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THE MONTH.

THERE are certain metals whose consumption forms an index of the condition of industry. The chief of those are iron and copper. The great extension in the uses of copper, as applied in modern industrial development, have made it a factor almost as determinative of the condition of industry as iron itself. One of the most immediate effects of the industrial activity of the last two or three years was a large increased demand for this metal, an increased demand which was not met by a commensurately increased supply of the metal, but by a very marked increase in its price and in the difficulty of procuring it in sufficient quantities for industrial purposes.

THE COPPER MARKET.

Although copper is one of the most widely distributed of all metals, and one which exists in masses which can be profitably worked under suitable conditions in many portions of the world where it is not being worked to any large extent, it is still quite impossible to bring about suitable conditions for the opening of new copper mines in response to any sudden emergency. The development of a new copper mine requires not only immense capital but also a considerable period of time, and will not be undertaken unless there is good ground for supposing that the increase in price is not due to any sudden industrial boom, but may be looked on as a permanent condition. It is probably for this reason that the unique conditions prevailing in the copper market during the last year or two have led to less development of new sources of production than might otherwise have been expected.

If so, prudence has been justified in the outcome. There is not, by any means, the same demand for copper as there was, and in spite of many contrary opinions the demand is likely to become less instead of greater, and to be rather below than above the normal for some time to come.

As usual, the first symptoms of industrial distress appeared in Germany. There is no country, except possibly the United States, where industry is artificially stimulated more highly than in Germany, and it does not possess the enormous resources which enable the United States to carry this burden of artificial stimulation with comparative ease. Consequently the first symptoms of industrial depression, or reaction from an industrial boom, generally become visible in Germany, and they have been distinctly noticeable there for some time past. This fact has had considerable influence upon the copper situation in the United States, as Germany is the largest buyer of American copper, Great Britain controlling sources of supply in Spain, Australia and elsewhere. During 1900 the United States exported 160,082 long tons of copper. During the first six months of the present year the exports were 50,027 tons and a shortage of 70,000 tons is expected over the year. As production has not diminished there is naturally a process of accumulation going on. The excess of supply over demand is being carried by the Amalgamated Copper company, which for that reason passed its last dividend and the shares of which have taken a heavy drop on the Exchange. Through this action of the Amalgamated the price of copper has been maintained in New York at the same level as before. The New York price has been held so much in excess of the price in Europe that it has actually been profitable to export copper from Europe to the United States.

This is an entirely unnatural condition of affairs, to have an exporting country maintaining the price so high that it is obliged not merely to retain its own surplus but also to absorb the surplus of other countries. The end of it is absolutely certain unless one of two things

happens. Either the European demand must increase or the American demand increase so much as to use up the surplus. We confess not to be able to accept the most roseate views about the European demand. To say that it would go back to the conditions of 1900 would be to maintain the proposition that the late industrial activity was of a normal character. On the contrary, the reaction now in progress is likely to carry industrial activity below the normal for a while. Nor is the American demand likely to show any marked immediate expansion. It is much more likely to be affected by the same causes of contraction, though to a lesser degree perhaps, which are now influencing the European demand.

The *Engineering and Mining Journal* appears to defend the supposed intention of the Amalgamated company to maintain the price of copper on the ground that even if it did allow prices to fall consumption would not be materially increased. That is not exactly the point, production would be materially diminished. There is no trust in the world strong enough to control or limit the production of copper except by permitting the demand to regulate the price. If, in the face of a supply in excess of the demand, the Amalgamated Copper company endeavours to maintain the price of copper at from 16 to 17 cents a pound, its success will only last as long as its money does and that will not be very long. The success of a trust in maintaining an artificial price of any commodity in a particular country is purely and simply a question of controlling the sources of supply in that country, and of being protected against outside competition by means of an import duty. It is true that the Amalgamated company controls between 50 and 60 per cent. of the copper produced in the United States. Suppose it limited production in the mines it was able to control, and at the same time maintained the price at its present level, it would only be placing a bonus upon the production of mines it was unable to control, and fostering the development of new countries and new mines to enter into competition with it. Because then the American price would be looked on as a permanent institution until the Amalgamated Copper company was bankrupted, and a stimulus would be given to the development of mines which have been left alone during the boom conditions of the last year or two.

No conceivable condition of affairs would be more advantageous, temporarily at least, to British Columbia than this. The copper production of the Province is at present only a very small factor in the situation. This year it is only some three per cent. of the American production. But developed with a permanent market for copper at its present price provided at the expense of the Amalgamated Copper company, it would become in a few years time a very appreciable factor indeed.

It is, however, extremely unlikely that the Amalgamated Copper company will embark on any such Quixotic enterprise. Its immense resources may indeed be used, and wisely used, to steady the market, and prevent undue fluctuations from purely temporary causes, but we do not credit that company with any wild intention of tilting up against the law of supply and demand in reference to such a commodity as copper. Therefore, the only outlook at present seems to be a lower range of prices, and we rather think that so so far as the producer is concerned, that lower range of prices is already becoming apparent in the contracts for matte being entered into now.

With our cheap coal, abundance of ore, water-power and timber, it should be possible to produce copper as cheaply in British Columbia as anywhere else in the world, not to mention the fact that most of our ores contain gold in sufficient quantities to be of material assistance. Undoubtedly some of our low-grade ores possess advantages from a smelting point of view which place them on a level with ores of a higher grade but more refractory character in other parts. So long as we are able to produce copper, and lead, and gold, and silver, as cheaply or more cheaply than other mining countries, there is no need to be alarmed about the future of the mining industry.

THE NOBLE FIVE FIASCO.

Mr. James Dunsmuir's experiences in connection with metal mining in the Province have been singularly unfortunate. He has identified himself in particular with three enterprises, the Alberni Consolidated, the Fontenoy gold mine (Camp McKinney) and the Noble Five silver-lead mine. The first he abandoned after spending a large sum of money in exploitation work, which was not scientifically conducted; the second, he also lost interest in, although still a large shareholder: and so far as the third is concerned foreclosure proceeding have been commenced by Mr. Dunsmuir's instructions with the object of recovering the money advanced by him to the company some two or three years ago on mortgage. While doubtless Mr. Dunsmuir's losses in these several ventures have been heavy, the public also have suffered severely. When, in 1899, the Fontenoy company was floated in Victoria, a number of people were induced to purchase shares at an unduly high price upon the understanding that Mr. Dunsmuir was backing the undertaking, and also on the assumption that as he was in a position to secure the very best professional advice the property must necessarily be a valuable one. After a period during which the shares had been persistently "boomed" little more was heard about the Fontenoy, until one day shareholders were suddenly apprised that three judgments had been secured against the company and a meeting of shareholders was called to consider the position. At this meeting one director represented the board, but he informed the meeting that he was unaware whether or not he was still qualified to hold such a position and that he preferred, at any rate, to be present on that occasion in the capacity of an "irate

shareholder." Meanwhile, as was to be expected, no action was taken to satisfy the creditors or to arrange for the resumption of operations. The directors, however, bought up one judgment for a small amount, and the others have since been liquidated by private individuals. The company is still presumably in existence, but it has no office, no secretary, and to all intents and purposes, no directors. No returns have, to this day, been officially made, nor has the Company law, in one respect, been complied with. The shares, of course, are absolutely worthless. It is common to criticise and condemn the methods of British management of mines, but could there possibly be a worse or more flagrant instance of disregard of the interests of shareholders than here afforded? The case of the Noble Five is somewhat different. Three or four years ago the Noble Five company being in financial difficulties and hard pressed by one of the Sandon banks, which went so far as to have a liquidator appointed, Mr. Dunsmuir was induced, having just previously purchased a large block of shares, to come to the rescue, and advanced a sum of one hundred and fifty thousand dollars which not only relieved the company of its embarassment but afforded funds for future working. Since that time the stock has been more or less cleverly manipulated on several occasions. Two years ago in particular a report of sensational character in regard to the development of the property was unblushingly circulated, which had the effect of advancing the price of the stock to 36c. This report subsequently proved to be entirely misleading and the shares as rapidly dropped, until in the early months of this year they were quoted as low as 2c. The annual meeting of shareholders was held in March, and a statement submitted showing the position of the company. At this meeting Mr. Dunsmuir was not present, but one of the directors, Mr. B. J. Perry, who has acted as a sort of confidential agent of Mr. Dunsmuir's in connection with all that gentleman's mining investments and undertakings, quite voluntarily gave the shareholders attending to understand that although interest on the mortgage was considerably in arrears, Mr. Dunsmuir had no intention whatever of foreclosing, but on the contrary he had agreed to advance a further sum in order that the proposed scheme of development at the mine might be carried out in its entirety. Naturally this intelligence was most enthusiastically received, and when later it was officially stated that the outlook at the property had materially improved, the shares were again freely dealt in, advancing to 10c. The most recent reports from the manager were to the effect that at no time in the mine's history was the mine in a better condition and the hope was also held out that, with the rich ore in sight, not only were the prospects of paying off the indebtedness good, but that shareholders might, evn at no distant date, expect dividend distributions. It is true that it was at the same time given out that some little difficulty had been experienced with the owners of the neighbouring mine, the Last Chance, who claimed one of the ore bodies recently encountered on the Noble Five, and also that work might be suspended during the winter months on the property in consequence of inability to cope with the inrush of water in the lower workings, but these reports had little, if any, influence on the market. Suddenly, however, without any warning, shares having been sold but the day before on the Toronto market at the relatively high price ruling in the early part of October, it became known that Mr. Dunsmuir had decided to foreclose, and a writ was issued the following week. The consequent loss to investors is very considerable and naturally a great deal of indignation is expressed at Mr. Dunsmuir's precipitate action. Before passing judgment, however, it is well to consider the facts. Referring again to the Fontenoy, except that Mr. Dunsmuir is fortunate or unfortunate enough occupy an exceptionally prominent position in the community, both politically and on account of his great wealth, in consequence of which the association of his name with an enterprise of this nature was sufficient to guarantee its solidity with the investing public, he must be absolved from all responsibility attaching to the miserable failure of that worthless concern, and was probably as badly deceived in the matter as any of his fellow shareholders. But the course of action followed by Mr. Dunsmuir in his seemingly disregardful treatment of Noble Five shareholders is certainly worthy of examination. The whole case hinges on this, whether or not or how far Mr. Dunsmuir is cognisant of, or responsible for, the actions of his reputed agent, Mr. B. J. Perry. It is through Mr. Perry's efforts largely that speculation in this stock has been encouraged and maintained, and it was Mr. Perry who allowed shareholders to believe at the meeting last March, that no step such as has occurred in the way of mortgage foreclosure was contemplated or to be feared. It is true Mr. Dunsmuir has never personally confirmed this assurance, but on the other hand he has not denied it ; and in allowing the public to believe in the truth of the assurance made in his name, without attempting to undeceive them, he was morally bound to abide by it. If foreclosure proceedings had been instituted last spring before the annual meeting, Mr. Dunsmuir would have been well within his rights, and he would have acted as any business man in his place would have acted in trying to realise upon an unprofitable investment. The interest due was far in arrears and shareholders had made up their minds to lose the property and accept their losses with the best grace possible. Instead of taking the obvious course Mr. Dunsmuir displayed a quite uncalled-for generosity, and offered at his own private cost to defray the expenses of proving definitely the value of the property which, provided the result was satisfactory, would enable the public to share with him in the profits of an undertaking where the risk was all his. This arrangement was either planned in a most philanthropic spirit or it was a generous impulse ; in the same manner, it would appear, that the decision to foreclose was either the product of malevolent instinct, or from a mean impulse. In his

proposal to "carry" the Noble Five shareholders Mr. Dunsmuir assumed a certain self-imposed responsibility, and it is not creditable to him that he should have failed to recognise that responsibility. His action in the matter has added to the losses of those who previously invested in the property, for former shareholders having been led to suppose that so great an improvement has lately been made in the mine have, in many cases, bought again heavily in the hope of averaging. The worst feature, however, is the possible effect of the Noble Five fiasco on Eastern investors, for as may be supposed, Mr. Dunsmuir's action is not likely to assist in restoring confidence among this class in the desirability of mining investment in British Columbia.

The most extraordinary and erratic fluctuations are taking place at the present time in the local mining stock market. There is obviously no support being given to the market by legitimate investors. It appears to be left entirely at the mercy of more or less professional operators. As soon as a stock shows any buoyant tendency, a rush of selling orders swamps the market — a striking evidence of the entire lack of confidence existing. For the usual course of the investor is here reversed. When conditions are healthy the investor buys on a rising market, and the higher the stock goes the less does he feel inclined to lose his interest in it. Suppose an investor purchases a thousand shares in a mine what he considers a low and attractive price, say 30. The stock moves upwards to 35 or 40, and he considers it no worse an investment at 40 than it was at 30, which is very likely the case. Therefore, he does not sell. But at present so many people do sell, that quite independently of the value of the shares or the improved appearance of the mine, the stock rapidly falls to the price at which he bought, or even lower. The consequence is that when the stock again reacts favourably he also is found among the sellers. Through this process, which depends directly upon the discredit which has been attached to many of the mines represented by shares dealt in upon the open market, there occurs a continual depression in the general level of prices unwarranted, in some cases, by the position or outlook of the mines as mines. Such a condition of affairs is injurious to the mining industry as a whole. It is quite true that mining is extendiug and improving in the Province, and it may not be an unhealthy sign that the industry is becoming divorced from joint-stock enterprise of the peculiar kind of which we have had so many examples in the recent past. But after all joint-stock enterprise, not merely in mining but in all forms of industry, is the most powerful known machinery for the application of capital where capital is needed.

LACK OF OFFICIAL INFORMATION AND THE STOCK MARKET.

The development of joint-stock enterprise has had incidentally connected with it, not in British Columbia alone, nor more here than anywhere else, a large number of very gross abuses. In Great Britain one law after another has been passed for the purposes of restricting the abuses connected with company promoting. These stringent measures have not been highly successful. They have certainly made it harder to promote companies at all, but it is very questionable whether they have made it harder for unscrupulous men to fleece the public once the initial difficulties of promotion were overcome. Legislation of that character seems merely to restrict joint-stock enterprise without purifying it. It has certainly developed a large class of company lawyers whose main business appears to be to teach promoters how to defeat the purpose of the law without contravening the sections of the Companies' Act. In spite, however, of the abuses connected with the development of joint-stock enterprise the fact remains the same, that without it the wonderful industrial development which has characterised the latter half of the 19th century could never have taken place, and that without it the procuring of the capital to develop a new country like British Columbia would be infinitely slower than is necessary. Joint-stock enterprise decentralises the risk of loss and spreads it over a number of individuals according to the means of each. It is, therefore, peculiarly adaptable to the development of mines where the average success is, or ought to be, high but where the risk of loss in individual cases is considerable.

It is most important that the operation of mines by joint-stock companies should not be restricted but encouraged, and in order to accomplish that, it is essential that the individual shareholder should be protected as far as it is humanly possible to do so. Theoretically, the director of a company is the trustee of the shareholders. Practically, he is too often merely an agent of the promoter, or a tool in the hands of a clique operating on the market, who take advantage of the peculiar knowledge possessed by the board of the affairs of the company.

When a director gives a private hint to buy or sell the shares of his company he commits a breach of trust. He induces an outsider to purchase shares from the person whose trustee he is, on the strength of information he has acquired through his position as trustee. But so long as human nature remains unchanged this kind of breach of trust is likely to occur pretty frequently.

From the foregoing it is reasonably clear that the one protection for the shareholder does not lie in restrictive law but in enforced publicity. Because the root of the whole trouble lies in knowledge withheld from, or at least not procurable by, the ordinary shareholder. The matter is of vital interest to British Columbia at the present time, because our mining shares are largely discredited both on the London and on the Eastern markets, and they will remain discredited until the investing public are supplied with regular authentic and official information about the output and progress of the mines. What the investor requires is a periodical return of ore

marketed and its gross value. From the annual reports he can form a fairly adequate idea of the amount of profit in a certain amount of ore of a certain grade. Given this information, which is always supplied voluntarily by reputable companies, but which should be made compulsory for all, he has some ground to go on for his confidence, or want of it, in his investments and is no longer subject to the panic influences of the moment. Legislation has been passed for the purpose of acquiring and circulating this information but it remains a dead letter. Unfortunately there does not exist at the present time a too cordial understanding between the mine owners and the Government of the country, and the former take every opportunity to display their resentment. The reasons for this it is unnecessary to enter into, nor need we discuss their validity. Whether that attitude of the mine owners is justifiable or not is not the question. The feeling exists, and as a consequence continual friction and irritation are engendered, where harmonious and sympathetic action would greatly conduce to the prosperity of the Province.

The White Pass and Yukon Railway company has earned profits amounting to £340,000 during the past year, which permits of a distribution to the shareholders of 30 per cent. on their invested capital. We should think this is the most highly profitable railway line in the world. Naturally a railway company operating into a placer-mining country must be expected to return higher dividends than most railways, because of the risk of the exhaustion of the deposits taking away its *raison d'etre* altogether in the course of a few years. But the Yukon Territory served by this railway seems assured of being the scene of active operations for a very long time to come. In fact it is hard for us to realise that a time might come when this part of our country would again be given over to barren solitude. It seems more likely that without the assured life of the known placer deposits being taken into account other, and as yet unknown, districts will be opened up, as well as more permanent sources of wealth in the shape of quartz and copper deposits discovered, and that this railway will continue to serve a country in which the tide of enterprise is always rising and not falling. If that is the case the White Pass and Yukon Railway company has more to gain by acting as a colonization railway and stimulating the development of its territory in the matter of rates, than by grasping at every dollar which the industry of placer mining can afford to pay. And, indeed, while it is notorious that much complaint is current in Dawson over the freight rates of the White Pass and Yukon railway, directors of individual enterprises dependent on the railway service have generally admitted that they have been met reasonably and fairly by the officials of the railway company. At the same time the proposal to construct a second line of railway into the Yukon is interesting for a number of reasons, chiefly, however, as marking the confidence felt in the Yukon Territory as a permanent and abiding centre of industry. Such a railway would involve a considerable economic waste. There is no reason why two lines of railway should be built where one suffices for the traffic. It would be economically simpler to double the rolling stock on the road-bed already in existence. This second railway, if built, will be an interesting experiment in the benefits of railway competition. Though the traffic is sufficiently lucrative to pay 30 per cent. per annum on one line of railway, it would not be sufficiently lucrative to pay 15 per cent. on two lines of railway with the same amount of capital invested. And, if through their competition their respective dividends are reduced to 10 per cent. it would not by any means follow that the country would get the benefit of the 10 per cent. of profit eliminated. That would probably be absorbed in increased working expenses. But even if some benefit did accrue to the public, it seems rather strange that to accomplish this very salutary object an unnecessary expenditure of some millions of dollars should require to be made, and the Yukon Territory burdened with the support of two railways when, so far as the tonnage of freight is concerned, one is ample.

Referring to the effect of new company law in England, a correspondent writes: "It will no longer be easy, if possible, to float companies on the old lines. The new idea is to pay vendors by results and not in cash. For example, I am informed of a big flotation where the vendors are receiving their consideration in what is described as 'Royalty shares.' The vendors take £1 royalty per ounce, and the promoters ten shillings—in all £1.10 per oz. In spite of the bad times it is expected that the issue will be a success and that the public will come in and subscribe the whole working capital asked. They will naturally argue that this sort of flotation can be no 'wild cat,' and as no promoting money is paid and the vendors take their profits in royalties, both vendors and promoters must have confidence in the value of the property. As a matter of fact this new scheme is by no means a bad one for the vendors and promoters. They form this royalty into Royalty shares of one shilling each and get a quotation on the Stock Exchange and there will be dealings in them long before the property is on a producing basis." The same correspondent remarking on the prospects of interesting British capital in Western Canadian mining continues: "The idea (above outlined) is a new one, at least to the British public, and will, I think, prove popular and to the advantage both of shareholders, promoters and vendors. The difficulty, of course, is to get vendors to accept the terms. In B. C., I understand, everyone wants cash, and if I mistake not this is what they will find very difficult to get out of the British public in the future. But as I pointed out, under the system (or trick if you like to call it so) of Royalty shares quot-

ed and dealt with on the market, they can realise their holdings long before the mine is paying a cent. The sale or dealing in the Royalty shares only affect speculators and will not affect the shareholders one way or another."

While doubtless the new Royalty system so interestingly described by our correspondent is, in several respects, a vast improvement over old promoting methods, it is clear that it is just as open to abuse, but the truth of the well-worn saying tha you cannot make men moral by Act of Parliament has been long ere this sufficiently demonstrated. Again, particularly in the case of low-grade mines, any such fixed charge as thirty shillings per ounce of gold recovered would be an almost impossible burden, but of course, our correspondent does not intend to imply that this proportion is to form an arbitrary standard. A reasonable percentage of net profit earnings set aside to represent royalty to promoters and vendors would be obviously the only equitable basis upon which such an arrangement could be effected if the interests of shareholders are to be at all considered.

