about the same as the previous month, some 750 tons. Unless the Gooderham Syndicate purchase the Trail smelter the output will not be increased.

Centre Star.—Shipments from the Centre Star have fallen off slightly, only ten car loads a day in place of twelve going out. No reason for the decrease has been given. A complete repairing shop has been installed at the shaft-head level where repairs can be made without the annoying delays of the past.

Giant.—The mine remains closed down pending the completion in London of the transfer of the property.

Evening Star.—All shipments were stopped and the mine closed down about the middle of April, and Manager Chamberlain has returned to Spokane. It is not stated definitely when work will be commenced again, and several reasons are assigned for closing the property.

New St. Elmo.—A large amount of ore of low grade has been uncovered up to date by the tunnel workings, but nothing of note has happened during the month.

SANDON.

(From Our Own Correspondent.)

The Wonderful has this month been leased to Mr. W. W. Warner, a very successful mining operator of this district, who is at present in Spokane arranging to take over the lease held by Mr. Geo. B. Dean on the Miller creek. Under his management a great future is looked for in both of these properties. The Slocan Star is still working a force of about one hundred and twenty men, and is looking exceedingly well. The mill is being operated by steam power, there being at present only enough water for washing purposes. The showing in the bottom of the winze in No. 5 still continues satisfactory, both as regards width and grade. The American Boy is looking very promising and the output is also increasing, a contract having been entered into with the Hall Mines smelter, of Nelson, for the treatment of the product. The Ivanhoe, owned by the Minnesota Silver Co., still maintains its position as a regular producer, but, until recently, owing to a scarcity of water, a day shift only was employed in the mill. Now, however, the water supply is ample and shipments should consequently be greatly increased in the immediate future. Operations at the Sunset, at Whitewater, owned by the Canadian Gold Fields Co., were suspended during the month, meanwhile, Mr. W. H. Jeffrey has severed his connection as manager, and is, at present, on his way east to try to float the Kaslo smelter scheme. The Sunset at the head of Jackson basin, controlled by Mr. Geo. W. Hughes, still ships regularly.

SLOCAN CITY MINING DIVISION.

(From Our Own Correspondent.)

The mountain road and trails being impassable, owing to the spring break up, it would seem a good time to review the winter's work in this division and outline plans for the summer.

The ore shipped since January 1st, amounts to 1683 tons, of an average value of about \$100 per ton, from the following properties: Arlington, 1335; Enterprise, 140; Black Prince, 100; Two Friends, 40; Bondholder, 22; Phoenix, 20; Chapleau, 15; Speculator, 10; total 1683 tons. All of these except the Enterprise (Ten-mile) and the Chapleau (Lemon), are on Springer creek. The Arlington is out of the list of prospects and rapidly coming to the front among the mines.

Development and ore extraction have been steady and satisfactory all winter. The plans for the summer include considerable outside improvements and the opening of the mine to deeper levels. The Speculator above and adjoining the Arlington is being rapidly opened up (about 40 men on the roll). The last shipment of 10 tons gave good returns and the outlook for another mine here seems to be excellent. The Phoenix, a quartz property about 1½ miles up the creek, has just made its initial shipment of a car load of \$80 rock. The Black Prince, Two Friends and Bondholder, all old acquaintances, have been worked to more or less advantage under lease and will continue work during the summer. On Ten-mile the Enterprise people are putting up a big concentrator, some of us wonder why! as the ore is certainly well concentrated in the vein. The Iron Horse is being developed with a fair force of men and good ore being taken out. Twelve-mile has made no shipments so far but V. & M. about two miles from the lake has been very thoroughly prospected near the surface and the showing is so satisfactory that practical development under Mr. B. P. Little is now under way and ore being sacked for shipment. Lemon creek has had an unsatisfactory winter. The Chapleau mill proved unsatisfactory and money troubles followed. Work in the mine was stopped, and at one time it looked as though the whole thing would go by the board. However, arrangements have been made for resuming work, and we still hope to see the Chapleau a profitable undertaking. Development, in a small but steady way, has been going on at the Kilo all winter, and on the Creole for about three months. There will be some hundreds of prospectors and others at work on the creek next month, as the general opinion seems to be that this is Lemon creek's year.

