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THE MONTH.

DURING the last two months the mining and financial press of London has been discussing with extraordinary eagerness, bitterness, and, be it said, an astonishing ignorance of the subject, the financial position of the Le Roi mine.

The discussion originated with the publication of the statistical tables of metal production given in the Report of the Minister of Mines and the discovery of a great discrepancy between the figures given officially as the copper output of the Trail Creek district and the figures given as the copper output of the Le Roi mine. The tonnage of ore shipped from the Le Roi mine during July, August, September and October of last year, 83,-

488 dry tons, is estimated by the Le Roi company in its annual report to yield 1,049 tons of copper; while in the Report of the Minister of Mines the yield of copper from 217,636 tons,

the output of the district for the year, including these five months, is given as 1035.9 tons.

Upon attention being drawn to this discrepancy explanations were obviously in order and the following

cables were interchanged between the London office and the mine:—

“That Le Roi output systematically falsified by us. It is said Minister of Mines' return for Trail Creek district for 1900, when published, is 2,071,865 lbs. copper from 217,636 tons, based on actual smelting returns. Le Roi claims to have shipped 2,098,000 lbs. copper for five months—July to November—or more than whole copper return for district. Cable reply.”

The manager replied as follows:—

“Our copper returns are based on wet assay. Government returns on commercial or dry assay. On copper ore, commercial assay equals wet assay, less 1.3 per cent.; therefore, ore yielding 1.3 per cent. copper, or less, not included in Government returns.”

The opening having been made, the scope of the discussion widened and the general financial position of the property and its prospects were brought into the arena. A statement of assets and liabilities was finally extracted and an official report as to the position of the mine which is published in full in another column, and in which fact and fancy are inartistically mingled.

Before going into that, however, we propose to deal with the discrepancy in the copper statistics.

In the first place it is necessary to premise that the official figures are supposed to show, as nearly as it is humanly possible to calculate it, the actual amount of metallic copper produced from British Columbia mines during the year. If they do not show that they are of no value to any one. If the Le Roi company, or any other company which is producing copper, can prove that there is any serious or avoidable difference between the calculated official statistics and the actual copper produced, it will have made a case against the Department of Mines the gravity of which it would be impossible to overlook. But we have no reason to suppose that any error of this kind has crept into the official statistics. And we do know that the estimated returns of the Le Roi company published in London are inaccurate. We know that from Mr. Macdonald's statement. Because these returns show that the wet assay value of the ore extended as tons of recovered copper. The inaccuracy consists in this that while the wet assay shows the amount of copper contained *in* the ore, it does not show the amount of copper recovered *from* the ore. In the Le Roi company's returns it is displayed as if it did.

Mr. Macdonald claims that the Mines Department subtracts 26 pounds of copper per ton from every ton of Rossland ore produced. We doubt it, and our reason for doubting it is this: In the Report there is a return of production made by Mr. John Kirkup, of Rossland,

which is the return made to him by the mines, for assessment purposes. In this return the 26 pounds of copper are deducted quite legitimately, coming in as one of the indirect smelting charges. If to this return, in the case of the Le Roi mine, we add 26 pounds of copper per ton at 16 cents a pound, we get approximately the aggregate value claimed by the London returns of the Le Roi company. But on the other hand Mr. Kirkup's aggregate gross value for the district is considerably lower than that of the Mines Department. It is therefore reasonable to suppose that the returns of the Mines Department are a fairly aggregate approximation of the actual metallic copper produced. No return based upon assay values can possibly be positively accurate. Because the amount of copper recovered is affected by a number of varying factors such as the grade of the smelter charge, the nature of the ore and the manner in which the smelting practice is adapted to the nature of that ore. On high-grade ore the actual loss of copper is higher but the percentage loss is much lower than in the case of low-grade ore. This pure copper resmelted and refined would present a loss of about two per cent. or 40 pounds per ton. Whereas the loss of copper in ore going two per cent. copper has been calculated as about 33 per cent. or 13.3 pounds per ton. On very low-grade ore this percentage rises rapidly.

In addition, however, to neglecting loss the Le Roi returns do not take account of the fact that copper in ore cannot be sold at the same price as refined copper. The ordinary quotation is six to seven cents per pound below the market price of pure copper. Naturally a company operating its own smelter makes a profit otherwise secured by middlemen out of these deductions. But there is a business reason for the deductions and to lead the shareholders to believe that the value represented by them is all clear gain is most culpable finance.