The statement made by Mr. Miner, president of the Granby Mining Smelting and Power Co., the other day that the improvements at the Granby smelter, now under construction, are being paid for entirely out of the profits of the last and this year's operations is extremely satisfactory. This company has not been very forward in bringing out a balance sheet and report, but, on the contrary, the main subscribers to the shares are the original subscribers, when the various companies now consolidated were promoted, and if they are satisfied the public has not any very serious reason of complaint. This company's operations have for some reason or another always been subjected to more than the ordinary amount of criticism, but in looking back over its history it is difficult to see where greater economy of organization or efficiency of working could have been attained. The ore in the Knob Hill and Ironsides is exceedingly low grade. It has always been felt that its successful treatment was in the nature of an experiment. But, certainly, if it had not been successful there would have been something very far out in the original calculations of its nature and value. It has, apparently on the contrary, proved fully as amenable to treatment as was expected, and the various economics originated in connection with the mine and smelter have proved most efficient and valuable. According to Mr. Miner the cost of smelting has already been reduced to $1.90 a ton and the increase in the plant, now being paid for out of profits, is expected not merely to double the tonnage but to still further decrease the cost of treatment per ton. Under these circumstances there is fairly good authority for the assertion that the enterprise is a proved success. This of course does not touch the question of the capitalisation of the company which, if it were considered as anything but a mere conventional figure, is excessively high. It must be years yet, at the best, before the company can hope to pay such dividends on a capital of $15,000,000, not to mention $20,000,000, as would justify the buying and selling of the shares at par. In the meantime a report and balance sheet giving the average value per ton of the ore treated, (for this is a fact that has never been disclosed by the management), will be awaited with great interest and, if satisfactory, will set finally at rest the fears of the most sceptical.

Reports which have the hall mark of authenticity, so far as they go, give intelligence of the discovery of virgin placer ground in the Cariboo district at the head waters of the Horsefly river. It is, of course, impossible to hazard a guess at the present time whether the creeks discovered will prove at all important or extensive, and it is unlikely that any competent opinion can be risked before the middle of next summer. But at the same time it is permissible to hope that placer ground of real importance has been found. There never was a territory, except the land of Ophir, in which there has been a longer and more painful hiatus between the glories of its placer days and the more settled and permanent prosperity brought about by modern methods of gold mining, than the Cariboo district. It is only now beginning to be realised what immense opportunities lie in its beds of gravel when hydraulic power has been brought to bear on them. Even now the progress made is slow and halting. An important discovery of virgin soil would change all that. It would bring population in, and the miner with his pan and rocker would be followed by the capitalist with his flume and monitor. Cariboo would again become a busy centre of industry, and the conditions of development are so changed from the early days that that industry would not be confined to one particular locality but would spread and ramify over all the gold-producing area. The effect also upon the general business interests of the Province would be most satisfactory. This is, perhaps, quite a superstructure to build upon the reports we have now to go upon. But it is better to have our eyes fixed upon the smallest apparent opening in our great unexplored territory, and to estimate its possibilities, carefully remembering that they are only possibilities which may never be realised, than to awake too late to what was possible to take full advantage of what has become actual.

Platinum is now a more valuable metal than gold, being quoted at $21 an ounce. In 1899 it was quoted at about $15, in 1900 in April it rose to $18.20, and has again advanced this year. An agitation has been inaugurated in Germany to have platinum restricted by agreement to those uses only for which it is an absolute necessity, as at present the demand is greater than the

supply. We have always been of opinion that this was the effect produced by a rise in price, and not only so, but that a rise in price was the most effectual, in fact the only effectual, method of so restricting the use of any article. The rise in price is likely not merely to restrict the use but also to bring out a larger supply, so adjusting the balance. Whereas, an attempt by agreement to limit the demand, if it did have any effect, which is most improbable, without increasing the price, would occasion no stimulus to the search for an increased supply of the metal. In the various articles on the subject we have seen lately what we should consider one of the chief dangers of an excessive rise in price has not been hinted at. It is, that platinum, having become the most valuable metal, except one or two so rare as to almost be unknown, except to science, may be rushed upon as a means of personal adornment. It is certain that the dearer it became, the more it would be prized for this purpose. It is fortunately an ugly metal. But then, æsthetically, gold is not so beautiful as copper in its various alloys particularly. Yet on account of its rarity and value large quantities are consumed every year in all kinds of jewelry. A similar sentiment inspired by its rarity towards platinum would have a serious effect upon its price and availability for industrial purposes.

A very remarkable testimony to the Canadian administration of the Yukon Territory is published in the columns of the *Spokesman Review* of Spokane, Wash., U. S. A. We make no apology for publishing it in full:

"For several years after the discovery of gold in the Klondike, there were bitter complaints by the Americans in that country over the injustice dealt out by Canadian officials, and it was commonly asserted by those having grievances that the administration of affairs would have been quite different had the rich placers been discovered on the American side.

"Since that early period of discontent in the Klondike, rich placers have been discovered on the American side and their uncovering was followed by a rush that in numbers and excitement nearly equalled the stampede to Dawson. The Americans have had an opportunity to show what they could do in properly administering a remote mining camp, and it must be confessed that a comparison of the methods of regulating mining, maintaining the law and providing the security to life and property is decidedly to the advantage of the British.

"In two years there has been as much crime and lawlessness at Nome as there has been at Dawson since its founding, five years ago. In the American camp there has been unprecedented disrespect shown the rights of property. It is two years' story of claim jumping, dispossession by force and interminable disputes over boundary lines. A camp, which, under British jurisdiction, would probably have been comparatively free from crime and disorder, with claim owners working peacefully and recording a large output of treasure, has, under American jurisdiction, been plunged into endless litigation that has paralyzed the energies of the district, tied up its properties, and made it a community of idlers, brawlers and discontents.

"Justice, according to all accounts, has been administered in a fashion most lame. Mining rights have been abridged or destroyed through the agency of unnecessary receiverships, projected work has been abandoned through fear that a disclosure of riches might result in a transfer of the property from the owners to the Court. Judicial scandals have furnished the principal topic of conversation for a year, and the President of the United States is now petitioned by members of the Nome bar to remove the Federal judge on the ground that he is weak and vacillating and dilatory, weak and partial, negligent, careless and absolutely incompetent.

"This is a most unhappy record for a camp that is indisputably rich and which at one time was thought to be so full of promise. Its development has been hampered by unfortunate circumstances, the most striking of which appears to have been that lack of orderly and prompt administration of affairs which obtained at Dawson during the early years of its history.

"The difficulties at Nome may be overcome and the camp will thrive, but in the meantime it may be fitting to abstain from criticisms of methods in mining camps across the line."

The appointment of Dr. Haanel by the Dominion Government as head of a mining bureau at Ottawa, is part of measures being taken to erect the mines branch of the Department of the Interior into a practical and useful part of the public service. For several years Dr. Haanel was professor of geology and mineralogy at Victoria college, Cobourg, and for the last eleven years has occupied the same position at Syracuse university. He was commissioned by Mr. Sifton to open the Assay office at Vancouver, and succeeded by incredible exertions in having it installed and in operation within three weeks time.

As quoted in the Toronto *Globe*, Dr. Haanel may be presumed to recognise the peculiarity of the present arrangement by which Yukon gold is assayed and paid for in Vancouver and Victoria and then shipped to Seattle just the same as before:—"My idea" he said "would be for the Government to purchase all the Yukon gold. Let them open an office, properly equipped, where the gold could be received and weighed and then exchanged for currency. It is better to keep the gold in the country than let it go to the other side. We shall need it for the Canadian mint."

Mr. A. B. W. Hodges, superintendent of the Granby smelter writes to the MINING RECORD as follows: "I regret to say that on account of the machinists strike in the East our arrangements for adding to the capacity of our works have been seriously interfered with, and from present indications it will be impossible to complete the proposed improvements before the New Year. Of course, you will understand that we are adding two more copper-matting furnaces which, when completed, will make four and will give us a smelting capacity of 1,300 tons per day. We have also increased our sampling and crushing capacity so that the combined output will be 2,000 tons per day if required. We are also putting in a converter plant to treat from 100 to 150 tons of matte per day and with our water-power we feel that we can treat matte cheaper than anyone in this country and we contemplate making contracts and treating here most of the output of copper matte made in B. C. and from other outside sources."

The abstract of the report of the Alaska-Treadwell Gold Mining company which we publish in another

column, is a remarkable testimony to the results which may be achieved by the economical mining and treatment of low-grade ore. But it should not be forgotten that the continued success of this company depends entirely on the fact that it has practically no exploratory work to do to develop the enormous tonnage which it handles annually. In any ordinary lode mine the dead work necessary to produce such a tonnage would more than eat up the profit secured from a grade of ore so low as that profitably mined at the Treadwell. It is therefore as well not to apply to the figures of the Treadwell balance sheet to mines where the same or similar conditions of ore supply do not prevail.

THE MINING OUTLOOK IN LONDON.

(From Our Own Correspondent.)

BUSINESS in the London mining market has for a long time past been very unsatisfactory, being chiefly limited to West Africans, where the excitement has at times been intense. Before West Africans came on the scene there were two principal markets. Kaffirs and West Australians, and it was at one time hoped that British Columbia would make a good third. But this was not to be, and West Africans took that position instead, British Columbians being quite out of favour now-a-days, and likely to remain so apparently. The public have had such a bitter lesson in connection with the Province that they are likely to remain shy for a long time to come. The collapse of the Globe and the B. A. C., and the scandals which have marked the course of the West Australian market from its inauguration, shocked the public, and Westralians are only slowly recovering from the effect of those disgraceful episodes. Unfortunately there is a prospect of one of the worst of them being reopened, for at the end of this month a creditors' petition (backed by all the strength of the Stock Exchange) is down for hearing for taking the London & Globe Finance Corporation out of the hands of the voluntary liquidator, and having the winding-up completed by the Court itself. Then there is the big fight in prospect in which the much discussed "Lake View Syndicate"—whose defection, Whitaker Wright alleges, was the sole cause of the collapse of the Globe and B. A. C. — is being pursued for damages, and in connection with which lively times are expected. In fact there is prospect of a whole series of big fights ahead; and it is perhaps not surprising in the circumstances that neither the West Australian market nor shareholders in West Australian companies feel very anxious to increase their investments and interests in the colony until some of the squabbles have been settled and the position is somewhat clearer. In South Africa the war drags on and Lord Kitchener's proclamation which expired on September 15, was not only ineffective, but was followed by a series of fresh reverses to the British troops. Of course we all know that there can but be one end to it all, but to achieve it is taxing all the patience and resources of the Empire, and there has been growing up a feeling of dissatisfaction with the government, which has even been expressed somewhat in such leading supporters of the present Executive as the *Times*, *Standard*, *Globe*, *Pall Mall Gazette*, etc. Rumour has it that Lord Kitchener had come to logger-heads with the Minister of War, and was about to resign; and although this was contradicted, there seems to be little doubt that there is something wrong in the conduct of the war. It is felt that more drastic measures should be taken, and it is possible that before these lines are in type the cabinet will have been compelled by the growing force of an adverse public opinion in this country to adopt those harsher measures which it is felt would be kinder in the long run. But, of course, such a state of affairs is not conducive to increased business in the mining market, as all the while the conflict lasts dividends are absent, and the burden which the industry will have in large part to be responsible for is growing at an alarming pace. So much so, indeed, that this prospective taxation has, for some time, exercised the minds of investors to a painful extent. The West African market has had one bad time at least already, but at the moment there is no immediate prospect of a crisis in this direction despite the enormous amount of capital which has been raised to carry on mining operations in the Gold Coast colony, and a very large proportion of which will certainly have to be written off as a dead loss to the investor. As a matter of fact many of these West African companies are pure gambling counters, and their promoters have but a shred of belief in their ultimate success. But West Africa came at a time when there was no other opening for the worst class of promoter, and it did as well as West Australia, or British Columbia. The consequence is that a mass of rubbish has been forced on to the public —whether any but a small proportion of this paper has yet been digested remains to be seen. A small proportion of these West African companies may pay, but recent bore-hole tests have caused some disappointment, and there is not the slightest doubt that the section is simply an inverted pyramid and will, sooner or later, cause trouble to the whole market. And then this month we have had an awful smash in copper and copper shares. The developments in connection with the Amalgamated Copper Co., of the United States, caused a very sensational fall in the price of G. M. Bs., and the reductions in the dividends of the Amalgamated, the Anaconda, and now the Rio Tinto has been punctuated by a corresponding depression in the prices of all copper shares. Rio Tintos were, at one time this week, as low as 45½, and although the Tinto dividend was rather better than the market had hoped for, the whole section has been weak in the extreme, Paris having been realising its holding of copper shares in a state of semi-panic. In the British Columbian section Le Rois have been better, and it was stated that the Globe liquidators had disposed of the whole of their holding of Le Roi No. 2, to strong city groups, but there can be little relief in this section until the legal questions at present in abeyance have been fought out, and these may take months to resolve. Meetings have been held during the month of the New Goldfields and the Snowshoe companies, while another new director has been added to the Le Roi board to make up for the absence in B. C. of Mr. Frecheville, who should by this time be in Rossland.

It will be seen that the mining outlook is not by any means a cheerful one, and although, no doubt, should the war be brought to an early conclusion—and at present the Boers seem as determined as ever to prolong the struggle — there would be an improvement which would benefit all sections, pending this much-desired event the market will probably drag along in much the same fashion as it has done during the past two years. There is at present, certainly, little to go for from the investors point of view, and the outlook in the mining market at this particular time is the very reverse of cheerful.

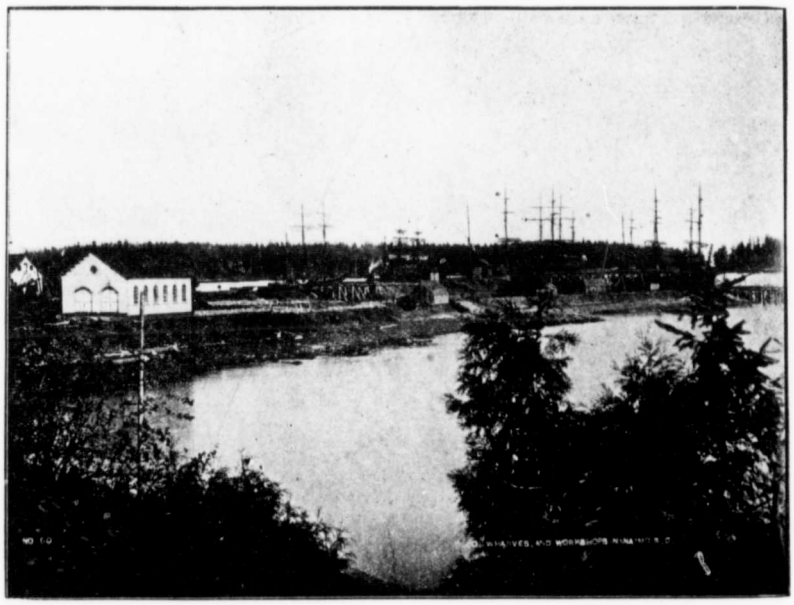
THE MINERAL RESOURCES OF VANCOUVER ISLAND.*

By W. M. Brewer, M. I. M. E.

CONSIDERED geologically in a general way, Vancouver Island is made up as follows: The coal measures through the northern and northeastern portions, with occasional masses of igneous rocks as intrusives, as for instance around Nanaimo, Cameron and Horn lakes; igneous rocks and a belt of semi-crystalline graphitic slate through the southern, southeastern and southwestern portions, with a narrow fringe of sandstones and conglomerates forming a portion of the southwestern coast line; igneous rocks and crystalline limestones through the western portion.

The geology of the greater portion of the interior of the island can only be guessed at because of the lack of trails, the heavy timber and the luxuriant growth of sallal and other underbrush which has rendered exploration or prospecting so extremely difficult that but very few men have ever attempted the task. The stage road from Nanaimo to Alberni offers a good opportunity to study the geology of that portion lying between Nanoose bay on the east coast and the head of Alberni canal on the west. Roughly speaking, sandstones and conglomerates of the coal measures occur until Cameron lake is reached; there igneous rocks are encountered, apparently belonging to the same class as make up the southern portion of the island, especially in the vicinity of Victoria; between the lake and Alberni another comparatively narrow belt of conglomerates and sandstone occurs, but about seven miles from the town these give place to igneous rocks which, with limestone, usually fully crystalline, prevail to the coast line. This condition is demonstrated by travelling down the Alberni canal to the Pacific ocean at the entrance to Barclay sound. From these premises the conclusion is apparently warranted that to the northwest the same geological conditions exist, but in addition there is the fact that around Comox as well as Hardy bay on the east coast, coal of commercial value occurs, also near the head of Quatsino sound, where the distance from the east coast to the head of the sound is only about ten miles. Along the west coast and as far into the interior as prospectors have explored, igneous rocks with the crystalline limestone (often excellent marble) are the prevailing country rocks.

Consequently from the present knowledge of the conditions of Vancouver Island, the assertion is warranted in a general way, that so far as its geology and mineral resources are concerned, the former is made up of igneous rocks in the extreme southern portion; a belt of semi-crystalline slates traversing the island, northerly from these igneous rocks, from the neighbourhood of Saanich peninsula, on the southeast coast, to San Juan harbor on the southwest coast; while to the northwest from these slates the island is divided into two distinct geological divisions, the sandstones, conglomerates and other sedimentary rocks, forming the eastern portion, with crystalline limestone and intrusive dykes of igneous rocks forming the western portion, except at some points along the west coast line where narrow strips of sedimentary rocks still occur, having apparently escaped destruction from the immense work of erosion which has been going on for ages. The mineral resources embrace the coal on the eastern side of the island, together with copper ores carrying low gold and silver values, together with occasional occurrences of gold-bearing quartz and immense deposits of magnetic iron ore, occur throughout the western and southeastern portions.



Wharves at Nanaimo from which the Coal is Shipped.

* Abstract from article published in the "Victoria *Times* Royal Souvenir Number," and reproduced by special arrangement with the proprietors.

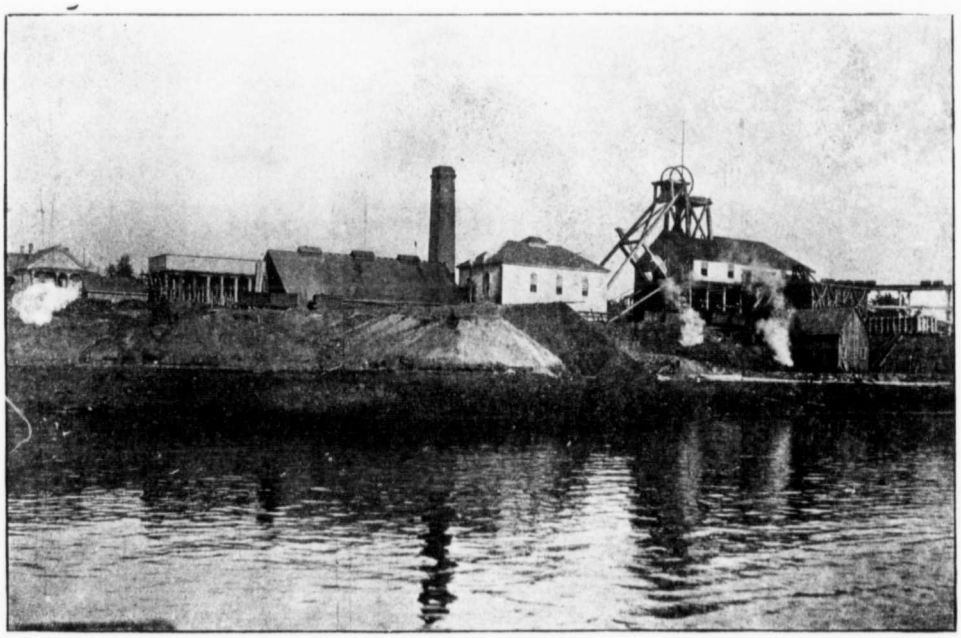
The island, when considered in detail and with regard to its mining divisions, is found to embrace all of the Victoria, Alberni and West Coast divisions, as well as a large portion of the Nanaimo division.

VICTORIA DISTRICT—VICTORIA MINING DIVISION.

"Commencing at a point in Portier's Pass, between Valdes and Galiano islands, thence southwesterly, passing to south of Kuper island to the northern boundary of the Chemainus land recording division; thence west along such northern boundary to a point where it intersects the height of land separating the drainage area of Cowichan lake from the drainage area of Nanaimo river; thence northwesterly along such height of land to a point where it joins the height of land separating the drainage area of the Nitinat river and lake on east from drainage area of those streams flowing into Alberni canal and Barclay sound on west; thence southwesterly along such height of land to the Pacific ocean; thence by Straits of Juan de Fuca, Haro Straits, Gulf of Georgia, to point of commencement."

Prospecting in this territory began as early as 1860, when placer gold was discovered in the Leach and Sooke rivers. Leachtown, a typical mining camp, was built and the population is reported as at one time having reached several hundreds. The yield of placer gold was satisfactory for some years, but when worked out, as no gold-bearing quartz of suffiicent grade and extent was discovered, prospecting was abandoned and it was not until about 1896 or 1897 that prospectors revisited this section of the island and resumed their explorations. The discovery of a heavy iron capping, below which was found high grade chalcopyrite ore on Skirt mountain, at Goldstream, about ten miles from Victoria, gave the incentive to the prospector and was followed by the location of a large number of mineral claims in that immediate neighborhood, as well as in the Sooke mountains, and on Mount Sicker, some 30 miles north from Goldstream.

The Sooke mountains are formed from the uplifting of the semi-crystalline slates. These slates have much the appearance of metamorphosed Cambrian shales, and carry quite an appreciable percentage of graphite. The strata have been tilted from their horizontal position to nearly vertical, either from lateral pressure or from the upheaval of the intrusive igneous dykes, or both. The strike of these slates is northwesterly. Interfoliated conformably with line of strike are numerous lenses of quartz; usually narrow and quite limited in length. This quartz is generally gold bearing, and evidently was the source of the placer gold of Leach and Sooke rivers, the waters of which have cut channels through the mountains, and crosscut the formation.



HEAD WORKS AT THE NEW VANCOUVER COAL COMPANY'S COLLIERY.

Owing to the auriferous character of the quartz lenses quite a number of mineral claims were located some years back, but none of them have developed into mines although on some much work has been done.