With regard to the new undertakings, the Republic group and the Tamarac group, on Springer, have been bonded and will be developed as soon as the season opens up. The Evening Star people are planning extensive developments, including three miles of wagon road.

On the whole the outlook is a very satisfactory one. The work that has been done during the winter has been, generally, well planned and remunerative, and while we are not looking forward to any very great excitement this summer, we do expect our camp to progress steadily all the way through.

♦

We are in receipt of Bulletin No. 27, issued by the Northern Electrical Mfg. Co., of Madison, Wis., describing the direct current generators manufactured by them. The circular is handsomely illustrated and contains much valuable information.

THE MINERAL PRODUCTION OF CANADA IN 1900.

WE are indebted to the Geological Survey for the following summary of the mineral production of Canada for 1900.

(SUBJECT TO REVISION.)

PRODUCT.	QUANTITY. (a)	VALUE. (a)
METALLIC.		\$
Copper (b).....Lbs	18,919,820	3,063,119
Gold, Yukon.....	\$22,275,000	
" all other.....	5,441,752	
* Pig Iron.....Tons	35,387	27,916,752
Lead (c).....Lbs	63,169,821	583,158
Nickel (d).....Lbs	7,080,227	2,760,521
Silver (e).....Ozs	4,446,595	3,327,707
Zinc.....Lbs	212,800	2,730,598
Total Metallic.....		49,391,197
NON-METALLIC.		
Arsenic.....Lbs	606,000	22,725
Asbestos and Asbestic.....Tons	30,641	763,431
Chromite....."	2,335	27,000
Coal....."	5,332,197	12,668,475
Coke (f)....."	157,134	649,140
Fire Clay....."	1,245	4,130
Graphite....."	1,922	30,940
Grindstones....."	5,549	53,450
Gypsum....."	252,001	259,009
Limestone for flux....."	52,966	39,332
Mica....."		166,000
Mineral pigments—		
Baryta.....Tons	1,331	7,575
Ochres....."	1,966	15,398
Mineral water.....		75,000
Natural Gas (g).....		417,094
Petroleum (h).....Bbls	710,498	1,151,007
Phosphate (apatite).....Tons	1,415	7,105
Pyrites....."	40,031	155,164
Salt....."	62,055	279,458
Soapstone....."	420	1,365
Talc....."	1,000	5,000
Tripolite....."	336	1,950
STRUCTURAL MATERIALS AND CLAY PRODUCTS.		
Cement, natural rock.....Brls	125,428	99,094
" Portland....."	283,124	545,826
Flagstones.....		5,250
Granite.....		80,000
Pottery.....		200,000
Sewer Pipe.....		231,525
Slate.....		12,100
Terra-cotta, pressed brick, etc.		259,450
Building material including bricks, building stone, lime, sands and gravels, tiles, etc.....		4,850,000
Total structural materials and clay products.....		6,284,145
Total all other non-metallic.....		16,799,748
Total non-metallic.....		23,083,893
Total Metallic.....		49,391,197

*The total production of pig iron in Canada in 1900 from Canadian and foreign ores amounted to 96,575 tons, valued at \$1,501,698, of which it is estimated 35,387 tons, valued at \$583,158, should be attributed to Canadian ore and 61,188 tons, valued at \$918,540, to the ore imported.

(a) Quantity or value of product marketed. The ton used is that of 2,000 lbs.

(b) Copper contents of ore, matte, etc., at 16.19 cents per lb.

(c) Lead contents of ores, etc., at 4.37 cents per lb.

(d) Nickel contents of ore, matte, etc., at 47 cents per lb.

(e) Silver contents of ore at 61.41 cents per oz.

(f) Oven coke, all the production of Nova Scotia and British Columbia.

(g) Gross return from sale of gas.

(h) Calculated from inspection returns at 100 galls. crude to 54 refined oil, and computed at \$1.62 per brl. of 35 imp. galls.