MOUNT SKIRT.

Mount Skirt is situated on the southern flank of the belt of slate, and apparently belongs to the same formation; but the rocks, which are schistose, have been very much more metamorphosed. The ore body on the Phair-Lubbe group of mineral claims has every appearance of filling a series of lenticular fissures. The general line of strike is approximately conformable to that of the country rock, but through faulting the continuity of these fissures has been disturbed and consequently the one ore body appears from a cursory examination to be really three distinct bodies.

Since operations were commenced on this group of

claims, it is said about $25,000 have been expended in development work. During 1900 this property entered the list of shippers, the ore being hauled to the Esquimalt & Nanaimo railway, about 1½ miles distant, and thence to Victoria and by steamer to the Tacoma smelter. The ore body averages about three feet in thickness, and the shoots of pay ore vary in length. The ore is a chalcopyrite of good grade.

MOUNT SICKER.

At Mount Sicker the mineralised zone appears to be much more extensive than at Mount Skirt. The most important working propositions, the Lenora and Tyee, are situated about six miles by wagon road from Westholme station on the E. & N. railway to Victoria, and from there by steamer. But during the early spring of 1900 a tram track was laid from near Westholme station to within about three miles distance from the mine. The shipments, under these conditions, were increased to about 30 tons a day, and the railway haul was shortened to Oyster Bay or Ladysmith, where the ore was reshipped to Tacoma by steamer. During the summer of 1900 a railway was built direct from the mine to connect with the E. & N. railway, consequently at the present time the freight charges on this ore are very materially reduced from those on the earlier shipments.

The altitude of the summit of Mount Sicker above sea level is about 2,000 feet. The country rock is principally schist, and would probably be cast as a sericite if microscopically examined. It apparently contains considerable chlorite and feldspar. The line of strike of this belt of schist is nearly due magnetic east, and the strike of the ore bodies conforms with that of the schist.

The structure of the ore bodies in this vicinity is similar to that of the large majority on Vancouver Island, which have come under the writer's observation, and should be classed as lenticular. The ore apparently fills fissures produced when the rocks were folded and contorted. The present cleavage planes of the schists on Mount Sicker are not the original cleavage planes of the formation.

At points along the line of strike of the schists the fissuring process has been so violent that the lenses of ore sometimes reach a thickness of thirty feet or more, as at the Lenora, but at others are narrow, and of limited extent longitudinally.

The Tyee mine, which adjoins the Lenora on the east, has been equipped during 1900 with machinery, including hoisting, pumping and compressing plants.

The underground workings on both the Lenora and Tyee mines are being prosecuted with vigor. The former, since the completion of the railroad, has been shipping about 60 tons of ore daily. The policy of the management of the latter is to develop and block out ore in sight with a view to erecting their own smelter on some site in the neighbourhood.

Development work has been prosecuted on the following mineral claims located in the vicinity of the Lenora and Tyee: Seattle, Copper Canyon, Queen Bee and Lord Roberts. Assessment work has been done on several situated between Maple bay, on the east coast of Vancouver Island, and Mount Brenton, to the west of Mount Sicker. The same mineralised zone appears to extend between these points, but to what further distance west is unknown.

New Vancouver Coal Co's Head Works and Shipping Wharves, Nanaimo.

At the present time the Mount Sicker camp is the most active metalliferous mining camp on the island.

A townsite has been surveyed and platted, and every indication points toward its building up into a permanent, prosperous and progressive town.

A short distance northerly from Mount Sicker the change in formation from the metamorphic or crystalline to the unaltered sedimentary rocks and coal measures occurs.

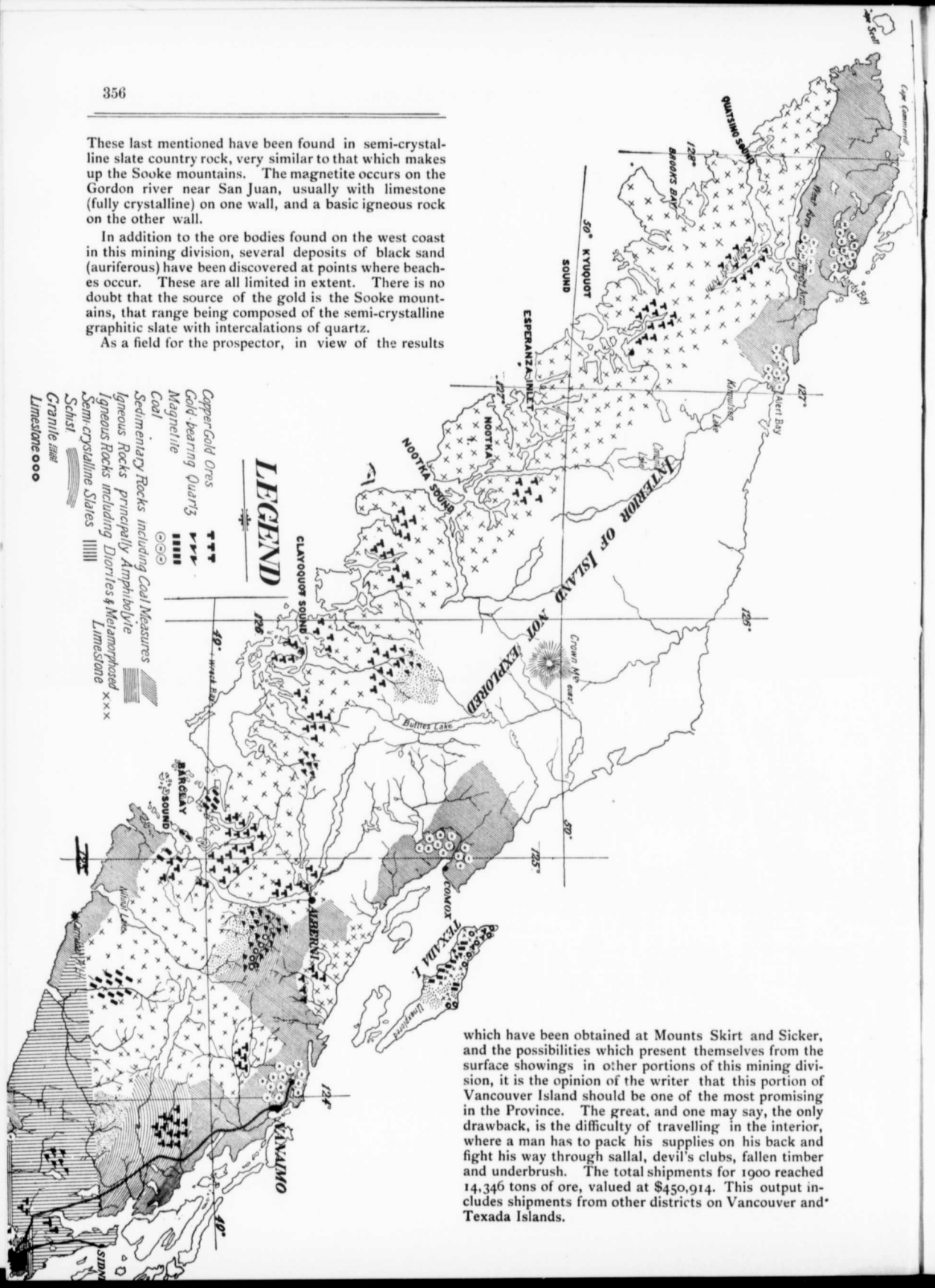
SAN JUAN.

The western portion of the Victoria Mining Division has not been as thoroughly prospected as has the eastern. The San Juan and Gordon rivers have been explored for considerable distances above their mouths, and several mineral claims located. Most of the ore bodies so far discovered are composed of immense deposits of high-grade magnetite, while others are bodies of pyrrhotite carrying some copper and gold values.

These last mentioned have been found in semi-crystalline slate country rock, very similar to that which makes up the Sooke mountains. The magnetite occurs on the Gordon river near San Juan, usually with limestone (fully crystalline) on one wall, and a basic igneous rock on the other wall.

In addition to the ore bodies found on the west coast in this mining division, several deposits of black sand (auriferous) have been discovered at points where beaches occur. These are all limited in extent. There is no doubt that the source of the gold is the Sooke mountains, that range being composed of the semi-crystalline graphitic slate with intercalations of quartz.

As a field for the prospector, in view of the results

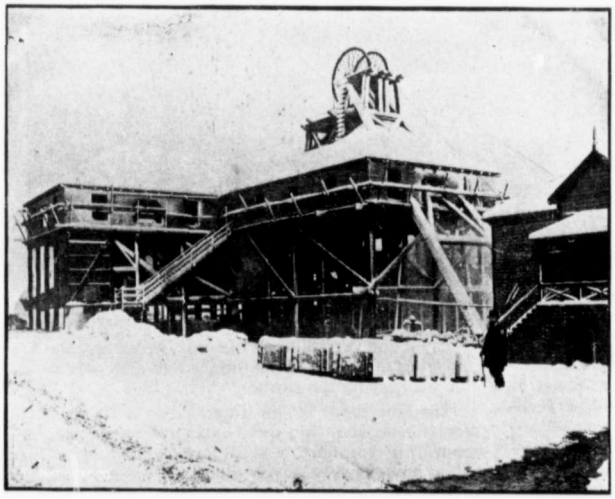


which have been obtained at Mounts Skirt and Sicker, and the possibilities which present themselves from the surface showings in other portions of this mining division, it is the opinion of the writer that this portion of Vancouver Island should be one of the most promising in the Province. The great, and one may say, the only drawback, is the difficulty of travelling in the interior, where a man has to pack his supplies on his back and fight his way through sallal, devil's clubs, fallen timber and underbrush. The total shipments for 1900 reached 14,346 tons of ore, valued at $450,914. This output includes shipments from other districts on Vancouver and Texada Islands.

ALBERNI MINING DIVISION.

"Commencing at Amphitrite Point; thence northerly along height of land separating drainage area of those streams emptying into the Pacific ocean north of such point, from the drainage area of those streams emptying into Barclay sound, following such height of land to a point where such height of land joins the height of land separating drainage area of streams emptying into Pacific ocean on the west, from drainage area of streams emptying into the Straits of Georgia on the east; thence southerly along such height of land to a point where it joins the height of land separating the drainage area of Nitinat river and lake on the east from drainage area of those streams flowing into Alberni canal and Barclay sound on the west; thence southwesterly along such height of land to Pacific ocean, including coast islands, to Amphitrite Point and point of commencement."

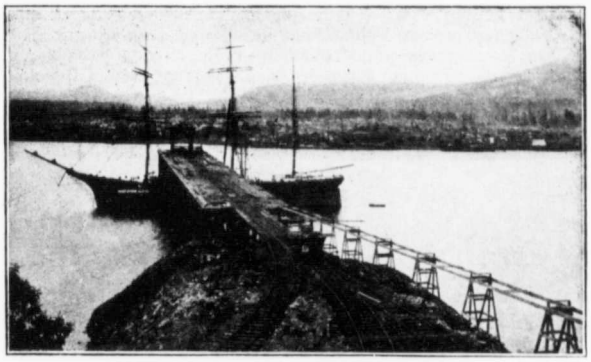
Lode mining was commenced in this division at an earlier date than anywhere else on Vancouver Island. Prospectors took advantage of the Alberni canal, which enabled them to explore the mountains contiguous to the shore line. China and Granite creeks, which empty into the canal, had been prospected some years previous to lode mining prospecting, and placer gold mined from the beds and banks. This fact led to the installation of hydraulic plants and a more systematic exploration for gold-bearing quartz. The former are idle to-day, in fact appear to have been failures from the start, but as a result of the latter a large number of claims were located on Mineral Hill, at the head of China creek, and the adjoining mountains as well as on the mountains near the head of Granite creek.



HEAD WORKS AT NANAIMO.

Outcroppings of gold-bearing quartz veins indicated the occurrence of free-milling gold ore, and led to the building of small stamp mills and the expenditure of considerable money in an attempt to develop mines. Owing to various causes except at the Golden Eagle, situated at the head of China creek, but little activity has been shown around this section of the camp of late, although many promising prospects occur.

The geological conditions prevailing on Mineral Hill and in the vicinity of Granite creek appear to be peculiar to that immediate section, at least as far as known at present, because no discoveries of similar character of ore have been reported from the west side of the canal in this mining division. There, so far as exposed, all the ore bodies are either magnetite, chalcopyrite or pyrrhotite, carrying copper and low-grade values.



COAL SHIPMENT WHARF AT PROTECTION ISLAND.

The most important of the chalcopyrite bodies are those located in a zone about fourteen miles below the town of Alberni. The full extent of this zone in width is hardly known, but ore bodies of the same character have been exposed at intervals, northeast and southwest, for a distance of about five miles. At that point Uchucklesit harbor causes a break in the zone, but southwest of that lies Copper Island in Barclay sound, on which occur very extensive deposits of magnetite, while on the opposite side of the sound or southeast from Copper Island occur the ore bodies on the Sarita river, composed of magnetite and pyrrhotite.

Northwesterly from Copper Island, a few miles distant, occur vast bodies of magnetite, known as the Sechart group. Consequently this mineral zone may be considered as extending in width from Nahmint bay, about twelve miles below the head of Alberni canal, to the coast line at the entrance to Barclay sound, a distance of about twelve miles as the crow flies. In length the zone apparently extends to the northwestern extremity of Vancouver Island. In area this mineral belt is the most extensive on the island, but up to the present time the results attained from working have not reached the importance of the camps at Mounts Sicker and Skirt combined.

The mineral claims situated in the Alberni Mining Division and located on this particular zone, on which the most extensive development has been performed,

are the Three Jays, Uncle Sam, Mountain Treasure, Lake Shore, Belvidere, Blue Bells and Great Expectations.

On the Three Jays it is claimed that there are about 75,000 tons of ore in sight, as exposed by the drifts and crosscuts on the three levels opened. Sample shipments aggregating about three hundred tons were made from this property in 1899, since which time the management has been actively engaged in developing ore in sight, with a view to ascertaining the capacity of the mine previous to installing an ærial tramway, ore bins and a permanent mining plant. The management of this property, which is owned by the Nahmint Mining Company, has shown the utmost confidence in the district, having expended about $100,000 in developing the Three Jays to its present condition. The ore is a good grade of chalcopyrite, with occasional occurrences of native copper. The smelting returns show an average of about 11 per cent. copper, with low gold and silver values.

The installations of an ærial tramway about 5,000 feet in length, compressor plant and extension to wharf, including ore bins, has been recently completed. A crosscut tunnel have also been started 425 feet below the lowest workings and about 700 feet below the apex of the outcroppings.

The country rock is crystalline limestone, diorite and a greyish color feldspathic rock, having a porphyritic structure. The ore is usually found either at the contact of the limestone and feldspathic rock, or else at the contact of the latter rock and diorite.

Systematic development of the Uncle Sam was commenced in the winter of 1899 and 1900. The outcroppings were so extensive and of such high grade that a New York syndicate purchased the property, organized the Monitor Mining Company, and started work on an extensive scale. During the year a camp of substantial cabins has been built, a wharf, ore bins and an ærial tramway constructed and about 1,100 tons of ore shipped.

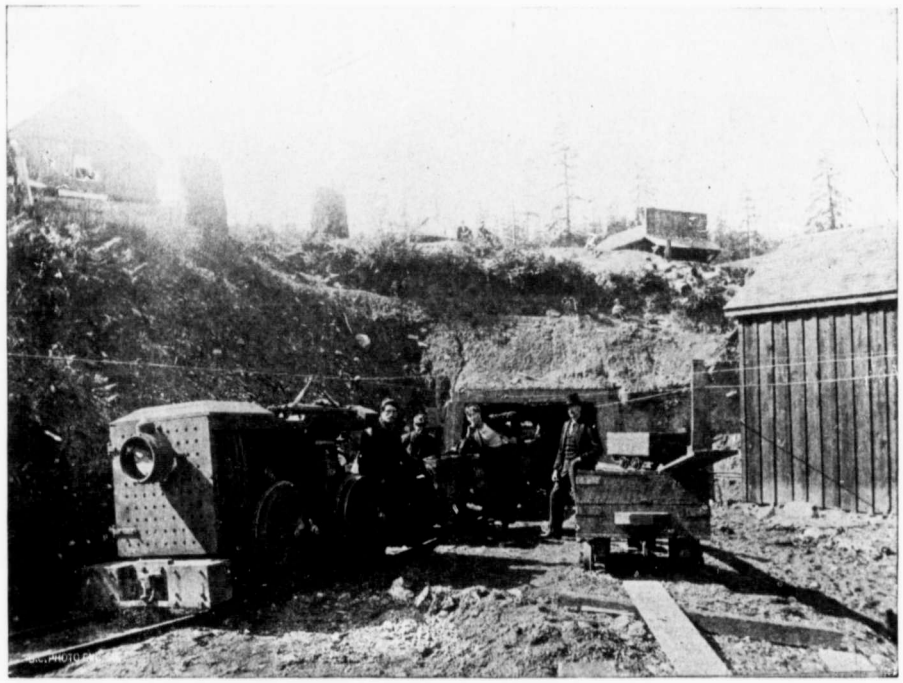
The ore body apparently fills a fissure in an igneous rock. Crystalline limestone is also closely associated with the ore body near the surface, but whether deeper work will determine the ore body to be a contact vein or deposit between limestone and igneous rock, instead of filling a fissure, remains to be proven. The structural geology of this section of the district is quite complicated and very difficult to study, because of the heavy covering of moss and material from slides which hides the geology on the surface.

Surface Works, Extension Colliery.

The limestone is most capricious in its occurrence, sometimes occupying quite extensive areas, then again appearing as a narrow seam as though filling a fissure in an igneous dyke, or as filling the space between two dykes, and at one point on the Three Jays it has the shape of a wedge with the thin edge downwards. On the Uncle Sam this rock has maintained the same capricious characteristics, thereby rendering it extremely difficult to classify the ore body.

About $5,000 was expended on the Lake Shore group of claims, which are situated on the east shore of Anderson lake. The outcroppings of pyrrhotite are extremely persistent, and unlike many other outcrops on Vancouver Island can be traced a long distance.

Four parallel ore bodies occur, the first at the contact between limestone and diorite, the second filling a fissure in the diorite, the third apparently as a contact between amphibolyte and diorite, with which is associated large quantities of epidote, and the fourth in this latter rock, with no well-defined walls but apparently as a deposit caused by replacement. No work has been done on the last named, and it is impossible to classify the occurrence from the surface showings. More development may determine that all these bodies, which appear as distinct and separate at present, are really only one deposit, filling a wide zone between a crystalline limestone footwall and amphibolyte hanging wall. The rock, which is designated as diorite may prove, if microscopically examined, to be merely an alternation of the other igneous rock.



Electric Locomotive at Mouth of Tunnel, Extension Colliery.

Work was suspended on this property July 1st, 1900, because the installation of a pumping and hoisting plant was considered necessary in order to prospect at deeper levels.

During 1900 considerable interest was aroused in the immense deposits of high-grade magnetite occurring on the Sarita river, Copper Island, and in the vicinity of Sechart. A syndicate from Pittsburg has bonded these properties on a royalty basis. So far as the grade of this iron ore is concerned, the analyses show that the content of metallic iron ranges from 58 per cent. to 62 per cent., and that the phosphorus is usually so low as to bring the ore within the Bessemer limit.

The fact that most of this ore carries a low percentage of copper may prove detrimental to the manufacture of iron and steel, but deep work on the same character of ore body on Texada Island has shown that the copper entirely disappeared, leaving the iron ore practically free from all impurities.

Satisfactory results from the work of 1901 with regard to these deposits of magnetite mean inestimable benefits to Vancouver Island, and consequently to Victoria as its metropolis. Apparently commercial reasons only have been retarding the successful development of these important mineral resources, but the members of the syndicate working last year claim to have these causes removed and to be prepared to develop an iron and steel industry on the Pacific coast extensively.

WEST COAST VANCOUVER ISLAND MINING DISTRICT.

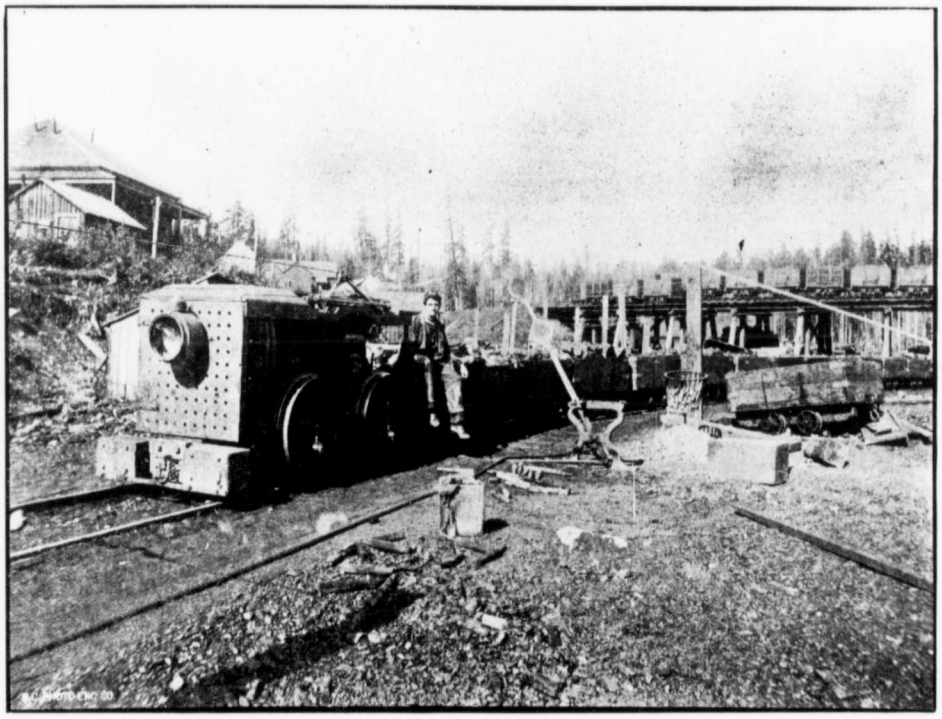
"Commencing at Amphitrite Point, thence northerly along height of land separating drainage area of those streams emptying into Pacific ocean north of such point from drainage area of those streams emptying into Barclay sound, following such height of land to a point where it joins the height of land separating drainage area of those streams emptying into Pacific ocean on the west, from drainage area of those streams emptying into the Straits of Georgia on the east; thence northwesterly along such divide to Cape Scott; thence by Pacific ocean, including all coast islands, to point of commencement."

Within a few miles of Amphitrite Point, by following the coast line, Wreck Bay is reached. It is there that during 1900 the first commercially successful attempt was made to save the gold occurring in the black sands on the beach. About $12,000 is reported as having been saved from a portion of one claim.

The discovery that gold occurred in this black sand in paying quantities was made during the summer of

1899, but owing to the difficulty of saving the particles but little was accomplished during that year. In the spring of 1900 Messrs. Sutton and Graham made a contract to work the sands on the basis of a royalty. They constructed a long, expensive flume, and after commencing work in a systematic manner found that the sand carried much more gold than had been apparent from the prospecting done previously. The area of beach comprises some ten or twelve claims, and at the rate of working during last year considerable time will be consumed before the ground is all worked out. Several years ago it was known that gold occurred in black sand on the beach near Cape Scott, at the extreme northwestern end of the island, but several attempts had been unsuccessful in saving it on a commercial scale, because of its flakey character and the heaviness of the sand. Consequently when the Wreck Bay diggings were first discovered but little attention was paid to them. However, since the successful work of last and this summer there is a strong probability that all the beaches along the coasts of Vancouver Island, and possibly Queen Charlotte Islands, will be thoroughly prospected. No other placer mining of sufficient importance to mention has been done for years in the West Coast Mining Division, but at one time Bear river, which empties into Bedwell sound, was the scene of active placer mining. Because of this fact a good deal of prospecting for gold-bearing quartz veins has been done near the head of this river. This has not all been wasted because several mining claims have been located on which the outcroppings are quite promising, and some assay very high values in gold. But at the present time that portion of the district is not sufficiently easy of access to warrant the performance of extensive work. The claims are all held by prospectors, who can ill afford to do more than their yearly assessment work.

The occurrence of this class of ore when considered in connection with the fact that on Elk river, at the head of Kennedy lake, auriferous quartz has also been found, is significant. If a straight line be drawn from the gold-bearing zone on Mineral Hill, in the Alberni Mining Division, following the line of strike of the formation about N. 60 degrees W. mag., it will intersect that portion of the Elk river in the vicinity of the Rose Marie group of mineral claims, and if continued in the same direction will also intersect the gold zone on Bear creek. The strong probabilities are though that the sulphide ores of West Coast Mining Division will, in the near future, prove to be the most important of the mineral resources.



Train of Coal Cars, Extension Colliery.

In connection with the occurrences of chalcopyrite ore in this portion of the island it is noticeable that nearly all the outcroppings are of magnetite, having particles and masses of almost theoretically pure chalcopyrite disseminated through the ore. Outcroppings of pyrrhotite are comparatively scarce, while ordinary gossan is hardly ever found. This last fact is probably accounted for by the extreme shallow zone of oxidation. Erosion has been so general and active that nearly every evidence of oxidation has disappeared and unaltered pyrites are encountered on the present surface of the ground.

This condition is not confined to one portion of the island but is general throughout. During the past two

years a considerable amount of development work has been done in this mining division on mineral claims on Elk river, which empties into Kennedy lake ; Deer and Tranquil creeks, which empty into Tofino inlet, on Meares Island, at the entrance to Bedwell sound ; on Trout and Bear rivers, which empty into Bedwell sound; Bedwell sound in the vicinity of Hesquoit harbor ; Sidney inlet ; Tahsis canal ; Koksitle inlet ; Kyuquoit sound and Quatsino sound.

Many of these prospects have very promising possibilities, but none can yet be considered mines in the general acceptance of the term. Depth is necessary in order to determine fully the result of the association of the magnetite and chalcopyrite, as well as to determine the extent of the ore bodies.

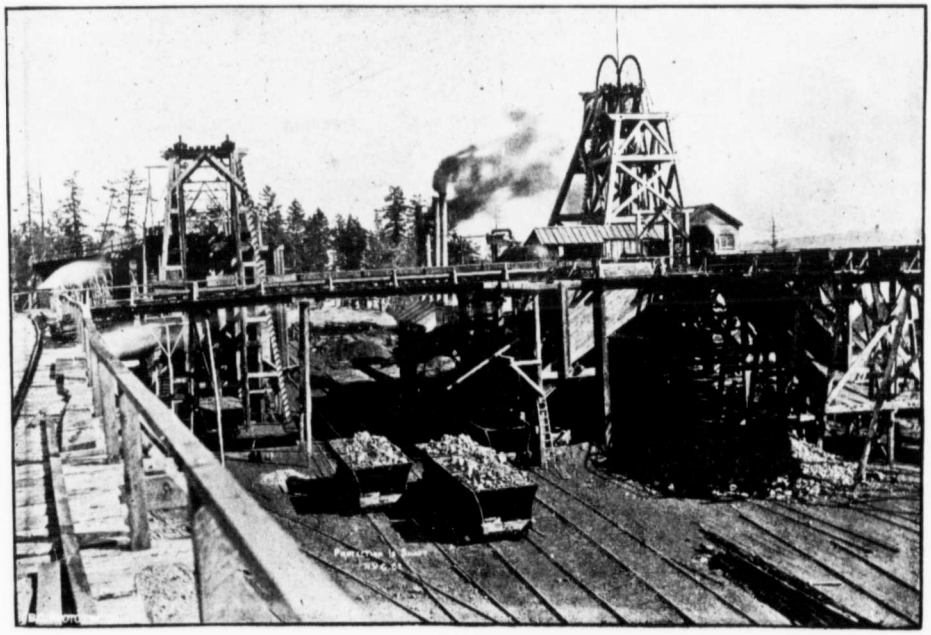
The highest grade ores found in this division are bornite from the mountains near the shores of Sidney inlet, and pyritous gold ores from Meares Island.

Toward the end of the year more activity was shown in the mountains bordering on Quatsino sound, where it is claimed some very extensive bodies of chalcopyrite occur, and which it is proposed to develop fully and systematically.

Coal was discovered in the same neighbourhood a few years ago, and a San Francisco syndicate has been working steadily since then to develop mines and open collieries.

NANAIMO MINING DIVISION.

"Commencing at the north end of Lanz Island, thence easterly through Slingsby channel and Seymour inlet to the North Arm of Seymour inlet ; thence north and east following the height of land forming the watershed of all rivers flowing into the Pacific ocean south of Seymour inlet from those flowing into the Pacific ocean north of Seymour inlet, to the height of land forming the drainage area between those rivers flowing into the Pacific ocean from those flowing easterly ; thence southerly along the height of land forming the drainage area between all those rivers flowing into the Pacific ocean south of Seymour inlet and north of Hotham sound on the west, from the drainage area of the Chilcotin, Chilco river and lake, Jervis inlet and tributaries on the east ; thence following Hotham sound, Thunder bay, Malaspina straits, Straits of Georgia, passing to south of Valdes and Kuper Islands to the north boundary of Chemainus district, thence west along this same boundary to height of land forming the watershed between Nanaimo and Cowichan rivers ; thence following the height of land on Vancouver Island forming the divide between the eastern and western watersheds of such island to Cape Scott, then to point of commencement."



No. 5 Shaft, New Vancouver Coal Co's Colliery.

This district covers a larger area than any other on Vancouver Island, because within its boundaries are included so many of the islands in the Straits of Georgia, as well as an extensive territory on the Mainland.

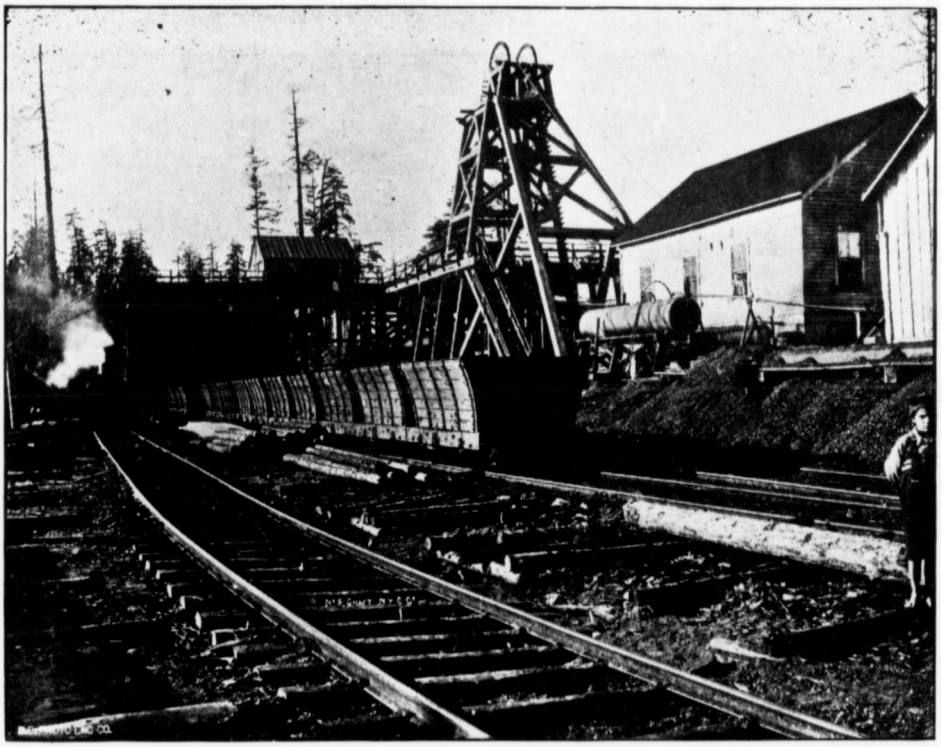
The Vancouver Island collieries being located within this district places it as the most important from points of development and production of any of the island districts, though the actual operations are carried on over a comparatively small area, being confined to the neighborhood of the following towns on the east coast of the island ; Ladysmith, at Oyster bay ; Nanaimo, at Nanaimo harbor ; Wellington, six miles northwesterly from Nanaimo ; Comox, Union and Cumberland, near Union harbor.

The collieries are operated by the following companies : New Vancouver Coal Mining and Land Company, operating the Nanaimo colliery, consisting of the No. 1 shaft, Esplanade, in the City of Nanaimo ; Protection Island shaft, Southfield, near Nanaimo river.

Robert Dunsmuir & Sons, operating the Wellington colliery, comprising No. 1 shaft near Departure bay; and Nos. 3, 5 and 6 shafts at Wellington.

The Union Colliery Company of B. C., Ltd., operating the Union colliery, consisting of No. 4 slope, and Nos. 5 and 6 shafts in the Comox district; Wellington colliery in Douglas district known as the Extension mine, consisting of Nos. 1, 2 and 3 slopes, and Tunnel mine; the Alexandria colliery in the Cranberry district at Union bay, where coke, fire and ordinary brick are manufactured by the same company.

Although the workings, haulage and methods of ventilating have been described in various publications several times, the industry of coal mining is of such importance on Vancouver Island that the writer deems it advisable to give a brief description of such in this article. Probably no more concise or comprehensive description can be obtained than that published in the reports of the Minister of Mines, from which the following is taken:



PROTECTION ISLAND SHAFT NEW VANCOUVER COAL CO'S COLLIERY.

NEW VANCOUVER COAL COMPANY'S MINE.

Name of seams or pits: Southfield No. 2, Southfield No. 5, No. 1 Esplanade shaft, No. 1 Northfield shaft, and Harewood mine.

Description of seams, tunnels, levels, shafts, etc., and number of same: Southfield No. 2, worked by slope, seam 6 to 10 feet; Southfield No. 5, worked by shaft, seam 5 to 10 feet; No. 1 Northfield shaft worked by shaft, seam 2 feet to 3 feet 6 inches; Protection Island shaft, worked by shaft, lower seam 4 feet, upper seam 6 feet; No. 1 Esplanade shaft, worked by shaft, seam 5 to 12 feet.

Description and length of tramway plant, etc.: Railway to Southfield, six miles, with sidings; railway to No. 1 shaft, one mile, with sidings; railway from Northfield mine to wharf at Departure Bay, 4½ miles; rails are of steel, 56 lbs. per yard, of standard gauge, viz., 4 feet 8½ inches; 11 hauling and pumping engines, 19 steam pumps, 6 locomotives, 271 coal cars (6 tons), besides lumber and ballast cars; bunkers with capacity of 10,000 tons; fitting shops for machinery repairs, with turning lathes, boring, drilling, screw cutting machines, hydraulic press, steam hammer, etc.; diamond-boring machinery for exploratory work (bores to 4,000 feet); 150 horse-power electric plant, engines, boilers, dynamos, four 30 horse-power 8-ton locomotives, and one 15 horse-power locomotive; hauling and lighting equipment; wharves, 2,000 feet frontage, at which vessels of the largest tonnage can load at all stages of the tide.

A brief descriptions of the workings, etc., at No. 1 shaft, Esplanade, will suffice to give an idea of the workings, etc., at other shafts.

At a point on the Esplanade, to the east and to the dip of the site of the old Douglas pit, still to be seen between Nicol street and Victoria road, Nanaimo, a bore hole was put down in 1881 by the New Vancouver Coal Mining & Land Company. At a depth of 650 feet coal was reached and a seam 8 feet 6 inches thick was bored through.

The proximity of the shaft to the shipping docks has

been of great advantage in facilitating the loading of vessels whether by night or day.

The main slope runs east from the bottom of No. 2 shaft, the16-foot upcast shaft, for some 2,200 yards from which levels Nos. 1, 2, and 3, north, have been run.

Hauling is done in two parts, along No. 1 level for 2½ miles, and down No. 3 level for about 1½ miles. The motive power employed is provided by electric motors, which haul as many as 96 loaded mine cars at a trip, each car having a capacity of 15 tons of coal. From points farther in than is reached by electric haulage sixteen mules are used.

Mining is carried on by the "pillar and stall panel system."

The seam is from 3 to 8 feet thick and is well bedded with good roof and floor.

Air ways are well constructed of sufficient sectional area for ample ventilation. Connection has been made by way of the No. 1 and No. 3 north levels with the Protection Island shaft, which is used as an air "intake" for the ventilation of the workings on these levels. No. 2 shaft, Esplanade (16 feet diameter) is the hoisting shaft, and serves also as the "intake" for the ventilation of that portion of the mine in its vicinity, as well as for the mule stables, etc.

Ventilation is effected through No. 2 shaft by a 36-foot by 12-foot Guibal fan, to which is directly connected an engine making from 40 to 46 revolutions per minute.

The volume of air drawn by these agencies through and around the faces and workings amounts to from 150,000 to 165,000 cubic feet per minute.

An underlying seam of coal was discovered in 1887 at a depth of 71 feet below the Douglas seam, some six feet in thickness.

A large percentage of the screenings of the coal are passed through a coal washer consisting of two jigs with fixed screens, and having a capacity of ten tons per hour.

The hoisting plant consists of a pair of 30 x 60 inch Cornish valve, direct-acting, high-pressure engines, operating a 15-foot drum, provided with a 10-inch cylinder steam brake, and capable of hoisting six tons 30 feet per second on a steam pressure of 50 lbs. The steam is generated by a plant of four two-flue Lancashire boilers and four "egg-ended" boilers.

No. 1 shaft and the engine houses above and below ground are lighted by incandescent electric lights.

The electric plant consists of two flue boilers, two 150 horse-power Ball engines, each running a separate dynamo, generating a current of 275 volts. This plant supplies power for three electric motors and an electric winch underground, besides providing all the electric lighting.

WELLINGTON COLLIERY.

No. 1 shaft, distant about 12 miles from Departure bay, was sunk about 25 years ago by the late Hon. Robert Dunsmuir. The coal was found at a depth of 300 feet below the surface, the seam being about three feet thick.

The mine is worked by a slope from the bottom of the shaft, with levels therefrom to the westward. The roof of the seam is tender. The ventilation is good, there being 8,000 cubic feet of air per minute for thirty men and two mules. The shaft is the "intake," the "return" being the fan shaft at No. 5 shaft.

UNION COLLIERY.

The shipping wharves for this colliery are located at Union Bay, Baynes sound, on the east coast of Vancouver Island, where are also situated a well-equipped Luhrig coal washer, a coking plant consisting of two batteries, each of 100 bee-hive ovens, and large coal bunkers. The mines being operated are situated at the town of Union, about 11 miles north of Union bay, connection between the two points being maintained by means of the standard gauge railway, built, owned and operated by the company.

No. 4, the main slope, is down some 5,600 feet (N. 25 degrees W.), and from it a point 300 feet from the surface the No. 2 or diagonal slope branches off to the east at an angle of 45 degrees (N. 20 degrees E.). This diagonal slope has been run about 4,000 feet, nearly to the true dip of the coal, and although not as long as the main slope, the vertical depth attained is greater than in the latter, which runs across the dip.

At a point some 5,280 feet down the main slope a second diagonal slope has been run parallel to the one already mentioned (N. 20 degrees E.).

The hoisting plant consists of a large double cylinder engine, geared to double-loose drums, boilers, etc. It is situated about 700 feet from the mouth of the slope, from which point the engineer hoists and dumps the mine cars. The slope head arrangements are such that the cars run to and from the tipple automatically.

Ventilation is effected by a 14 x 5 feet Guibal fan, causing a circulation of 85,000 cubic feet of air per minute if run to its full capacity of 95 revoltions.

The coal averages about four feet in thickness, and is worked by the "pillar and stall" system.

There are two steam and eight triple electric pumps in the mine, the power for the latter being generated by two dynamos on the surface.

No. 5 shaft is sunk vertically and cuts through two seams of coal, the upper at 275 feet, and the lower at a depth of 590 feet from the surface. The shaft is 23 x 8 feet inside, very substantially constructed of heavy timbers and well lined. A partition of 3 x 12 inch planking, lined with tar paper, divides the shaft into two compartments, one used as the air "downtake," and the other as the "upcast."

The hoisting plant consists of a double cylinder engine, 30 x 60 in., connected with a 14-foot winding drum fitted with steam brakes, and has ample boiler service.

This shaft is connected by railway with the wharves.

No. 6 shaft was bottomed in October, 1899, at a depth of 814 feet. It is well constructed and timbered with a mid-wall, and has been in working order since spring of 1900.

The pit bottom is all timbered with 12 x 18 sawn bulks, built solidly together, 16 feet wide and 12 feet high.

The hoisting plant consists of a 16 x 35 engine, provided with suitable and sufficient boiler service.

The shaft is located close to the railway, and all necessary sidings have been provided.

THE UNITED STATES GOVERNMENT ASSAY OFFICE AT SEATTLE.

By A. W. Dee.

THE business done at the United States Assay office at Seattle is not nearly so great this year as in 1900. The exact figures up to September 10, are $7,000,000 as against $12,000,000 for the twelve months preceding. The assayer in charge, Mr. F. A. Wing, denies, however, that the falling off is in any way due to the establishment of the Dominion Purchasing Assay office in Vancouver during July last, an ac-

count of which is given in the August number of the MINING RECORD. As far as the aggregate value of the gold is concerned this is, no doubt, correctly stated, inasmuch as the present practice of the Vancouver office is to send all its bullion to Seattle where it is purchased by the United States office. The total thus is not affected by its Canadian rival, and cannot be so until the establishment of a mint within the Dominion creates a local market.

The cause of the falling off is placed by Mr. Wing to the lateness of the season in starting, which he declares opened some six weeks after the usual time. Should the fall be open the Seattle office expects to deal with at least $25,000,000 in gold as against $22,000,000 for 1900. This increase, which is about 15 per cent., is

UNITED STATES ASSAY OFFICE, SEATTLE, WASH.

based by the Seattle people on the reports received from the north by their correspondents which are said to be based upon the size of the dumps.

A further cause is assigned, viz.: the scarcity of water for sluicing operations which, however, it is thought, will be overcome later in the fall, always supposing that the season remains open longer than is usual.

The equipment of the Seattle office and its method of procedure is much about the same as that in Vancouver but is, of course, conducted on a much larger scale. There is a staff of some thirty employees subordinate to the assayer in charge, Mr. Fred. A. Wing. The clerical, melting and assaying departments are kept distinct as in the Vancouver office. The first is under the control of the chief clerk, Mr. T. G. Hathaway, the second under the chief melter, Mr. W. R. Towne and the third is looked after by Mr. J. C. Newton, the chief assayer. The building, of which an illustration is given, is one that is leased by the Federal government and although an appropriation has been recommended for the purpose of erecting a government structure, yet, as Seattle has just succeeded in obtainining a million dollar appropriation for a Federal building it is unlikely that any further grants will be made in this direction for some years to come. In the meantime the office will remain in its present location. The building is a good sized one and is practically—the basement being unusually well lighted and commodious—of three stores. The melting and receiving departments, together with the strong room, are situated on the ground floor, the assay offices being above and the machinery and carpenter shop below. The capacity of the plant is upwards of $500,000 a day, but the melting department has proved itself on occasion capable of handling $750,000 within the limits of one working day.