Estimated value of mineral products not returned	
.....	300,000
Total 1900.....	63,775,090
1899 Total.....	49,584,027
1898 Total.....	38,697,021
1897 Total.....	28,661,430
1896 Total.....	22,584,513
1895 Total.....	20,639,964
1894 Total.....	19,931,158
1893 Total.....	20,035,082
1892 Total.....	16,628,417
1891 Total.....	18,076,616
1890 Total.....	16,763,353
1889 Total.....	14,013,913
1888 Total.....	12,518,894
1887 Total.....	11,321,331
1886 Total.....	10,221,255

It is gratifying again to be able to record a large increase in the total production of minerals in Canada during 1900, thus continuing the very satisfactory records of the past four years. The total increased by a little over 28 p. c., 12.6 p. c. of which must be credited to the enlarged output of the Yukon gold; 9.6 p. c. to increases in other metals; and 6 p. c. to the increase in the aggregate value of the non-metallic products, the value of the structural materials and clay products showing only a slight growth over past years.

Compared with 1894, when the steady increase began, the total mineral production of 1900 improved nearly 320 p. c., and since 1886, when the first figures are available, over 600 per cent.

The value per capita of the mineral income of the community based on an estimate of the population amounts to \$11.94, as compared with about \$3.90 in 1899 and \$2.23 in 1886. The per capita production in the United States for last year, is estimated at a little over \$15.

The metal mining industries of the country lead all other classes, contributing 63.27 p. c., the non-metallic accounting for 26.38 p. c., and the structural class being credited with 10 p. c. If, however, the Yukon placer gold be excepted as a special feature, the metallic and non-metallic products other than structural materials, stand nearly on an equal footing.

Grouping the metalliferous products with coal and coke, over 84 per cent. of the total output is accounted for.

1899.		1900.	
Product.	Per cent. of Total Production.	Product.	Per cent. of Total Production.
Gold.....	42.88	Gold.....	43.84
Coal and coke.....	21.45	Coal and coke.....	20.92
Building material.....	9.07	Building material.....	7.62
Copper.....	5.36	Copper.....	4.81
Nickel.....	4.17	Nickel.....	5.19
Silver.....	4.10	Lead.....	4.34
Petroleum.....	2.42	Silver.....	4.29
Lead.....	1.97	Petroleum.....	1.81
Cement.....	1.28	Asbestos.....	1.20
Asbestos.....	0.98	Cement.....	1.11
Natural gas.....	0.78	Pig iron.....	0.92
Gypsum.....	0.52	Natural gas.....	0.66
Salt.....	0.51	Salt.....	0.44

The above figures give the percentage contributions for 1900 based on the values of the different minerals produced in comparison with 1899.

As for several years past, gold is the dominant factor, followed by coal and coke; lead takes a much more prominent place, whilst petroleum ranks considerably lower. The pig iron item refers only of course to the proportion of the whole credited to Canadian ores. Other features of less import, will be evident on inspection of the figures.

Product.	Quantity.		Value.	
	Increase.	Increase.	P. c.	P. c.
Metallic—				
Copper.....	25.47		15.35	
Gold.....			31.30	
Iron ore (Canadian).....		7.40	14.96	
Iron pig.....		3.40	17.20	
Lead.....	188.94		176.81	
Nickel.....	23.26		60.93	
Silver.....	30.33		34.34	
Non-metallic—				
Asbestos.....	19.99		57.13	
Coal.....	8.27		23.19	
Coke.....	55.86		85.45	
Cement.....	2.97		1.98	
Gypsum.....	3.84		0.65	
Natural gas.....			7.70	

The foregoing figures illustrate the growth in the chief branches of the mineral industry.

In copper there were increases at every centre. In gold large in-

creases in British Columbia and the Yukon were slightly offset by small decreases in the eastern gold mining districts. The iron smelting industry shows encouraging features. The figures above refer to Canadian ore and the pig produced from it. The total production of pig from both foreign and home ore, viz: 96,575 tons, valued at \$1,501,698, compared with that of the previous years, shows a decrease of 6.19 per cent. in quantity and an increase of 9.03 per cent. in value.

The very large growth in the output of lead was slightly offset by somewhat lower prices. British Columbia, as practically the only producer, is to be credited with this gratifying feature of the year's record, as well as with that illustrated in the figures for silver, where the higher prices ruling considerably enhanced the already large increase in quantity. The nickel output of the Sudbury district in Ontario was much increased in quantity, and the prices were higher by about 30 per cent. as evidenced by the figures.