The system of receiving the gold is much about the same as in Vancouver. The depositor sees his dust weighed in before him on a huge Trœmner scale, a duplicate of that to be seen in the Canadian office, and is given a receipt for the same. This receipt is made out in triplicate and bears a number which alone goes up stairs to the assay offices. The melter, indeed, knows the name of the depositor, inasmuch as this is often a guide to the locality whence the gold is procured and the correct flux to be used can by this means be arrived at without time lost in experiment. The weight of the gold is checked by two receiving clerks weighing separately. The depositor is given his money for his gold within the next 24 hours following deposit. If the melter is ready to receive the gold at once it is simply placed in an open box and taken into the melting department, an illustration of which is here shown, but not before the gold is carefully reweighed by him. Should pressure of work preclude immediate treatment the gold dust is locked into a separate box and put away uutil the next day.

The melting department is one that is particularly complete. It comprises one gigantic circular furnace capable of treating over 2,000 ounces at one melt, two other furnaces, whose crucibles will receive from 1600 to 1700 ounces of gold apiece ; four No. 4 furnaces, whose capacity is from 600 to 700 ounces, and two "little giants" whose charge is about 30 ounces.

Underneath the melting room is a blower having a capacity of 1200 cubic feet per minute for each cylinder, and there are two, exerting a pressure of 2¼ pounds to the square inch. This is driven by a small electric motor. In addition gas is used, intermixed with the air in the tuyere, which has four inches of pressure.

The crucibles used are known as the Dixon lead crucible composed of an admixture of graphite and high-grade silicon. These are placed within the furnace and the fluxes properly arranged with the gold, and on the furnace being covered the air is let into the tuyere or circular pipe surrounding the furnace. The air passing under pressure into the tuyere creates a vacuum, passes a siphon through which the gas is drawn and mixed with it. It then passes into the furnace through three apertures set equidistant around the bottom. These apertures are not at right angles to the inner surface of the cylindrical furnace but enter at an angle of 60 degrees so that a rotary motion is given to the flame which soon brings up the temperature to between 2200° and 2300° Fahr. The method is slightly varied in the largest furnace, as also in the two smallest.

At the bottom of the furnace is a dumping arrangement by means of which the contents of the crucible, if

spilled, can be readily recovered, but in the three years' practice which have occurred since the installation of the plant occasion to use this has never arisen.

The fluxes used are nitre, borax, soda and potash and are so arranged that there is the very slightest possibility of oxygen gaining access to the gold through its glassy covering of borax and so causing loss by oxidization. That such oxidization does take place is to be seen by examination of the inside to the tops of the furnaces where the tint of "royal purple," a color only to be obtained by oxide of gold, can be seen showing that there has been a slight volatilization. The loss, however, is infinitesimal and can be recovered.

After the melting of the gold and the volatilization of the impurities the metal is poured off into moulds and allowed to cool. The slag is broken off, crushed in a hand crusher and panned for any gold contained in it. The resultant dust and small nuggets are placed in an envelope and accompany the brick whose size depends upon the amount of gold sent in by the depositor. The gold is then reweighed by the chief clerk and two pieces cut off the bricks from the front upper right hand and back lower left-hand corners of the brick and each sent to the assayers. Two separate assays of these must be made and must agree within 2-10 of one per cent.

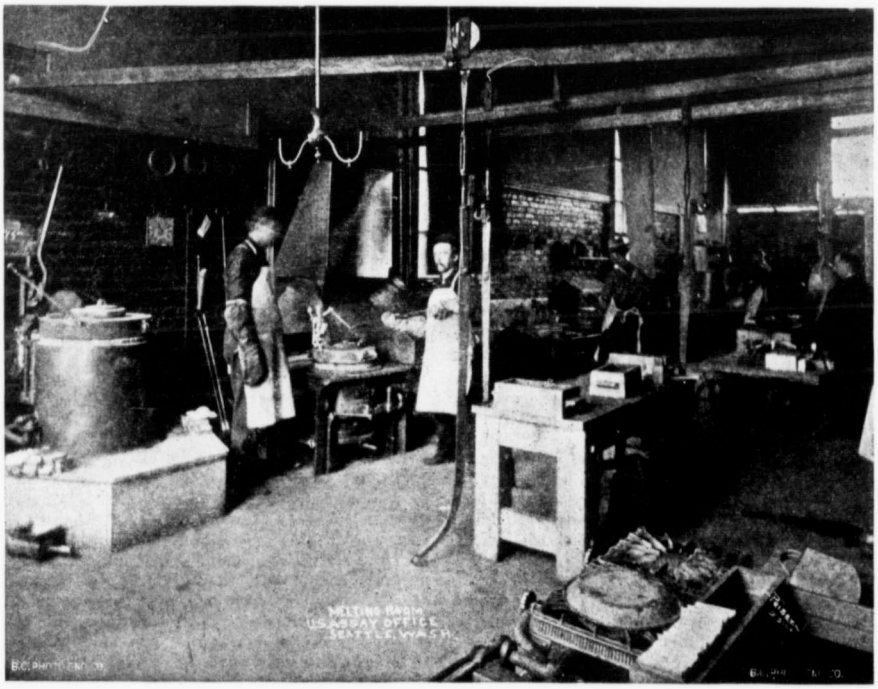
After the crushing and panning of the slag the remainder which still contains a slight trace of precious metal is placed within a binn in the basement and is sold to the highest bidder once every three months.

It will be seen that the whole process is very similar to that conducted in Vancouver, great care is taken in the entire method; even the very dust of the melting room being gathered up and put through a muffle furnace.

The assayers' room presents no features of unusual interest, being conducted in the usual manner.

The expense of shipping the bars of gold and silver to the United States mint is met by the Assay office which has a regular carpenter shop in the basement. The gold shipped away is invariably despatched in bars whose value is from $20,000 to $35,000. The largest bar produced seldom exceeds 1500 ounces as it is found that larger bars are difficult of handling. The smaller bars necessarily produced by the smelting of the smaller deposits are remelted after a certain period and formed into a brick of the usual shipping size.

Quite a large stock of gold is always on hand in the Assay office strong room where there was stored on September 10, the day of the visit of the representative of the MINING RECORD, upwards of one hundred bricks of all sizes whose total value was considerably over three quarters of a million dollars. This was the product of three days work; the last shipment east being made on September 7. This amount of gold was stated to be the average amount always lying in the strong room.



MELTING ROOM, U. S. ASSAY OFFICE, SEATTLE, WASH.

THE GOLDEN MINING DIVISION OF EAST KOOTENAY, B. C.

BY JAMES BRADY, M. E., ETC.

THIS Mining Division comprises the northern portion of the district of East Kootenay, and includes the country on either side of the Columbia river from the summit to the Rocky mountains on the northeast, to the summit of the Selkirk range in the south-

west, and extends in a northwesterly direction from Galena, above Spillimacheen, to about 7 miles north of the Big Bend of the Columbia—a distance of about 140 miles.

The Canadian Pacific railway traverses the district in an easterly and westerly direction ; the stations within the division being Bear Creek, Beaver, Donald, Golden, Palliser, Otter Tail, Field, Hector and Stephen.

The predominating rock formation on the Rocky mountain side of the Columbia is carboniferous limestone, overlying argillaceous slates and shales, which are exposed in some of the deeper canyons and along the banks of the larger streams.

On the southwestern or Selkirk side, igneous granular rocks such as diorites, syenites, granites, dolerites, etc., (frequently porphyritic) form the higher mountains and ridges, while on the flanks, and in the depressions or basins, metamorphic slates and schists, with occasional bands of limestone form the country rock, and in many places are traversed by porphyritic and other eruptive dykes, and metalliferous quartz lodes.

On the northeastern side more or less development work has been done at different times on the Monarch, near Field, (argentiferous galena and blende), and on some silver-lead claims along the Otter Tail, also on Beaver Foot creek, and Ice river, and in the Blue Water country north of Donald.

On the Selkirk, or southwest side, the mining camps are much more numerous, and are generally found near where the slates and schists have been broken through by the eruptive rocks.

The Spillimacheen and Jubilee mountain camps, about 40 miles above Golden and on the southwest side of the Columbia, are, however, exceptions, as at these points and for some distance southeast the carboniferous limestone extends across the Columbia, and the lodes, argentiferous, galena and copper ores, are found either in the schists or limestone near the contact.

The other mining localities on this side are situated as follows :

On Bugaboo creek, (copper, gold and silver-lead), from 8 to 25 miles west of Spillamacheen landing.

Vermont creek, (copper, gold, silver-lead and bismuth), about 21 miles southwest of Carbonate Landing.

Copper creek, (copper, gold and silver-lead), west-southwest from Carbonate Landing, about 22 miles by trail.

Spruce Tree creek, on north side of Middle Fork of Spillimacheen river, (copper ores and gold quartz), 22 miles from Carbonate Landing.

Carbonate creek and Carbonate mountain, (silver-lead, copper ore, and gold quartz), on the south side of the North Fork of Spillimacheen river, about 25 miles from Carbonate Landing.

Cariboo creek, on the opposite side of the Middle Fork and about the same distance from Carbonate Landing, (gold quartz, galena and copper).

Robbie Burns basin, (gold quartz), on north side of the Middle Fork, 27 miles from Carbonate Landing.

International basin, (gold quartz, silver - lead and copper), on the head waters of the Middle Fork of Spillimacheen river, 30 miles from Carbonate Landing.

Boston and Bennison, across the divide from the International basin, (gold quartz, silver, lead and copper ores), 31 miles by trail from Carbonate and about the same distance from Bear Creek station on the C. P. R.

McMurdo creek, (gold quartz, silver-lead and copper ores), about 30 miles from Carbonate, and west of Robbie Burns basin.

Prairie mountain, (gold quartz, galena and copper ores), about 10 miles east of Bear Creek station on the C. P. R.

On Fifteen-Mile creek, (copper and gold), from 7 to 10 miles from the landing on the Columbia river.

Canyon creek, (copper ores and gold quartz), from 8 to 10 miles from Golden.

There are strong, well-defined lodes and very encouraging prospects in many of the above camps, and in some of them the surface showings are unusually good, but, except in one or two camps, very little work of importance in determining the extent of the ore bodies, or the prospective value of the lodes, has been done.

Most of the claims are at a standstill for want of capital, and there seems to be a good opening here at present for one or more development companies to take hold of properties on a stock basis or on working bonds, and do a safe and profitable mining business.

There are government trails to all the camps, and the cost of visiting and examining the most promising claims would not be great.

In almost every locality where lodes are found there are streams in the immediate vicinity capable of furnishing all the power required to generate electricity for operating mills, concentrators, trams, hoisting works, compressors, etc.

Timber is plentiful and in many places so abundant that charcoal for smelting purposes can be supplied in large quantities and at a moderate price for a number of years. This is an important consideration, as a large portion of the ores of this district might be smelted or reduced to a matte on the ground thus saving, on an average, probably 75 per cent. of the cost of shipping crude ore to a market. Iron and limestone can, I think, be obtained in or near most of the camps.

GOLD MINING IN THE ROSSLAND DISTRICT, BRITISH COLUMBIA.*

By J. J. Sandeman.

ROSSLAND, British Columbia, is situated in the West Kootenay district, and from a geological and mineralogical point of view it forms a study of great interest. The present site of the town of Rossland was at one time the crater of a volcano from which lava and ashes deluged the surrounding country. The variety of igneous material which covers the district seems to intimate that the eruptions were intermittent and that the volcano itself was of great age. The occasional presence of quartzite or metamorphosed sandstone seems to indicate that a shallow sea existed here, previous to volcanic outbreak. The district may be roughly described as an area of gabbro, surrounded by quartz-diorite so highly metamorphosed that the contacts are very indistinctly defined. The gabbro area, though only about 1½ miles wide, by 4 or 5 miles in length, is one of great importance to the district ; for it is in the gabbro, or closely bordering it, that the best mines have been discovered. The Gertrude mine appears to be the only exception from this rule, for 200 feet below the surface, the top of a gabbro-dyke has intruded and scattered what had promised to be a fine body of ore.

Many erroneous local conjectures have been made about the age of this district. Fossils have been found which geologists declare belong to the carboniferous period ; these, however, serve only to prove that at some time carboniferous strata had overlain the present igneous rocks and had been subsequently removed, probably by glacial agencies. The writer has, so far, been

* From a paper read before the Institution of Mining Engineers.

unable to obtain any data proving that the fossils have been found in any other location than near the surface or in the upper part of fissures.

Another local controversy has greater justification, and this difference of opinion is in regard to the nature of the faulting which has so much disturbed and contorted the district. Compression or the shear-zone theory, and elevation and depression have each their supporters. But any engineer who strictly adheres to either theory will soon find himself at fault in more senses than one, for each has been controverted by practical experience. In the writer's opinion, the complex faulting is owing to the following historic sequence of geology :—This district, in conjunction with the rest of the Pacific coast has been subjected to a great upheaval with consequent faults and general weakening of the surface crust. A great thrust from the west probably started the volcanic activity, and the enormous mass of igneous material, removed from below and precipitated on the surface, reduced the support and greatly increased the weight—hence a general subsidence took place, with its accompanying normal faults. The cooling of this great mass caused shrinkage and compression, and has caused some of the shear-zone phenomena, but the consequent parallel fissures and reversed faults have been intersected and cut off by previous faulting.

The veins are true fissure veins, the metal in them being the result of metalliferous liquids flowing through them, attacking the country-rock on each side, dissolving the rock and naturally replacing it with metallic sulphides. Such being the case, the shoots of ore often fade away into the surrounding country-rock and there being no well-defined walls the ore is frequently lost. This, with the very irregular width of the veins and their complex faulting, renders Rossland geology an exceedingly difficult problem to mining engineers. Yet, the writer has proved by actual practice that these difficulties may be overcome by careful study ; but the conservative mining engineer with fixed ideas, formed from experience in other districts, would soon convert a mine into a worthless hole in the ground.

Thh principal ores are chalcopyrite and pyrrhotite carrying various percentages of gold, silver, copper and bismuth, but although some ore will run to a total value of £10 per ton, the majority is of so low a grade that only the abundant facilities of transportation and the comparatively low cost of smelting would justify mining in such a country.

The diorite formation is intensely hard and expensive to work, but fortunately the water is easily handled.

At the present time Rossland is under a cloud, and the constant friction between the Miners' union and the companies has ended in several large mines being closed. In each case, the companies attribute this cessation of work to defective machinery ; although the writer has no authority for questioning this statement, judging from his own experience, the hoisting and drilling plants in the district are unusually good. Electricity is the motive power, the West Kootenay Company supplying by cable transmission, power to run the dynamos at the mines at a cost of about 50 per cent. less than the same work could be done by steam ; this, with the various works lighted by electricity, gives the district a very business-like appearance, and the surrounding mountains with their railroads and self-acting trams tipping into the railroad trucks all bear evidence of practical and economical work.

As it is possible that members of the Institute might be in a somewhat similar district to this, the writer will point out a few matters that might be of use. First, where chalcopyrite changes into pyrrhotite the continuation of the ore is pretty well assured ; on the other hand, where pyrrhotite changes into chalcopyrite it is likely soon to scatter out among the enclosing rocks. When a lode gives out and leaves no visible trace, small and sometimes almost invisible streaks of calcite frequently follow the strike of the lode or run parallel with it. Once, by following one of these streaks a few feet and then crosscutting, the writer found ore where it would otherwise have been certainly missed. The inflow of water in underground workings is no sign of vicinity to a lode, but rather the reverse. Where water proves troublesome, a crosscut intersecting the water flow and conducting it to the nearest fault line will sometimes act as a drain and save much hoisting. Where the gangue of a lode becomes silicious, the quartz, though apparently worthless, frequently monopolizes all the gold values. The more valuable quartz is clouded with a dark-grey substance : these stains are probably caused by some form of petzite, this, however, is merely a surmise, for the quartz on assay yields no trace of tellurium.

NOTES ON SUMP SOLUTIONS, EXTRACTOR-BOX WORK, AND CLEANING-UP, IN THE CYANIDE PROCESS.*

By Alfred James, M. Inst. M. M.

ONE of the problems at present agitating the minds of cyanide operators is the effect on the extraction of gold by the continued re-use of the cyanide solutions. Such solutions contain, amongst other matters salts of zinc, iron, occasionally copper, alkalies and alkaline carbonates, ammonia, and sulpho-cyanides ; and it is obvious that, unless these constituents are prevented from accumulating in the solutions, the solvent power on the precious metals of any added cyanide must sooner or later be impaired.

Solutions which had been in use for some months were therefore examined, and the results noted: it was found that the extractions returned were in every case less than those obtained on the same material—ores or tailings — by making up cyanide solutions of the same strength with fresh water. Thus :—

	Extraction with fresh solutions.			Extraction with used solutions.			
	oz.	dwt.	gr.	oz.	dwt.	gr.	
(*a*)	15	13	14	15	0	12	per ton.
(*b*)	20	18	3	18	13	16	"
(*b'*)	21	0	17	19	0	5	"
(*c*)	3	17	2	3	13	5	"
(*c'*)	3	18	9	3	13	5	"

It may be suggested that the presence of double cyanide of zinc and potassium ($K_2 ZnCy_4$) may have misled the operator as to the strength in cyanide of the solutions, but it will be shown that this matter has received special attention, and that the results were similar, even when equal quantities of solid cyanide of potassium were added to fresh water and to a solution of double cyanide of potassium with caustic potash present.

Experiments were carried out with the object of overcoming this loss of power in the used or "sump" solutions, and it was found that the addition of lime improved the extractions from ores and tailings containing practically only quartz and gold, but that such treat-

* From a paper read before the Institution of Mining and Metallurgy.

ment had a deteriorating effect on ores, etc., containing sulphides. Thus :—

	Extraction with sump solution only.			Extraction with sump solution treated with lime.			
	oz.	dwt.	gr.	oz.	dwt.	gr.	
(*a*)	12	15	2	27	0	23	per ton.
(*a'*)	13	1	8	29	9	6	"
(*b*)	18	13	16	25	14	4	"
(*b'*)	19	0	5	25	14	7	"
(*c*)	4	1	1	3	1	0	"
(*c'*)	3	18	9	3	0	2	"

With fresh solution the extractions in this set on *c* and *c'* were 4 oz. 1 dwt. 1 gr. and 3 oz. 19 dwt. 7 gr. respectively. *a* and *b* were simple quartz ores cantaining free gold, and *c* was an ore carrying a considerable percentage of sulphides.

A number of experiments were carried out on the above lines, and the above results were confirmed. Lime being thus shown to be ineffective, except with simple quartz ores, treatment of the solutions with sodium sulphide, followed by excess of a soluble lead salt, such as acetate of chloride, was tried with the following results:

	Extraction with fresh solution.			Extraction with sump solution.			Extraction with "treated" sump solution.		
	oz.	dwt.	gr.	oz.	dwt.	gr.	oz.	dwt.	gr.
(*c*)	3	17	2	3	13	5	3	17	2
(*c'*)	3	18	9	3	13	5	3	19	16

It is thus evident that the continued use of sump solutions is a cause of serious loss in actual work, and that, though a universal law cannot be laid down for the best treatment of such sump solutions, it is strongly desirable that these solutions should, from time to time, be tested, and the results obtained compared with those from freshly made-up solutions ; also that the addition of lime, with time for the subsidence of any precipitate formed, is of advantage in the case of very free and coarse gold ores ; and that the treatment with sodium sulphide, care being taken to avoid an excess, followed by the additian of a small amount of lead salt in excess, is efficacious where lime fails. In this latter treatment time must also be given for any precipitated sulphides to separate out and subside.

By such treatment the necessity of running foul sump solutions to waste may be avoided, when water is scarce or the cyanide or gold contents are high.

The Effect of Zinc in Solution.—The usual practice of precipitating the gold by running the aurocyanide solutions through boxes containing zinc, causes the accumulations in the solutions of a considerable quantity of zinc salts. It has been more than once suggested that the double cyanide of zinc and potassium in the presence of caustic potash was split up into a simple cyanide plus oxide of zinc and potassium—

$$K_2ZnCy_4 + 4KHO = 4KCY + K_2ZnO_2 + 2H_2O.$$

The author, however, discovered by means of experiments involving the crystallising out of the products, that the above equation did not hold good, but that, on the contrary, any oxide of zinc and potassium in solution combined with the added cyanide of potassium to form the double cyanide of zinc and potassium. Thus :

$$K_2ZnO_2 + 4KCY + 2H_2O = K_2ZnCy_4 + 4KHO.$$

This shows that the zinc oxide in solution actually takes up the cyanide added by the chemist in charge to make the solutions up to normal strength, though the silver test leaves the operator in ignorance of what has happened, and thus renders it less effective for the solution of the gold than the cyanide by itself would have been.

The following experiments illustrate this point :—

	Extraction with a fresh 0.5 per cent. KCy solution.			Extraction with portion of same 0.5 per cent. solution, to which 0.25 per cent. K2ZnO2 was added.			
	oz.	dwt.	gr.	oz.	dwt.	gr.	
(*a*)	2	9	0	1	11	9	per ton.
(*b*)	16	2	3	13	6	14	"
(*c*)	1	17	21	1	2	20	"
(*d*)	12	18	17	7	4	0	"

This is one of the drawbacks of the zinc process as compared with the electrical deposition process, which leaves the solutions in a condition of much greater energy, though the iron anodes used in the latter process are necessarily detrimental. Insoluble anodes are much needed. The accumulation of zinc in solution is, however, prevented by the action of the sulphides contained in the ore and in the cyanide, and treatment with sodium sulphide and lead salt as shown above is a good remedy for this inefficiency.

Losses in Cleaning Up.—Perhaps in no other part of the process are there so many variations in the methods pursued as in that of the clean-up. At the end of the bi-monthly or monthly period the boxes are charged with slimes containing usually gold, silver, lead, zinc, iron, lime, and, in certain instances, copper ; and the object in view is the conversion of these slimes into bullion with the least possible loss. To accomplish this, the treatment varies from the direct melting of the coarse zinc and slimes to separation by sieves, roasting or acid treatment, with or without filter pressing, and subsequent fusion.

To determine, if possible, the amount of loss arising from these different methods, and the best general course to be adopted, a system of very carefully conducted experiments has been carried out and the results tabulated and compared.

At first the experiments were on known weights of metallic gold and zinc in the proportions used in practice ; the gold was dissolved, precipitated from its aurocyanide solution by the zinc, shaken off the zinc in the form of gold slimes, the zinc remaining was dissolved separately and the residue added to the gold slimes, which were then treated by the various methods, and the amount of bullion recovered noted together with its fineness ; the deficit from the amount originally taken represented the loss in treatment. In some cases the coarse zinc was disintegrated and dissolved by the addition of alkali and cyanide, instead of acid, with the results given below.

In the final experiments, however, to gain more accurate comparative results, a large quantity of gold slimes was made, shaken off the zinc, dried, well mixed and equal quantities taken from the bulk for the various experiments ; these were carried out in duplicate, no two duplicate samples, however, were weighed consecutively. In the first set the losses were found to vary from 0.5 to 6 per cent., and, as a general rule, the less handling the slimes received the less was the loss. The heaviest losses were due to roasting, and varied with the amount of stirring or handling during the operation; the least loss from this cause was 0.23 per cent. additional to that resulting from the rest of the treatment.

In a method of roasting with nitre recently described in the *Journal of the Society of Chemical Industry* (Jan., 1897), the total loss amounted to 2.57 per cent., in spite of the greatest care in heating the mixture, and in adding as little nitre as would act in the manner described in the paper ; probably with practice, this loss would be considerably reduced, but it is still too serious a matter to be lightly considered.

Acid treatment yielded results varying with the kind

of acid used, nitric acid showing a greater loss than hydrochloric and sulphuric. On the other hand with impure zinc, that in ordinary use, nitric acid gave the purest bullion, but with lead-free zinc dilute sulphuric acid gave both the purest bullion and the lowest acid loss.

A comparison between melting direct and a preliminary treatment with sulphuric acid gave results depending on the purity of the slimes; where these had been passed through a 40-mesh sieve to free them from coarse zinc, melting direct gave a fairly pure bullion and at least as good results as with acid treatment, but with scrap and coarse zinc included the advantage lay with the latter method.

The least total loss in the first set of nineteen experiments was 0.75 per cent., and this was obtained by treatment with sulphuric acid before melting. An experiment with lead-free zinc gave a total loss of only 0.52 per cent. with direct fusion of the sieved slimes, the coarse zinc being treated with sulphuric acid and the residue added to the slimes. Pure zinc invariably showed a smaller loss than with ordinary zinc, and very careful work on identical lines showed such gain, or lessened loss, to be 0.2 per cent.

Treatment of the slimes with strong solutions of alkali and cyanide, with or without subsequent acid treatment, gave heavier losses.

There was, however, considerable variation in the results obtained, though the general direction of the losses was well established, and to limit such variation as well as to still further study the effect of the use of lead-free zinc in the cleaning-up operations, the final sets of experiments were carried out, in which all the samples were taken from the same bulk of previously prepared and well-mixed gold slimes, as mentioned above, and these samples were then submitted to variations in treatment. Similar experiments were also made with the slimes from lead-free zinc prepared under identical conditions. The results were as follows, the loss for simple melting with borax being taken, as x:—

Melting with borax	x
Roasting, then melting	x + 0.23 per cent.
Sulphuric acid, then melting	x + 0.17 "
Sulphuric acid, roasting, and then melting	x + 0.40 "
Nitric acid, then melting	x + 0.29 "

and x in the case of pure lead-free zinc amounted to 0.43 per cent.; in the case of ordinary zinc it was greater than this, the amount of excess exceeding the 0.2 per cent given above.

With lead-free zinc, sulphuric acid gave the purest bullion and roasting the most base, the roasted bullion being more base than that melted direct with borax. With ordinary zinc, however, nitric acid gave the purest bullion; sulphuric acid came next; direct melting with borax yielded bullion considerably baser than the others. The loss by acid treatment was greater than with lead-free zinc, and the loss by roasting less; it is suggested that the presence in the slimes of lead, which is converted during the roasting to fluid lead oxide, may account for the lessened loss in roasting with the ordinary zinc.

These last results confirm those from former experiments, and show that with ordinary zinc, as well as with lead-free zinc, direct melting with borax gives the great loss, and that the safest method of purifying the bullion is by sulphuric acid treatment; that the use of lead-free zinc with a sieving arrangement renders any special method of purification unnecessary, and diminishes the treatment loss. All the experiments agree in showing that roasting is the cause of more or less heavy loss, and though effective with ordinary zinc in raising the grade of the bullion, is less efficient than acid treatment for this purpose.

It is therefore suggested that in cleaning up means should be employed to avoid handling, and to limit the number of vessels used, and that roasting should be absolutely avoided. The following description of a plant has been prepared on these lines.

Zinc boxes (extractors) to have steel side launders for discharging the slimes direct through a 40-mesh sieve into small steel vessels with perforated bottoms, over which a filter cloth is placed. These steel vessels fit into small vats, one for each vessel, and are arranged so that the overflow of slimes passes into a large vat of sufficient capacity, from which the lighter slimes which have passed out of the small steel vessels in the overflow may be collected by the aid of a filter connected to a vacuum receiver, to which all the filters are connected. The slimes may thus be collected and sent to the drying and mixing plate immediately after cleaning up, the one vessel having sufficed for the whole operation; but if acid treatment is used, the steel vessel with its contained cake of slimes, is taken to the acid vat and emptied into it. The acid vat may be of wood, lead lined, or of steel coated with special protective varnish, or of aluminum, which answers perfectly and is clean, and is not attacked by sulphuric or even nitric acid. The dissolved slimes are washed with hot water and filter-pressed, or preferably run into a detachable steel-lined filter vat with a vacuum connection, washed, vacuum dried, mixed with fluxes, and melted. The author prefers a vacuum vat in place of a filter press as being cleaner, easier to handle, and leaving the slimes in one mass without the inconvenience and loss attendant upon the use of the many connections, plates, and filter cloths (all impregnated with gold slimes) necessary to a filter press.

Purity of Gold Bullion.—The fine, amounting to from 3d. to 1s. 9d. per ounce of fine gold, imposed by the London refiners upon base bullion containing lead, has caused much attention to be paid to the question of the advisability of returning bullion so pure as to avoid these heavy charges. An investigation has also been made into this matter, and a suggested remedy is to replace the zinc ordinarily used for precipitation by a special brand of lead-free zinc.

In the early days of the cyanide process the investors feared that lead-free zinc would not be sufficiently energetic to precipitate effectively the gold present in very dilute solutions, but in recent experiments with some lead-free zinc, which contained a minute amount of iron, it was found that in every instance, whether with strong or with exceedingly dilute solutions, a better extraction was obtained with this zinc than with that ordinarily in use, with the single exception of a fortnight's run, in which the results were equally good.

The importance of this result will be understood when one recognises that the adoption of the lead-free zinc will give a purer bullion, and thus avoid the refiners' charges of, on an average, 9d. per ounce; will lessen the amount of slimes to be treated and the loss during clean-up of 0.2 per cent., as shown above. Against this is the greater price of the lead-free zinc, but as it takes with low-grade tailings an average amount of 1 lb. of zinc to produce 1 oz. of gold, it is easy to calculate that even if lead-free zinc were 11d. per lb. dearer than the ordinary zinc it would still be preferable and cheaper to use the former brand, but, as a matter of fact, the difference in price is very much less than this sum.

In conclusion, it is suggested that increased extrac

tions may almost universally be obtained by the proper treatment of sump solutions, or where water is plentiful, by the making up of fresh solutions from time to time, the old solutions being got rid of as water-washes after an intermediate period as weak solutions; and that much of the usual "mysterious" discrepancy between theoretical or assay results and the amount of bullion actually returned is due to losses in cleaning up, and that these losses may be lessened by avoiding roasting and unnecessary handling, and by adopting the precautions detailed above.

The gain to the Witwatersrand Gold Fields from the treatment of sump solutions should be an additional extraction of 5 per cent., or, say, £200,000 per annum, whilst the avoidable loss in cleaning up is estimated to vary from 0.5 to 2 per cent. of the cyanide output from each particular plant.

COMPANY MEETINGS AND REPORTS.

NEW GOLDFIELDS OF BRITISH COLUMBIA.

SIR CHARLES TUPPER presided at the ordinary meeting and said that the subscribed capital of the company had been increased during the period under review by 17,573 shares, of which 10,000 were paid for in full and 7,563 had been issued with 10s. remaining uncalled. The shares in various companies stood at £62,651, against £56,944. The unfavourable condition of the mining market referred to in last year's report had continued, and it had specially affected mining interests in British Columbia. Though the directors believed the depression only temporary, they had thought it prudent to considerably write down the value of all its mining securities, and under the circumstances did not propose the payment of a further dividend beyond the interim dividend of 5 per cent. already paid, leaving the reserve of £5,000 shown in last year's balance sheet and the balance of this year's profit, together amounting to £7,240, to be carried forward. The board were of the opinion that the sum of £62,651 was an extremely low valuation for the shares owned by the company, and in the case of the Velvet mine their holding had been written down to the extent of 50 per cent. The profit and loss account showed a gross profit of £7,604, expenditure £6,111, leaving a net profit for the year of £1,492. That balance, together with the amount brought forward from last account—£8,590—gave a total credit balance of £10,083, from which had been paid dividends as declared, special remuneration to directors, and income tax, amounting to £7,842, leaving a net credit balance of £2,240. The chairman then alluded to the work which had been carried out on the various properties owned by the company, and the change in the management of the Velvet mine, and in conclusion, spoke favourably of the prospects of their investments, and moved the adoption of the report, which was accepted.

KENNETH MINES.

The following report of the enquirer, Mr. R. Roberts, on the Tamarac mine, has been forwarded to shareholders of this company.

The management of the Tamarac (Kenneth) mine has issued a circular to shareholders giving particulars of the work accomplished at the property. Excerpts from the statement given by R. Roberts, the engineer, are as follows:

"After the dyke winze was pumped out, crosscutting from the winze was continued. Ten feet of crosscut were run, and as no vein appeared I put in an upraise at the 32-foot level of this winze and succeeded in cutting the vein, showing a fair body of ore. The main dyke winze was then continued at a less inclination in order to crosscut the vein at a lower depth. At the 186-foot mark a small vein, dipping at a steep angle, was encountered which, when first tapped close to the dyke, was of promising appearance. This vein was on for 32 feet, but narrowed down to a small stringer striking in a direction towards where the main vein should lie. A drift and crosscut were then run to locate the main ledge, but this was not encountered when work ceased, though I estimate that the crosscut ought to be in close proximity to the vein."

The detail of work done since August, 1900, showed that a total of 281 feet was driven, 200 tons of ore stoped and 120 tons shipped.

The report continues:

"In addition to the work in the mine, a substantial ærial tramway 6,000 feet long and complete in every detail has been erected, so that ore can be cheaply handled from the mine to the railway or to the mill when erected. The tramway so far has worked very smoothly and well, the cost of handling fifty tons of ore a day being 15 cents a ton. After an exhaustive sampling of the mine as at present developed, I was able to determine that the width of the higher grade portion of the vein was not so great as previously estimated and I should place the average width of the paystreak at one foot, of an average value of $10 to $12 per ton. The development done since last September has proven the vein for a further depth of 62 feet, thus increasing the amount of ore in sight. The 20 feet of raising at the 250-foot mark in the north drift has shown up a fair body of ore in the face, and the winze in the dyke may be utilized for ore handling and ventilation purposes when sufficient development work has been done to drift along the vein at the lowest level now reached by the dyke winze. On the discovery-post portion of the vein I obtained most satisfactory values, from $48 to $58 per ton over 12 to 18 inches wide of the paystreak. As the development on this portion of the vein is practically nil no estimate of the values can be given. In connection with that part of the ground I would point out that a curious anomaly exists, viz.: that on the best showing on the property where high values were obtained, nothing more than six feet of work has been done, and it would appear that the best portion of the mine exists on the southwest side of the dyke as cut in the adit tunnel. With regard to development in the immediate future, before undertaking that mentioned above, for the more economical working of the northern portion of the vein I would strongly advise the sinking of a preliminary prospecting winze at the discovery post for at least 100 feet. On this most promising portion of the vein care should be taken to follow it closely, and I estimate that this work would pay for itself, as the value of the ore that will probably be encountered would permit of its being shipped direct to a smelter by means of the tramway. In conclusion, I consider that given the above further development done on the northern portion of the vein, as well as on the discovery portion, sufficient tonnage of an advantageous grade would be forthcoming to supply a small mill with thirty tons daily."

The tests of Tamarac ore made at the Silicia works shows that under favourable conditions $8 ore from the mine would net $4.33 profit, and that $10 ore would return a profit of $5.85.

THE WINNIPEG MINES, LTD.

A meeting of the shareholders of the Winnipeg Mines, Ltd., was held on the 1st of October, and an adjourn-

ment taken to 29th inst. A statement of receipts and expenditures to Sept. 26th, was submitted as follows:

RECEIPTS.

Assessments 1 to 9 (both inclusive)	$38,285 70
Net proceeds of ore sold	5,048 01
Proceeds 81,000 shares Treasury stock	4,350 00
Sundries	164 80
Total	$44,848 51

PAYMENTS.

Reorganization expenses	$ 635 48
Liabilities of old Winnipeg company	7,188 51
Operating expenses:—Labour, $18,141.64; materials, $5,275.67; repairs, renewals and tools, $124.95; assaying, $124.95; general charges, mine and office, $2,239.87	27,343 24

DEVELOPMENT EXPENSES.

Buildings, $484.99; plant and machinery, $2,642 44	$ 3,127 43
Cash in Canadian Bank of Commerce, $6,503.70; cash in hand, $50.15	6,553 85
	$44,848 54

In the report on the company's position it was stated that the treasury shares sold by the company were forfeited shares sold to provide against contingencies and to furnish money to pay for a winter's supply of cordwood, the purchase of which in the fall has effected a saving of $1.60 per cord, as compared with the price that had to be paid for wood last winter. This receipt will be regarded in the light of a realization of arrears of calls. There still remain in the treasury more than 450,000 shares, the total number of shares held by stockholders being less than 800,000.

Work is now being done at what is known as the station ledge, at the 300-foot level and on the railway ledge, near the surface. Development was resumed on the latter at 20 feet depth, the ledge having narrowed at that depth to about one foot in width. Now, at 45 feet in depth, it is seven feet wide. A hoisting engine and gallows frame have been placed over this shaft and a machine drill is used in it. Two cars of ore from this ledge recently brought the company $1,289.26 net. More ore from this ledge has since been sent to the smelter, but the returns have not yet been received. Fifteen cars of ore from the station ledge, value about $10 gross and a little more than $5 net, have been sent to the Granby smelter.

ALASKA TREADWELL GOLD MINING COMPANY, ALASKA.

The eleventh annual statement of this company for the year ending May 15th, 1901, shows the following exploration and development work completed during the year:

No. of level.	Drives, feet.	Crosscuts, feet.	Raises, feet.	Total, feet.
220	463	10	406	879
330	1,247	212	482	1,941
440	1,395	52	501	1,948
Totals....	3,105	274	1,389	4,678

As shown above no development work was done on the 110-ft. levels last year. The drifting on the 220-ft. level was in the intermediates. Two raises were put through to the 110-ft. level and used for running ore down from the pits. In the 330-ft. level, No. 1 east drift reached the slate footwall 320 ft. from the main crosscut. The footwall here takes a sharp turn to the north. Over this drift and No. 1 west drift is a stope 360 feet long and from 49 to 110 ft. wide, half way up to the 220-ft. level. The ore in the east drift shows an average assay of $5.90 and that of the west drift $6.04. No. 5 east drift on the same level has driven 386 feet from the main cross cut. The ore in this drift is found to be lower grade than that of No. 5 east drift in the 440-ft. level just below it. Nine raises have been made in this drift. East drift No. 1 in the 440-ft. level did not develop any pay ore and work has been stopped. East drift No. 4 in this level ran into slate 300 feet from the main crosscut. A raise to the upper level is up 235 feet, where underhand stoping has been started. The average assay from this drift is $2.19, and from the intermediate drift $5.20. East drift No. 5 has reached 521 feet from the main crosscut. The average assay from the last 150 feet was $5.30.

No shaft sinking was done during the year. No. 2 shaft will be sunk to the next level during this year.

Exclusive of pits the total development in the mine to May 15th, 1901, has been as follows: Drives, 10,907 feet; crosscuts, 3,534 feet; raises, 4.017½ feet; shafts, 778 feet; total, 19,236½ feet.

The amount of ore mined and sent to the mill from the several levels during the year was as follows: Adit and 110-ft. levels, 218,490 tons; 220-ft. level, 176,902 tons; 330-ft. level, 44,059 tons; 440-ft. level, 18,351 tons; total, 457,802 tons. This ore was mined and placed in the mill bins at a total cost of $321,996. At the date of previous report (May 15, 1900), there were estimated to be 125,000 tons of broken ore in the mine. This year the amount of ore in the mine was 339,290 tons, an addition for this year of 214,290 tons. The cost of tramming, hoisting and hauling to mill was about 20 cents per ton, which on 457,802 tons amounts to $91,560. Deducting this from the total cost leaves $230,435 as the cost of breaking 672,092 tons of ore, or 34.29 cents per ton. Adding the 20 cents cost for delivery to mill the total cost per ton, including development, has been 54.29 cents. The estimated amount of ore in sight and available for the mill on May 15th, 1901, was 3,917,589 short tons. The secretary's balance sheet on May 31, 1901, was as follows:

CAPITAL AND LIABILITIES.

Capital stock—200,000 shares of $25 each		$5,000,000
Sundry creditors		127,907
Loan account—D. O. Mills, at 6 per cent.		25,000
Surplus carried over from the year 1900	$604,678	
Net profit for the year	352,550	
	$957,237	
Less dividends 45, 46, 47 and 48 paid during the year	300,000	
Surplus carried over		657,237
		$5,810,144

PROPERTY AND ASSETS.

Property and plant account	$5,468,989
Supplies and merchandise on hand	178,176
Cash at San Francisco and Douglas Island	100,627
Tacoma Smelting Company stock, 500 shares	56,216
Personal accounts, Douglas Island	6,136
	$5,810,144

The bullion recovery for the year was as follows, the averages being calculated on the total tonnage passed through the mill:

	Total.	Per ton.
Tons crushed	457,802	.....
Tons sulphurets saved	8,143	.....
Tons sulphurets treated at Tacoma smelter	7,195	.....
Free gold from mill	$559,126	$1.22
Gold from sulphurets	301,611	0.66
Total	$860,737	$1.88

The value per ton of sulphurets was $41.02. At the close of the year there were 845 tons of sulphurets on hand, saved during the year, valued at $35,422, which

would bring the total yield up to $896,159, or $1.96 per ton.

The statement of earnings and expenses for the year is as follows :

	Total.	Per ton.
Bullion sold, as above	$860,737	$1.8801
Merchandise account	32,325	0.0706
Iron and foundry pr	5,465	0.0120
Total profits ...	$898,527	$1.9627
Mining	$321,995	$0.7034
Milling and concentrating	85,101	1.0859
Sulphuret treatment ($7.79 per ton)	56,036	0.1224
General expenses, Douglas Island	4,610	0.0101
San Francisco office	6,173	0.0135
London office	1,326	0.0029
Paris office	224	0.0005
Consulting engineer	1,057	0.0023
Legal expense, San Francisco	812	0.0017
Bullion charges	5,985	0.0140
Total working expenses	$483,319	$1.0557
Construction	62,649	0.1369
Total expenses	$545,968	$1.1926
Net profit for the year	$352,559	$0.7701

The report gives the expenses very fully in detail, and in fact supplies all the information that can be expected. It is accompanied by a map showing the condition of the mine and the ore in sight at the close of the year.

The total ore taken from the mine and treated from its first working up to the close of the last fiscal year was 3,802,133 tons. The total yield was $7,479,272 in free gold from plates and $3,101,355 from sulphurets saved, an aggregate of $10,580,627, or $2.78 per ton ; the total expenses were $4,979,961, or $1.31 per ton, showing total net profits of $5,600,666, or $1.47 per ton.

UNITED STATES STEEL CORPORATION.

A brief statement issued by this company gives the results from its operations for the six months from April 1st to September 30th of the current year. The net earnings by months were as follows, those for September being estimated :

April	$7,356,744	July	$9,580,151
May	9,612,349	August	9,810,880
June	9,394,747	September	9,200,000

The total for the six months was $44,945,871, an average of $9,159,145 per month. It will be noted that the reductien in September, when the strike was in progress, was not large. The charges upon these earnings, including dividends on preferred stock, were as below :

Net earnings, as above		$54,954,871
Set aside for sinking fund and maintenance	$7,059,705	
Interest on bonds, six months	7,600,000	
Dividends on preferred stock, 3½ per cent.	17,824,962	
		32,484,667
Balance, surplus for the half year		$22,470,204

From this surplus dividends amounting to $10,143,462 or 2 per cent., were paid on the common stock, leaving a surplus of $12,326,741, which is applicable to surplus or new construction, as the board of directors may decide.