The chief non-metallic minerals show increases in quantity also, as well as higher values in most cases. Prices were much higher for asbestos, causing, of course, a larger output from the mines in Quebec. The coal output of the country still continues to grow steadily, and the value to increase owing to enhanced prices. The associated coke industries are growing rapidly, and the much greater value given is to be attributed to better prices and the increased prominence of the higher priced western product, chiefly from the Crow's Nest Pass operations.

CATALOGUES, CIRCULARS AND COMMERCIAL NOTICES.

THE West Kootenay Power & Light Company has ordered the necessary machinery for increasing the capacity of the present plant at Bonington Falls to 12,000 h. p. The contract for furnishing the generators and transformers and switchboards was let to the Canadian General Electric Company. The Stillwell, Pierce & Smith Vaile Company will furnish the water wheels. The Jencks Machine Company, of Sherbrooke, was awarded the structural iron work. Some idea of the size of the plant may be formed when it is known that it will weigh 1,400,000 pounds and it will take 50 cars to carry it. The water-wheels to be put in are to be the largest of their type in use, having an output of 4,800 horse power. The generators are each of 4,000 horse power. They are almost up to the largest sized generators in use. The transformers to be used for the "stepping up" of the power from a low voltage to a higher are also the largest in use, each having an output of 1,700 horse-power. When the new apparatus is in operation it is the intention to raise the voltage operating at present to 30,000 volts. This will greatly decrease the amount of copper used, and also lessen the losses.

The leather belting, which is described at "the Extra C quality, double 36-inch," in use in the mills of the Shawngnan Water & Power Co., was supplied from the works of Messrs. D. K. McLaren, of Montreal. This firm import only the English oak-tanned strap butts.

The James Cooper Manufacturing Company have begun the erection of a large new iron foundry at Lachine for the manufacture of mining machinery, to cost about \$250,000. The new works will be operated exclusively for the manufacture of the necessary castings, to be used in the other workshops of the firm. It is the intention at first to employ about three hundred men in the new works, but a much larger number will be required later on. The estimated cost of the new buildings and plant is about \$250,000.

Mr. Sidney Hayllar, of Vancouver, is acting as British Columbia agent for a number of well-known American manufacturing houses. Of these, the Smart-Eby Machine Co. manufacture the well-known "Brown" engines; girder frame, slide valve engines, fitted with Meyer's cut-off; high-speed automatic engines, specially designed for electric work (these engines are fitted with a double-ported valve which admits and cuts off steam very quickly, thus making a very economical engine); vertical engines; boilers in all sizes; pumps for every purpose, including a sewage pump (designed for handling liquids which are liable to have some solid matter in them); compound pumping engines; duplex pumps (Worthington type) also centrifugal and belt-driver pumps; electric travelling cranes and hand-power travelling cranes for handling heavy machinery, etc.; also refrigerating machinery; impulse and overshot water-wheels; Roger's patent shaking and dumping grate bars, which effect great saving in consumption of fuel over the ordinary grate-bar; shafting pulleys, hangers and general machinery, centrifugal sizers, marine engines, tank

work, etc. In gasoline engines Mr. Hayllar represents the Hercules Gas Engine Co.'s (San Francisco) machinery, and also the Weber Gas Engine Co., of Kansas City. The engines manufactured by these firms are high-grade and suitable for all power purposes. The Sullivan Machinery Co. have lately purchased the entire plant of the Bullock Mfg. Co., and are open to receive orders, and also undertake contracts for diamond drilling. In pumps, those made by the George E. Dow Pumping Engine Co. and sold by Mr. Hayllar are especially adapted for mining purposes.

MINING RETURNS AND STATISTICS.

THE COAST.

THE Lenora mine, of Mount Sicker district, shipped last month to the Tacoma smelter 1,863 tons of ore, representing an aggregate value of about \$36,000.

LARDEAU DISTRICT.

According to the report of a local paper, to the end of March 3,104,000 pounds of ore had been produced in the Lardeau district, valued at \$225,688.

THE SLOCAN.