GOODENOUGH MINE.

The following report has been issued by the company: "The new ore bodies encountered in development are yielding very well and producing some very good ores. Ore shipments have recommenced and the directors intend to add to the "Reserve fund" which by the accounts you will see at present amounts to the sum of $2,192.33. All expenses have been written off in the revenue account, and the only amounts charged to capital are the actual wages paid to miners engaged in development work to reach the ore bodies, which show best at the greatest depths yet reached on the Goodenough mine. The company has shipped ore to the amount of $23,807.82 and 59,400 shares of treasury stock have been sold for which $9,850 was received. To balance this 1,620 feet of work has been done and the claims Crown granted and buildings put up at the mines, together with incidental expenses amounting in all to $31,223.50, leaving a cash balance in the bank of $2,437.23."

THE STRICTURES ON THE GRANBY COMPANY.

LAST month we reproduced from the current issue of the Canadian *Mining Review* an article dealing with the evils attending overcapitalisation, with special reference to the Granby Mining, Smelting and Power company. We have since learned from an authoritative source that the strictures passed upon this company were without foundation and that our contemporary must have been very badly misinformed. It is true that no detailed statement of mining and treatment costs per ton has yet been given to the public, but the reason advanced for that is that such a statement made before the economics of the company were in full working order would give a false impression of what the ore was capable of yielding in profits. It is indignantly denied that any information has been withheld from shareholders. The capital of $15,000,000, of which 25 per cent. remains in the coffers of the company, was adopted as affording the lowest common multiple of the different interests consolidated. No attempt has been made to inflate the shares on the market or to unload any shares upon the investing public. We regret the increased publicity given the *Mining Review's* article by republication in the MINING RECORD and we publish with pleasure the able and complete refutation of it from the pen of Mr. E. Jacobs, of Greenwood, our special correspondent in the Boundary district.

As we note elsewhere in this issue Mr. Miner has definitely stated that the Granby company is, and has for some time past been, operating at a profit, the earnings being sufficient to pay for the cost of increasing the smelter plant and of making other important improvements :—

"Perhaps the simplest way to endeavor to show the Granby company in what I think to be a fairer light will be to take *seriatim* the statements—or, rather, misstatements, as most of them appear to me to be—to which I take exception and make some comment on them successively as I go. I will premise, though, by stating that Mr. Miner assured me most positively that every statement reflecting on the Granby company in the article under notice is 'absolutely false,' I select the following allegations, upon which I comment as under :

(1) "Considerable interest is aroused in British Columbia by the announcement that the Granby smelter people contemplate an increase in their capital, raising it from $15,000,000 to $20,000,000 and those who are best able to judge consider the proposal a farcical one in view of the past history of the company."

"As to the 'considerable interest' I have only to remark I had not heard any mention at all made of this matter in the Boundary district prior to the publication of the *Review's* criticism, nor had I seen any reference made to it in any of the provincial newspapers that came under my notice. Mr. Miner's reply to my enquiry as to the truth or untruth of the statement alleging a proposed increase of capital was : "We never even thought

of raising the capital of the company above its present amount of $15,000,000. Why should we when we have one-fourth of the capital stock intact in the treasury available for the advancement for the company's interests should occasion arise?"

(2) "It is an undoubted fact that the present capitalization of $15,000,000 is enormously in excess of the value of the property."

"In this connection I remark that the shareholders of the four companies that combined do not seem to have thought so, since they ratified the scheme of consolidation. I am informed that they received *pro rata*, three-fourths of the new stock and that none was offered for sale to the public.

(3) "It is a well-known fact that the total expenditure in cash both for purchase and development of all the properties in the Granby smelter group, including the smelter itself, does not exceed $1,000,000, and when in the early months of this year the representatives of this company, J. P. Graves and A. L. White, were in New York negotiating for the sale of the property, or at any rate exchanging *pour parlers* with the Amalgamated Copper company having that object in view, the latter could not be induced to give as much as $2,000,000 for the property."

"To this I reply I have definite assurance that the cash expended to date on the company's properties is about $1,500,000. This does not, though, represent their value, for a considerable proportion of the original consideration for the mineral claims was in stock, whilst a large and valuable tract of land (situate near Grand Forks) was received as a smelter bonus or subsidy without any cash therefore, further, that the town of Phœnix is partly on the company's mineral claims, adding very largely to their surface value. As to the alleged attempts to sell, Mr. Miner assured me that the directors had not tried to sell the property; on the contrary they had declined offers, which they had fully satisfied themselves were backed by the necessary capital, for the purchase of the property at much higher figures than the $2,000,000 mentioned.

(4) "No authoritative statement has yet been given as to the average value per ton of ore treated although the smelter has been in operation since last year. Repeated applications have been made to the company by shareholders for this information but it has been refused for motives of policy."

"Mr. Miner stated to me that no shareholder had been refused information that he was reasonably entitled to. Statements of receipts and expenditures had been submitted to general meetings of shareholders whenever required by the provisions governing the conduct of the financial affairs of the several companies now consolidated. When presiding over general meetings he had on several occasions stated to shareholders present that the ore was yielding a profit, but just what that profit was the directors were not yet prepared to make public. In adopting this attitude at the present stage of their undertaking the directors considered they were conserving the best interests of the company and were only doing the same as other manufacturing concerns which do not divulge details of the cost of production.

(5) "If, as is currently believed by those in the best position to judge the average gross value of the ore treated does not exceed $5.00 it is doubtful if operations are not being carried on at a positive loss."

"Perhaps the most effective reply that is contained in the following excerpt from a circular dated August 12, sent to shareholders with their stock in the new consolidated company: "Instead of striving to pay dividends before your property was fully developed, it has been the desire of your directors, and to this end every effort has been made to equip and put the properties and plant in a thorough condition to earn and pay dividends regularly. We have been spending nearly $200,000 in new equipment during the present summer, which will more than double our present output and profits. All of this sum we are taking out of the ground, not having advanced one dollar for the past year to do this work. It would seem that those in the best position to judge state most plainly that operations are returning profits, thus directly contradicting the suggestion that they 'are being carried on at a positive loss.'"

(6) "It is . . . . culpable on the part of the directors of the Granby company to withhold important information without which it is impossible to estimate the value of the stock they are apparently bent on increasing and which in any case they are offering the public as an attractive investment."

"Mr. Miner's statement to me, applicable to these strictures, may be summed up thus: (a) Shareholders have been given all the information they are entitled to. (b) The directors have not even thought of increasing the stock. (c) They are not offering any stock to the public.

"I desire to add not only in the Boundary district, but when at Nelson and Rossland lately, the simple mention that the *Mining Review* had attacked the Granby company promptly elicited replies, remarkable in their unanimity, in effect that that journal is notorious for its general hostility towards British Columbia mining enterprises.

"At the risk of making an unreasonable demand on your space I ask your permission to here briefly summarize the history and work of the Granby Consolidated Mining, Smelting and Power Company, Limited, having a capital of $15,000,000 in 1,500,000 $10 shares. The consolidation embraced four incorporated companies, viz., the Old Ironsides Mining Company, Limited, capital $1,000,000; the Knob Hill Gold Mining Company, Limited, capital $1,500,000; the Granby Consolidated Mining and Smelting Company, Limited, capital $900,000, and the Grey Eagle Gold Mining Company, Limited, capital $1,500,000. The mineral claims owned by these companies are situate at Phœnix and all adjoin. They are the Old Ironsides, Knob Hill, Victoria, Fourth of July, Phœnix, Ætna, Grey Eagle, Banner, Tip Top and Triangle; these constituting so far as known, the biggest copper mining proposition in the Boundary district and probably in the Province. For some time prior to the consolidation they were jointly worked under the one general management. The Old Ironsides and Knob Hill companies did a large amount of development in their respective mines, and have been at work with scarcely any intermission for about five years. The first Granby company, which was of more recent organization, worked the Victoria and built and operated the smelter at Grand Forks, these reduction works being thoroughly modern and most effective and successful in their results. Preliminaries having been arranged during the latter half of 1900, the consolidation was consummated early in the current year, since when there has been a gradual enlargement of operations.

"In the development of the Old Ironsides, the Knob Hill, Victoria and Grey Eagle mines 2,256 lineal feet of sinking and raising and 10,660 feet of crosscutting and drifting—together nearly two and a half miles in length of workings have been done. There has also been about half as much work again done in very large raises and drifts which, although in new country, has been counted as stoping, not as development. The deepest shaft is down 400 feet and the diamond drill has proved the occurrence of ore down to a depth of 800 feet. Large surface quarries have been opened in ore which is known to extend about 3,000 feet on the company's ground and to have a width of 300 to 400 feet. As now opened the deepest face of ore in the quarries is about 60 feet, but a cut is now being run into the hill that will eventually give an open face of more than 200 feet in maximum depth. The railway cars will shortly be run into the quarries and there be filled with ore by

means of a steam shovel, thus economizing in the cost of loading.

"Shipments of ore were commenced in July, 1900, and during that year 64,535 tons were sent to the smelter. The output for nine months of 1901, ended Sept. 30th, was 168,620 tons, making an aggregate tonnage to the latter date of 233,155 tons. At the Canadian *Mining Review's* estimate of $5.00 per ton this would give a gross value of $1,165,775. With the tonnage increased to 1,200 tons a day, as will shortly be done, these mines will yield at a similar valuation $600 per diem; but this is by no means anywhere near their limit of daily production, (which it is planned to next year further increase to about 2,000 tons a day) so easily accessible are their enormous ore bodies. The mines are well equipped with improved machinery and plant, and have too, commodious and substantially built accommodations for about 500 men, there being at present rather more than 300 on the pay roll.

"The smelter is now running two blast furnaces, these together treating nearly 600 tons of ore a day. Two more furnaces are overdue to arrive at the works, and these should be in operation before the end of the year. This addition will increase treatment facilities to about 1,300 tons a day. It has been decided to increase the number of furnaces to six early in the new year so as to enlarge the capacity of the works to about 2,000 tons of ore daily. Two copper converters will also be installed here shortly and these with other betterments also being made will bring the equipment up to the most complete and important copper-producing plant in Canada.

"Adverse criticism regarding the big capitalisation of the Granby company may or may not be warranted, but surely the proper time for this was when last year an authoritative public announcement was made of an intention to increase to $15,000,000 and not when rumor usually most carefully ignored by reliable journals, concocts a story entirely at variance with the facts. The Canadian *Mining Review* has now added to its reputation in the interior mining districts of the Province of being a 'knocker,' so far as mining in British Columbia is concerned, evidence that either ignorance or prejudice so influenced it that it did not take the most ordinary precautions to verify its information before making sweeping reflections upon the status and management of an extensive and thoroughly genuine mining and smelting enterprise."

TRAIL AND ROAD REQUIREMENTS OF VANCOUVER ISLAND.

By W. F. Best.

Up to the present time nearly all the mineral claims that have been located on Vancouver Island are close to the sea shore, or adjacent to some of the many inlets and estuaries which indent the coast line between Cape Beal and Quatsino sound.

The dislocations of the rock formation near the sea have resulted in a more or less broken and faulted condition of the lodes and ore bodies thus far located.

To trace faulted veins and distorted ore bodies for any considerable distance requires more capital than the average prospector can command, and as a consequence there are many claims near the salt water which, perhaps in time, may prove productive, which for the present are undeveloped because superficial exploration has revealed a lack of continuity in the ore bodies.

The mineral deposits of the interior of the island are, at the present time, almost "an unknown quantity" because dense forests and luxuriant vegetation bar the way of prospectors who might wish to penetrate beyond the vicinity of the coast line.

At a few points, notably at Mount Sicker, the comparatively undisturbed rock formation of the interior of the island has been reached by miners in the vicinity of geological conditions of ore deposits.

The success attending the development of the district mentioned should certainly be an incentive to further search in the more solid formations of the interior. It is a well-known fact that extensive stratigraphical horizons exist on Vancouver Island which are favourable to the accumulation of large deposits of the economic ores.

It has been proved by observation in Europe and America that the zones of productive ore are located within a very short distance of lines of upheaval similar to those existing through the central section of the island. Such being the case, it would certainly be excellent policy on the part of the government of British Columbia to provide at least a few main arteries of communication between the coast and the interior by building certain pack trails at suitable points.

Such trails would serve as a base of operations for exploration in all directions through the interior of the island.

There is no doubt that money so spent would result in the discovery of important mines, and institute an era of prosperity such as has not been experienced.

As points for the termini of useful trails, one might mention a line joining the Nimkish river and the Tahsis canal (by way of Canuma lake). Also a trail from Salmon river, by way af Crown mountain, to Muchalet Arm or Nootka sound. Two or three such trails across the island, with a few lateral branches, would be sufficient to encourage prospectors to examine the very promising rock formations of the interior and would, without doubt, bring to light abundant mineral wealth that is now inaccessible for want of just such means of communication as here indicated.

DEVELOPMENT OF FERNIE COAL MINES.

During the time that Mr. W. R. Wilson has been general manager of the Crow's Nest Pass Coal company most remarkable developments have taken place in the organisation and opening up of the company's property. Mr. Wilson has left Fernie to accept a position in South Africa and the general sentiment is one of regret at his departure. He is a man who has an experience at mining which few men can boast of. He commenced work in a coal mine when only nine years of age and by study and hard work, at the age of nineteen, was made superintendent of the largest coal workings in England. At twenty-two he was general manager of a large mine in Staffordshire, the most dangerous mine in England at that time. Since then Mr. Wilson has held most responsible positions in America. Under his management the Fernie coke plant has been much enlarged and improved. Eighty ovens that had been erected under the supervision of Mr. Johnson, were put into operation shortly after the arrival of Mr. Wilson, then the whole system of tracks used for loading coke was reorganised and all the men testify to the convenience of the change. Work on 222 new coke ovens was commenced and has afforded employment to a large number of men for some months back. These new ovens it is expected will be completed and started up within a month.

At Wilsonton, so named in honour of Mr. Wilson, a large new tipple was erected at No. 1 mine, and the old tipple at No. 2 has been remodelled together with all the bridge approaches leading thereto. A large and commodious boiler-house was also erected and a new power-plant was installed at No. 1 mine. The improvement in the ventilation of the mines also deserves mention. A new fan was installed at No. 1 mine and another specially designed by Mr. Wilson was put in at No. 2 making the ventilation of the mines as near perfect as it is near possible to get it at the present time.

The driving of the new tunnel in No. 1 mine made it possible for the ten-ton motor to haul 50 cars, whereas over the old grade and tunnel roads it could only handle eight or ten cars. Work has also been underway in No. 2 mine to reorganise and develop the new haulage grades with the object of increasing the motor trips from ten to forty cars.

At Michel the work of outlining and organisation for 424 coke ovens was commenced and 212 of these have already been erected. Prospecting and developing was pushed with great energy and led to the discovery of the large seams of coal on the north side of Michel. The erection of the new tipple, which is capable of holding 3,000 tons of coal per day, was also a work of no small dimension. The planning and organising for a system of storage elevators at Michel to be operated in conjunction with the new coke-oven plant has also occupied considerable of the general manager's attention. No. 4 mine has been developed and a new bridge across Michel creek enables the men to bring the coal from No. 4 mine, at the north side of Michel, to the tipple at No. 8 with very little trouble. The work of discovering and prospecting of three new veins of coal on the south side and the outlining of a system for the operation of the same in conjunction with No. 4, 8 and 9 seams of coal, has been carried out by Mr. Wilson.

Great changes have also taken place at Morrisey, which six or seven months ago was a complete wilderness. A general plan of development has been outlined and commenced which embraces a tipple plant, side tracks, one thousand coke ovens, the building of train roads to seven veins of coal, five of which have already been opened and the other two veins have been located and plans prepared for their development.

CANADIAN MINERAL EXHIBIT AT GLASGOW.*

THE colonies of Great Britain which are represented at the exhibition deserve great credit for the general excellence of their displays, and their representatives must have been highly gratified by the lively interest displayed by visitors. It has been said long ago, and repeated very often, that "comparisons are odious," but when we say that the Canadian exhibits, though perhaps not the most popular, have had probably the most lasting and beneficial effects of any from across the seas, we do not wish to infer that the others have failed in their object. When the Canadian government decided to take part officially, they must have had a distinct object in view, and, again, it is to attract men and money. At the time of writing there have been over 8,000,000 visitors to the exhibition. A large proportion of these, of course, it is to be supposed, have taken only a superficial and transitory interest in what they have seen. There is, however, a fair proportion of people who take an exhibition like this seriously, and therefore, derive great benefits from their visits. Business men from other parts of Great Britain and Ireland have visited the Canadian Court and pavilion, and without exception they have gone away with different ideas as to the possibilities of this great country. Canada is fortunate in her officials. Unlike some other sections, which it may be invidious to mention, the Canadian officials know their business, and not only do they know their business thoroughly, but they are ever eager and anxious to answer any questions put by anyone who displays the least interest. It is impossible in the space at their disposal to show all the productions of this country, and it may be questioned whether this is necessary; what has been done, however, has been sufficient to awaken an interest in, and to impart a knowledge of, a part of the world which unfortunately is too little known in Great Britain. Hitherto British capitalists have looked for investments almost in any quarter of the globe except the British colonies. This may be due to the fact that so many worthless mining companies have been foisted on to the British public, but had all the money which has been foolishly subscribed in this country been judiciously utilized there would have been much greater development and much more real progress to record to-day. The mineral exhibits of Canada have astonished most people. They are in charge of Mr. Angus K. Stuart, and much of their effectiveness is due to the manner in which they have been classified and ticketed. The Dominion of Canada, comprising the northern half of the continent, and exhibiting in different parts of its extent the most varied geological conditions, naturally affords many different minerals of economic value. Some of these have long been worked to a certain extent, but in late years a greatly increased development has occurred. This is best illustrated by the fact that in 1886 the value of the minerals produced in Canada amounted to $2.23 per head of the population, while at the present time it is about $11.84. In other words mining is rapidly becoming one of the principal industries of the country. The remarkable increase just alluded to, however, depends very largely upon the gold output, and particularly upon the great amount of alluvial gold that has in late years been drawn from the Klondike division in the Yukon district. Gold mining, and especially the working of rich alluvial gold deposits is, from its nature, an industry that may be successfully carried on in tracts very remote from ordinary means of communication. Its prosecution attracts population and leads to permanent settlement, affording a means of opening up new regions to possession and agriculture; but more general profit to the community undoubtedly results from the systematic working of less intrinsically valuable minerals, requiring for their proper utilization a greater amount of labour and skill. Mining industries of the last-mentioned class can scarcely be undertaken successfully elsewhere than in well-inhabited districts or at points on the coast to which free access may be obtained by sea. Such industries, therefore, in a new country extend with the spread of settlement and occupation of the land. They are of slower growth but more permanent, and in all parts of Canada where railways, roads, and water routes have opened up, industries of this class are now being rapidly established. Much detail in regard to current mining operations in the several provinces will be found in the reports of the provincial mining departments, as well as in the annual report of the section of Mineral Statistics and Mines, and in the Summary Report of the Geological Survey for 1900, for which enquiry may be made.

Not one of the colonies or countries represented at

* Condensed from London *Mining Journal*.

the Glasgow Exhibition has been so liberal in its provision of literature as the Dominion, and the books and pamphlets so freely distributed by them are of a high order, carefully prepared, and the matter is arranged in a most interesting manner.

We understand that the collection of minerals shown in the exhibition is to be transferred to the Imperial Institute in London, to be kept there as a representative display of Canada's resources.

THE MONTH'S MINING.

BIG BEND.

(From Our Own Correspondent.)

THE Duquesne Mining Co., of Pittsburg, Pa., who are operating placer ground on Smith creek, a tributary of Columbia, which empties almost opposite the mouth of the Goldstream, made their third payment on October 15th of $4,500 on the Blue Jay lease. A large quantity of supplies has been packed in and operations on the Blue Jay will continue all winter. The Duquesne Mining Co. recently increased their capital from $400,000 to $1,000,000 and will greatly extend their operations on the placer ground in the Big Bend district next season. Their manager is E. A. Bradley, an old Cariboo man of considerable experience and great faith in the future of deep placer mining in the Big Bend.

Mr. D. F. McCarty, of Revelstoke, who is working the Revelstoke placer lease below the Blue Jay, on Smith creek, has suspended operations on the property for the winter. Good pay gravel has been taken from the workings on the Revelstoke but it was mostly dead work that was done this season.

The Prince Mining and Development Co., a local syndicate, have been pursuing active work on their valuable copper properties in the Standard basin, about 40 miles up the river by trail. On the Standard claim, in a drift run from the bottom of a winze in the No. 2 tunnel, a fine vein of clear copper ore, which opened at about two feet in width and has since widened out considerably, was struck this summer. The management are driving on this vein. On another claim, the Commander, another fine body of high-grade copper ore, averaging some of it as high as 35 per cent., was opened up this season. The company have nearly 100 tons of ore ready for shipment as soon as the steamer is ready to be put on the upper river.

This steamer should have been ready to launch on September 15th, but owing to the steel strike in the States the engines and machinery were not ready on the date contracted for, and are not even yet at Nakusp at the date of writing. When this boat is launched it will altogether alter the transportation feature, which has hitherto proved such an obstacle to development in the Big Bend. The boat will ply regularly between Revelstoke and the foot of Death rapids. There is then about 3½ miles of unnavigable water, which we are in good hopes will be opened by a tramway, while the Dominion government have thrown out a strong hint that they may build out of a sum of $15,000 appropriated for the improvement of navigation on the river above Revelstoke last session. If this is done—it can be done without much difficulty or expense by putting the tramway on the west bank of the Columbia—there is capital enough interested in the placer fields and valuable timber limits above Death rapids, to make it pretty certain that a second steamer will soon be plying on the river above, which is easily navigable for another fifty or sixty miles, as far as the mouth of Canoe river and for a few miles beyond. These steamers will give access to a vast area of great known resources in minerals and timber and much of which, on both sides of the Columbia, presents virgin ground to the prospector and explorer. In ten years from now North Kootenay's development will rival the astonishing progress made within the last decade by South Kootenay. There is a great deal more wealth known to exist in the northern section right now than had been discovered in the southern part of Kootenay ten years ago.