The customs returns from Kaslo for the month of March include exports of ore aggregating 381,000 lbs., of which 134,250 lbs. were lead and 23,865 ozs. silver, valued at \$18,599.

The Sandon shipments to the end of March aggregate 3,805 tons, of which the Payne mine contributed 1,369 tons.

The shipments from McGuigan for the first two months of the year were 354½ tons.

The Three Forks shipments to the end of March total 656¼ tons, and from Whitewater 226½ tons.

The Slocan Lake shipments to date approximate 2,600 tons, of which the Arlington mine produced 1,335 tons.

The total shipments from the Slocan Division from the beginning of the year to the third week in April aggregate 8,892 tons.

NELSON DISTRICT.

The returns from the Granite mine for March are: Period of run, 26.9 full days; ore crushed, 1,161 tons; values recovered, 460½ ounces of bullion and 37½ tons of concentrates; estimated gross value, \$8,800; percentage of extraction, 89.3.

The following are the returns from the Ymir mine for last month: Eighty stamps ran 602 hours (25 days, 2 hours); 4,300 tons of ore milled; 324 tons of concentrates produced. Total revenue for the month, \$33,107. Total operating expenses chargeable to revenue, \$15,575.

The March run at the Athabasca yielded \$7,033.87, made up as follows: Value of bullion recovered, \$5,190.28; concentrates, \$1,834.59. There were 444 tons of ore crushed, and the run was one of 28 days and 16½ hours. The property is said to be looking better than ever.

BOUNDARY DISTRICT.

Shipments for the three months of the current year ended March 31st were as follows:

	1901.
Old Ironsides and Knob Hill Group.....	54,618
B. C.	9,852
Mother Lode	9,540
City of Paris.....	_____
Golden Crown	_____
Winnipeg	_____
Athelstan	_____
Carmi	1,000
Sundry shipments	1,000
Total	76,010

ROSSLAND.

The Le Roi shipments to the smelter for the month ended 31st March were 19,700 tons, yielding 6,847 ounces gold, 11,117 ounces silver, and 183 tons copper, value £42,236; value of matte shipped from the smelter to the refinery during the month, \$438,000.

	Tons.		
	1901.	1900.	Inc.
Shipments for January (revised).....	30,894	24,933	5,961
Shipments for February (revised).....	26,778	6,960	19,818
Shipments for March.....	39,000	279	38,721
Shipments for April (estimated).....	33,000	6,834	27,166
Total	129,672	39,006	41,316

THE METAL MARKET—APRIL.

SILVER.

THE Engineering and Mining Journal, of New York, comments as follows on the present condition of the silver market:

"Silver, after a long period of comparatively high prices,

has recently had a rapid decline, following a period of gradually falling prices. At the beginning of the year the current price in New York was 64c., and the average for January was 63.12c. On February 1st the quotation was 60½c., the average for the month being 61.06c. There was then a slight improvement, March opening with a quotation of 61½c., and showing an average of 60.63c. On April 1st 60½c. an ounce was quoted, but since then there has been a sharp fall, the price as we write being 59c. per fine ounce in New York, and 27¼ pence per sterling ounce in London."

According to latest advices a slight recovery is reported in the London market, the price having advanced to 27 1-16d. @ 27¾d., the New York quotations being 59@59½c.

LEAD.

The lead market continues dull and without any special feature, the ruling quotations remaining unchanged at 4.20½ @ 4.32½, St. Louis; 4.32½ @ 4.37½, New York. English lead is quoted at £12 5s. @ £12 7s. 6d. The average price in New York last month was 4.35.

COPPER.

Copper, which ruled very quiet during the first two weeks of the month, has recently shown considerable activity and strength, and reports from both American and European markets are decidedly satisfactory. The latest quotations are: Lake Copper, 167½ @ 17c.; electrolytic, in cakes, wire bars and ingots, 16.40 @ 16.50; in cathodes at 16.15 @ 16.25; casting copper, nominal at 16½. The average price of electrolytic copper last month was 16.42.

SPELTER.

The demand is very fair and prices have advanced. New York, 3.95 @ 4; St. Louis, 3.80 @ 3.82½.

COAL EXPORTATIONS.