BOUNDARY DISTRICT.

(From Our Own Correspondent.)

Winnipeg Mines, Ltd.—The annual meeting of stockholders in the Winnipeg Mines, Ltd., was held at Rossland on October 1st, when the directors' report and statement of accounts were submitted. The report gave details regarding the receipts from the respective assessments levied since reorganization of company and forfeiture of shares upon which calls had not been paid. The total number of shares now held by stockholders is under 800,000, and the number in the treasury at the company's disposal is more than 450,000. Cash receipts were from assessments 1 to 9 (both inclusive) $38,285.70; net proceeds ore sold, $2,048.01; proceeds of 31,000 shares Treasury stock sold, $4,350; sundries, $164 80; total, $44,848 51. Payments were: reorganization expenses, $635 48; liabilities of old Winnipeg company discharged, $7,188.51; operating expenses, $27,343.24; construction expenses, $3,127.43; balance of cash in bank, $6,553.85; total, $44,848.51. The report contrasted the position of the old company which, when it ceased operations, was $7,188 in debt and had no ore of good enough grade to ship at a profit available, whilst the new company had $6,553 cash at credit, no debts unpaid, had opened up two new ore bodies and commenced to ship ore that was returning a net profit of more than $5 per ton from ore lead, whilst two car loads from another part of the mine had just brought in $1,289 net. There were also the proceeds of two calls to come in and returns from six cars of ore. The following directorate was elected: T. G. Holt, Vancouver, B. C., president; W. W. Gibbs, Portland, Oregon, vice-president; Richard Plewmar, managing director and secretary-treasurer; R. Hodge and R. E. Plewman.

The meeting has adjourned until October 29th, the president and managing director to meanwhile visit the mine and prepare recommendations for future development for consideration of the stockholders at the adjourned meeting.

B. C. Chartered Company.—Ore shipments from the B. C. mine to the British Columbia Copper Co's smelter at Greenwood, during Sept. totalled 2,180 tons. Prospecting from the lower levels of the mine with the diamond drill is being vigorously proceeded with.

Chicago-British American Mining Company.—The shaft on this company's lake claim is now down about 125 feet, No crosscutting will be done until 150 feet depth shall have been gained.

Montreal and Boston Copper Company.—Four machine drills are being operated below ground, at the four levels between the surface and 300 feet depth in the Sunset mine, and one in a crosscut tunnel being driven into the hill on the adjoining Crown Silver. The spur from the railway has been completed and ore bins are now in course of construction. The new boarding house is about finished. About 300 tons of ore have been sent to the Hall Mines smelter at Nelson and some to the Granby smelter, Grand Forks the latter for test purposes. Some 65 men are now at work on these properties.

Morrison Mines, Ltd.—Two stopes have lately been opened at the 200-foot level of the Morrison mine. So far the ore has been proved to be 15 feet in width without its limit having yet been reached. Ore bins have been put in and arrangements made for a siding at the railway within half a mile of the mine, which is now in shape for maintaining a regular output of ore. Negotiations are in progress with managers of smelters with the object of closing arrangements for treatment of the ore. Prospecting underground with the diamond drill has been commenced. There are twenty-two men on the mine pay roll.

Golden Crown Mines, Ltd.—This company which is the reorganized Brandon & Golden Crown company, held its first general meeting at Brandon, Man., on September 20th. In June and July last special meetings of stockholders authorized the winding up of the old company, which was about $26,000 in debt and practically stranded. The new company has a similar nominal capital to the old, viz, $1,500,000 in $1 shares, but these were issued as paid up to 95 cents, leaving 5 cents per share assessable. The first assessment of 1 cent per share has been generally met. Under the superintendence of Mr. D. H Duncanson work has just been resumed in the mine, which adjoins the Winnipeg and has shipped 2,241 tons of ore. The directors elected at last month's meeting were: Judge Cumberland, president; Geo. R. Caldwell, vice-president; Senator Kirkchoffer, F. Nation and J. B. Curran (all of Brandon); W. L. Parrish, Winnipeg; C. E. L. Jarvis, St. John, New Brunswick, and W. A. Fuller, Spokane, Washington.

Dominion Copper Company.—Development work which had been in progress for about a year in this company's Brooklyn mine, has lately been suspended. The first half of a 20-drill air compressor has been received at the mine, but has not yet been set up.

Snowshoe Gold and Copper Mines, Ltd.—Development is being continued in the workings from the railway tunnel on the Snowshoe. Much surface stripping is being done preliminary to opening two big quarries in ore. Preparations are in progress for shipping ore in quantity regularly. New buildings are well on towards completion. Mr. J. W. Astley, who hereto'ore has only visited the mine at frequent intervals, in the capacity of consulting engineer, having now been appointed superintendent, will reside at the mine, and will direct the more extensive operations now entered upon. There are at present about 50 men employed on the Snowshoe property

Jewel Gold Mines, Ltd.—The work of sinking the new shaft on the Jewel, at Long Lake, is being pushed on, as, too, is the running of crosscuts at the 230-foot level of the old workings. Some good-looking ore is now being mined at the 330-foot level. Shipment of ore to the Granby smelter has been commenced and some is also to be sent to the Greenwood smelter.

Ruby.—An open cut into the hill on the Ruby, near Boundary Falls, has opened up four feet of copper-gold ore of good grade. Another cut 480 feet away is also in very nice-looking ore, whilst still another shows the best ore yet found in quantity on the property. The prospects are favourable for the ore proving permanent with depth, as it appears to be going down very solid. Mr. F. W. Hayes, president of First National Bank, Detroit, and associates have this property under option and have made one payment on it. The surrounding claims—

Ruby Fraction, 95, Horseshoe and Sylvanite—have also been secured by same parties.

King Solomon.—Some 500 or 600 tons of copper ore have now been sent from the King Solomon, in Copper Camp, to the B. C. Copper company's smelter. The values are stated to be higher than the general run of copper ore produced in the district. The ore body is being followed into the hill in which it occurs by a big open cut above the level of the ore bins.

No. 7 Mining Company.—Work lately in No. 7 mine, owned by a New York company, has been restricted to drifting on the vein at both the 60 and 120-foot levels. The vein gives two to three feet of quartz ore carrying zinc blende, galena, gold and silver. Ore is hauled about four miles to the Canadian Pacific railway and taken thence three miles to the Greenwood smelter.

British Columbia Copper Company.—This company's mine is producing from 350 to 400 tons of ore daily. Two more stopes were opened at the 200-foot level in September, and at the 300-foot level the new plan of working by the pillar and stope system was fairly started, this having already been adopted above the 200 level. The north drift at the 300 level is being extended and is now 460 feet from the shaft. Three quarries in ore are being worked from the surface. A recent blast firing a round of four holes in No. 1 quarry broke down more than 2,000 tons of ore. Machinery and plans, which is the largest in the district, continues to work smoothly. A machine shop has lately been put in and equipped with planer, drill press, lathe, steam hammer, emery grinder and a full complement of minor tools Another rock-crusher, equal to crushing about 800 tons of ore a day of ten hours to a size of five to six inches is being obtained for use at the mines.

Granby Company's Mines.—This company now has more than 300 men on its mines' pay roll. Development work is being kept well ahead underground in the Old Ironsides, Knob Hill and Victoria mines. The raise from the 335-foot level of the Victoria is now through to the surface. This will be enlarged to make it a five-compartment main working shaft. Raises have also been made lately connecting levels in both Knob Hill and Old Ironsides mines. The big quarries opened in ore from the surface are assuming large proportions. Cuts are being made into the hill at two levels, both with the object of running the railway cars into the quarries and using steam shovels in loading them. On the Grey Eagle at a point about 1,000 feet south of the southern boundary of the Knob Hill, an enormous outcropping of ore is being stripped, with a view to starting another big quarry here. This showing is about 3,000 feet distant from the Old Ironsides shaft, sunk in ore, and it is believed that the whole of the intervening ground, having a width of between 300 and 400 feet, is ore that it will pay to send to the smelter. A switchback is being constructed, to allow of the railway cars being run into the quarry now being opened at the mouth of the Knob Hill tunnel. The magnitude of the Granby company's plans is only now being made apparent, as preparations for increasing the daily output to 1,290 tons of ore develop these plans. Its ore shipments for nine months of 1901 aggregated 168,620 tons.

Ore Shipments.—Boundary district mines sent ore to the smelters during September as follows: Old Ironsides and Knob Hill group, 19,266 tons; Mother Lode, 7,420 tons; B.C., 2,180 tons; Snowshoe, 489 tons; King Solomon, 330 tons; Winnipeg, 200 tons; No. 7, 180 tons: Sunset, 95 tons; total 36,160 tons. Total shipments during 1900, 97,741 tons; during 1901 (nine months) 271,196 tons; grand total, 368,957 tons.

The Smelters.—Both district smelters during September exceeded their previous records for any single month. The Granby company's smelter, at Grand Forks, treated in two furnaces 20,050 tons, its highest earlier record having been 19,713 tons for last March, which was a 31-day month as against 30 days in last month. The average daily tonnage for September was nearly 668 3-5 tons. Its tonnage for four months last year was 62,387 tons, and for this year (nine months), 167,904 tons, making an aggregate to date of 230,291 tons. The British Columbia Copper company's smelter, at Greenwood, put through its single furnace during September 11,823 tons; this giving a daily average of 394 1-19 tons. Its previous largest tonnage for a single month was in July when 11,943 tons were smelted in 31 days, the daily average having been 385¼ tons. During the first half of October this average was considerably exceeded and on October 18th its record day's run was made, 450 tons of ore having been put through the furnace in 24 hours. Its total tonnage of ore treated during rather more than the seven months to September 30 it has been in operation is 79,543 tons. Both smelters are now adding to their treatment capacity.

The Cascade Power company is putting up its transmission line from its power station at Cascade to Phœnix, the line passing through Grand Forks and Wellington and Greenwood camps en route.

FAIRVIEW.

(From Our Own Correspondent.)

After a long period of depression Fairview camp is again the centre of much activity owing to the installation of the mill at the Stemwinder. The extensive development on this property warrants the erection of a still larger mill, and it is understood that the present daily capacity of from 80 to 90 tons will be increased so soon as the finances of the corporation enable the directors to take the necessary steps. The present mill of 26 stamps has been constructed under the superintendence of Mr. Austenburg and is erected ideally for economic working. The corporation has been fortunate— securing a thoroughly competent general superintendent—Mr. Cammbury, sr., M. E., and it is expected that the Stemwinder will be placed on a paying basis from the day the stamps begin to fall, which is expected in the very early future. The assessment of 3 cents per share has proved entirely satisfactory to the shareholders of the old Fairview corporation, over 80 per cent. of whom have paid up. In view of the present conditions of the money market the president and general manager, Mr. Russell, is to be congratulated upon the continued confidence shown in his management. The development of the coal fields was discussed at the annual meeting, and it is possible an important announcement in connection with these may be made at a later date.

CATALOGUES, CIRCULARS AND TRADE NOTICES.

WATER-POWER AT A SANDON MINE.

THE Last Chance Mining Company of Sandon has placed an order with the Vancouver Engineering Works for 2,000 feet of water pipe. It is the intention of this company to instal a water-power.

ELECTRIC PUMPING AT BONNINGTON FALLS.

The West Kootenay Power and Light Company has received from the Stilwell-Bierce & Smith-Vaile Co., of Dayton, Ohio, a 40-gallon, triplex, electric pump. The appliance is operated by a three-phase induction motor, manufactured by the Canadian General Electric Company, of Peterboro, Ont.

DEMAND FOR MINE MACHINERY IN BRITISH COLUMBIA.

Mr. A. C. McDonald, Canadian representative of the Fairbanks Co. recently visited the mining districts of British Columbia, and succeeded in securing the following orders for machinery and equipment:

From the Frank Gebo mine, of Frank, Alberta, one 105-foot, 250-ton track scale, two 150-horse power (18 x 72) boilers, one 120-horse power high-speed automatic engine, two 20-k. w. multipolar direct current dynamos—with a total capacity of 1200 lights—together with full accessory equipment, also 1,000 tons a day coal tipple and outfit, including five coal cutters. From the Crow's Nest Coal Co, a complete machine shop equipment comprising the following: Lathes, planers, drill presses, shapers, colt cutters and trimmers, valve receding machine, key seaters, emery grinder and wheels, new process twist drill grinder, Merrill pipe-cutting and threading machine, track scales for Michel and Morrissey, etc. The company has also contracted to supply complete water-works plant for the following towns: Blairmore and Frank, Alberta, and Morrisey and Michel, B. C.

The Fairbanks Co. recently equipped a complete new machine shop for the Hall Mines Smelting Co., of Nelson, and also furnished a new 80-ton scale to the same corporation. Mr. McDonald's firm recently shipped to Vancouver over 1,000 of vulcabeston, renewable disc and ring valves for use in the placer mines of the Yukon.

A SLOW-SPEED ROLLER MILL.

In a well illustrated and interested pamphlet the Western Machinery Milling and Mining Co., of Los Angeles, Cal., succeed admirably in describing the "evolution of milling." But still, as is pointed out, the old Chilean mill, also known as the "Trapichi" and in use so long ago as the days of which Herodotus wrote, is yet employed in certain localities where crude methods are in force, and its principle that of slow-speed crushing has been applied with great success in the construction of the most modern machinery. The Lane slow-speed roller mill is the modernised "Trapichi," embodying all the advantages of that type of crusher. We shall be glad to forward a copy of this pamphlet upon application.

AUTOMATIC ELECTRIC CONVEYORS.

The United Telpherage Company, of New York, send us copies of circulars No. 11, 13, 14 and 15, descriptive of appliance manufactured by them to allow of the automatic conveyance of material. The following extract is interesting:

"The system of automatic conveyance of packages and parcels by means of electricity is one of the oldest applications of the electric motor, yet its development has not been rapid, and to-day still finds a large field in which it may be employed usefully. Some of the original Telpherage systems which were constructed in England are still in operation. In nearly all cases these consisted of overhead cableways on which an automatically driven moving part carried the load which was suspended below it. The Telpher, or automatic truck which runs along the upper side of the taut wire cable, consists of four small slow-speed direct-current motors, two directly coupled upon each of the two shafts, upon which also are mounted grooved wheels which run upon the top of the cable. The load is suspended below. From the middle of the apparatus rises a short trolley, making contact by means

of a roller so as to allow considerable variation in the position of the trolley wire. The latter is suspended directly above the running cable. The operation of the system is entirely automatic. The current is turned on at one end when it is desired to start the Telpher, which accelerates itself gradually up to its full speed—generally about twelve miles an hour — slowing down automatically for curves and automatically switching off the current so as to stop at the desired place at the other end of the line. Telpherage is adapted to the conveying of almost every kind of material, and for mine purposes the buckets are arranged to be dumped either automatically or by hand, or a bucket is also made which opens at the bottom for discharging the load."

MINING RETURNS AND STATISTICS.

ROSSLAND.

The following table gives the monthly production from this district during 1901 to date, as compared with the shipments last year :

	1901. Tons.	1900. Tons.	Increase Tons.
Shipments for January (revised)	30,894	24,933	5,061
" February "	26,778	6,060	19 818
" March "	34,172	279	33.893
" April "	40,160	6,834	31,296
" May (estimated)	47,000	25,704	31,296
" June "	32,000	17,161	14,839
" July "	6,000	17,396	*11,399
" August "	1,000	19,417	*17,456
" Sept'r "	7,390	24,830	*17,440
" Oct. "	180,30	15,822	†2,208

* Decrease. † Increase.

The total production of the Rossland mines for the year to date is approximately 243,000 tons.

The following is the mine manager's report for the months ending 31st May and 30th June :—Output—The total tonnage of ore shipped from the mine for May amounted to 2,825,456 dry tons of 2,000 pounds each, having an average assay value of $10.52 per ton. The tonnage for June amounted to 393,329 dry tons having an average assay value of $13.20 per ton. The ore produced during the last two months as above stated, came from various openings and stopes made on the vein on the 200, 300, 400 and 600-foot levels. So far the ore bodies occurring in the vein have not been sufficiently developed to afford reliable data for estimating the extent and value of the ore bodies. The developments made on the vein on the 600-foot level show the most extensive body of ore in any of the mine workings. This body has an average width of 30 feet, and carries ore of shipping grade from wall to wall. A winze is being sunk on the vein from the 400-foot level from which to develop the ore shoot at intermediate points between the 400 and 600-foot levels. This has reached a depth of 132 feet on the dip of the vein. When connected with the 600-foot level, the ore shoot can be rapidly developed, drained and the workings ventilated.

BOUNDARY DISTRICT.

The following table gives the ore production from the Boundary district for the nine months of the current year ending Sept. 30th :

	1900	1901
Old Ironsides and Knob Hill group	64,535	167,973
Mother Lode	5,574	62 099
B. C.	19,494	34,701
City of Paris	2,000	.....
Golden Crown	2,240	.....
Winnipeg	1,100	600
King Solomon	.....	600
Athelstan	1,200	500
Carmi	.....	885
Snowshoe	338	439
Brooklyn	150	.....
Jewel	160	.....
R. Bell	.....	480
No. 7	.....	595
Sundry shipments.	1,000	600
Sunset	.....	400
Total	98,781	269,922
Grand total to date		385,253

Shipments during October approximate 30,000 tons.

The quantity of ore treated by the single furnace of the British Columbia Copper Company's smelter at Greenwood during September was 11,825 tons this giving a daily average of 394 1-10 tons. The largest tonnage of any single month was that of July, when 11,942 tons were smelted in 31 days, the daily average having been 385¼ tons. The tonnage for September is larger than the other two 30-day months of the year, that of April having been 11,322 tons, or 377⅓ tons per day, and that of June 11,206 tons, or 375½ tons a day. The total tonnage of ore smelted during rather more than seven months since the smelter was started is 79,543 tons.

NELSON.

The manager, Mr. Nelson Fell, gives the following particulars of recent operations at the Athabasca mine :

In the cyanide plant the class of material treated consisted of accumulated tailings in dam.

Number of tons treated, 1,582.4 ; value of bullion recovered $15,299.94 ; value of bullion per ton treated, $9.67 ; average percentage of recovery, 80 per cent.

Mill run—The ore treated was that which was produced from development work carried out during May, June, July and August. This work was carried on in the granite formation at the horizon of our deepest level. The vein looks finer here than it has at any previous period of the history of the mine.

Number of tons milled, 124 ; value of bullion recovered in mill, $1,547.61 ; concentrates recovered, $835.39. Total values recovered, $2,383. Value per ton, $19.21.

LARDEAU.

The Trout Lake *Topic* has compiled the following table, which shows the amount and value of the ore that has been shipped from the mines of the district for the nine months of the year :

	Tons.	Amount.
Silver Cup	1,020	$150,960
Nettie L.	470	58,570
Triune	132	34,350
Broadview	26	1,665
Ethel	17	1,595
Great Northern.	28	1,345
Lade group	6	1,320
Cromwell	7	800
St. Elmo	6	510
Total	1,712	$251,295

SLOCAN.

The total amount of ore shipped from the Slocan and Slocan City mining divisions for the year 1900 was, approximately, 35,000 tons. Since January 1 to October 19, 1901, the shipments aggregate 20,045 tons. Of this, rather over 5,000 tons have been contributed by the Slocan City division, the Arlington mine in which, being by far the largest producer of the Slocan district during 1901, with a record to date of 4,200 tons. Slocan shipments by rail for September were :

	Tons.
From Sandon, over the Kaslo & Slocan :	
Slocan Star	196
American Boy	167
Last Chance	60
Payne	42
Ruth	15
Sunset	40
From Sandon, over the C. P. R.:	
Minnesota Silver Co	105
Goodenough	30
Star	220
From Whitewater :	
Whitewater	394

RECENT CABLES.

Hall Mining and Smelting.—The output of smelting ore from the Silver King for the four-weekly period ended 23rd September is announced as 2,969 tons, averaging 20.16 ozs. silver per ton and 4.60 per cent. copper.

Le Roi No. 2 —It is announced that shipments last month amounted to 2,732 tons, yielding 1,258 ozs. gold, 3,300 ozs. silver, 68.8 tons copper ; estimated value $49,000. Net profit after payment of all expenses, $19,000. Average number of men working, 75. Expect to fill force to 130 men by 15th October.

1901 DIVIDENDS.

The following mines in the Kootenay district have paid dividends during 1901 :

	Amount.	Rate.
Bosun, Slocan	$ 12,500	5 per cent.
Centre Star, Rossland	105,000	3 "
Le Roi No. 2, Rossland	144,000	4¾ "
North Star	117.000	8 "
Payne, Slocan	78,000	3 "
St. Eugene, East Kootenay	210,000	6 "
Rambler-Cariboo	12,500	1 "
Ymir, Nelson	144,000	14¾ "

Last month (September) the New Vancouver Coal Co. declared an interim dividend of 3 per cent.

THE LOCAL STOCK MARKET.

BOTH the Eastern and Western markets this month have been weak and inactive, and conditions prevailing during the period under review have been generally unsatisfactory and disappointing. The public evidently have little faith in the intrinsic value or merit of even