THE foreign coal shipments from the Vancouver Island collieries to April 1st aggregate 265,445 tons. The shipments in March were divided as follows:—

	Tons.
New Vancouver Coal Co.	36,825
Ladysmith	34,474
Union.....	14,692
Total.....	85,991

The New Vancouver Coal Company's shipments for the three weeks ending April 20th were as follows:—

Date.	Vessel.	Destination.	Tons.
3	SS. "San Mateo"	Port Los Angeles	4,347
3	SS. "Titania"	San Francisco	5,754
7	SS. "Mincola"	Port Los Angeles	3,405
9	SS. "Milton"	San Diego	4,974
11	SS. "Kvarven"	San Francisco	2,955
11	SS. "New England"	Alaska	64
19	SS. "Titania"	San Francisco	5,787
20	SS. "San Mateo"	Port Los Angeles	4,350
20	SS. "New England"	Alaska	55
Total.....			31,691

EAST KOOTENAY.

The shipments from the Crow's Nest collieries, during March, were approximately, 40,000 tons.

THE LOCAL STOCK MARKET—APRIL.

THE hopeless dullness characterising the mining stock market in Eastern centres is reasonably well exemplified by the extraordinary weakness in War Eagle, Payne, Republic and Virtue, which rather more than a year ago were chiefly dealt in, in Montreal. War Eagle, which has sold as high as \$3.88, is now quoted at .24 asked, .17 bid; Payne from 1.70 has declined to .30 or thereabouts, Republic from 1.42 to .19, and Virtue from 1.20 to .11. In Toronto the apathetic condition of the market is no less marked, and dealing this month has been wholly insignificant. From present indications, some time must elapse before there is anything like a revival of interest, which will probably only be brought about when a number of mines which at present are included in the speculative class, are placed upon a prominent footing as regular dividend-payers.

In the West, particularly on the Victoria exchange, rather more activity has been displayed during the past four weeks, Noble Five, Morrison and Giant being in especially good demand. In fact Noble Five has experienced a distinct "boom,"

having advanced to 8 and $8\frac{1}{4}$ from $4\frac{1}{2}$. Morrison has, however, recently slumped in consequence of a delay in the construction of a branch line of rail connecting the mine with the Standard Smelting Works at Boundary Falls. But the most notable feature of the month is the slump in such good stock as Centre Star, which has fallen from 1.31 asked, .80 bid, to .40 asked, .30 bid; and North Star from .84 asked, .75 bid, to .75 asked, 50 bid. The decline in Centre Star is doubtless attributable to the unpopularity of War Eagle, while the unsatisfactory state of the bad market is probably to some extent responsible for the low price of North Star. It would seem that at present prices the opportunity for successful speculation in the better class of mining securities is exceptionally favourable.

NOTICE.

APPOINTMENT OF DEPUTY MINING RECORDER.

Under authority of Order in Council passed December 30th, 1899, the Honourable the Minister of Mines has been pleased to sanction, and I do hereby give notice that I have appointed James F. Godfrey, of Sandon, a Deputy Mining Recorder of and for the District known as Sandon District, in the Slovan Mining Division, with Sub-Recording Office at Sandon.

ANGUS McINNES,
Acting Gold Commissioner for the District.

Department of Mines, 23rd April, 1901.

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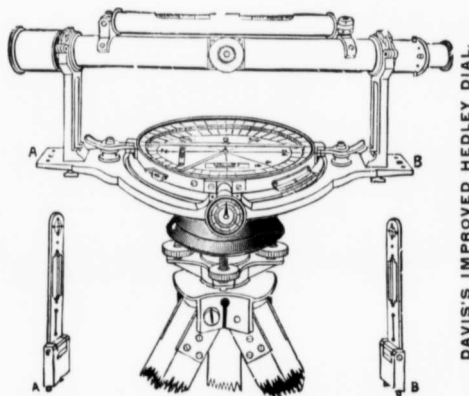
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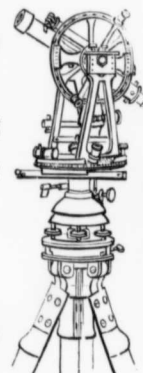
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