The statement made by the secretary of the Le Roi company, shows the financial position of the mine to be very different from what it would have been had the monthly returns of the company shown the values recovered from the ore as opposed to the value of the metals contained in it. A company which has been operating a mine as long as the present Le Roi company should have something more to show than a balance of assets over liabilities, and should never have been driven to mortgage its second-class dump, a pile of ore mined before the present company purchased the mine. In addition, if the value of the assets is computed in the same way as the value of the ore shipped has been, the balance of assets over liabilities is purely illusory.

There is only one way for a mining company to represent its operations intelligently, and that is the method adopted by the Anaconda company, and most reputable corporations; where the money received from the sale of matte is placed in one column, and the money spent in producing it in another. A child can tell by a glance at the Anaconda balance sheet how the mine stands; it is puzzling the sharpest brains in London to find out

how the Le Roi stands. The one thing, apparently, which the company will not do, is to show the tonnage treated during a certain period, and the money received for the product of that tonnage. The company should be compelled by its shareholders to do that.

When a responsible official of the company like Mr. Labouchere, its secretary, maintains that the ore is worth \$13 a ton and that the profit is 40 per cent. of that, in the absence of proof we beg leave to doubt his statement.

Admit, for the sake of argument, that when the ore leaves the smelter in the shape of copper matte, only \$8 a ton has been spent upon it and that the company has saved 65 per cent. of the copper, or rather that 65 per cent. of the copper will finally be turned into refined copper on the average copper content of its ore, namely, 1.3 per cent. wet assay. It is then necessary to subtract from the \$13

Nine pounds of copper at 16	-	-	-	\$1.44
Four cents per pound on 17 lbs.	-	-	-	.68
				\$2.12

This reduces the profit nearly in half to begin with, and if it be remembered that \$8 a ton for mining, dead work, management, depreciation, insurance, interest on advances, and so forth, is rather an ideal aimed at than a fact hitherto realized in actual practice, we arrive at a glimmering of the margin of profit on which the Le Roi has been working.

It is unlikely that the Le Roi company breaks ore and maintains its property more cheaply than the Anaconda company, yet its profit-earning capacity is based on a charge of \$3.25 for mining, development, depreciation, etc., for the same work which costs the Anaconda company \$3.97; its treatment charge is \$4.00, the Anaconda is \$5.14 and its freight rate is 50 cents where the Anaconda's is 15 cents. The Anaconda presents an item for \$1.57 per ton for cost of marketing. We do not hear of this in connection with the Le Roi at all. While no loss of copper or silver is included in the Anaconda's gross value per ton of \$14.20. Does the Le Roi company save 100 per cent. of its metal and having secured it, does it sell the product to better advantage than the Anaconda company?

Unquestionably the Le Roi is a great mine. If it has, as is claimed, 1,600,000 tons of ore of a gross value of \$13 a ton in sight, it is assured of a long life at a rate of production exceeding the present rate. But with that gross value calculated the way it is, an expectation of \$5.00 a ton net profit is a baseless dream, and the inflation of the shares quite unjustified by facts. We prefer to take Mr. Macdonald's statement to the miners then threatening a strike, that without great economy the margin of profit would be altogether eliminated, to accepting Mr. Labouchere's that 40 per cent. of the gross value is net profit. And we submit to these gentlemen with all due deference that both of these statements cannot possibly be true.

We are glad to learn that a company known as the Snowshoe Gold & Copper Mines, Ltd., which has been formed to acquire and operate the Snowshoe group of mines in the Boundary district, has been successfully floated in London and has received, at the hands of the reputable financial press, a better reception than has been accorded any new British Columbia venture in recent times. The company is moderately capitalised at £250,000, divided into 250,000 £1 shares, of which 150,000 fully paid have been issued to the vendors as the purchase price for the property, 50,000 having been offered for subscription at par to provide working capital, while the remaining 50,000 shares are held in reserve for issue at a later date should occasion require. The company is controlled by sound men of affairs, and two members of the board, Messrs. Waterlow and McMillan have specially acquainted themselves with local conditions, and they and their colleagues can be thoroughly trusted to bring the undertaking to a successful issue. The Snowshoe group comprising 120 acres, has been developed by the vendors, the British Columbia (Rossland and Slocan) Syndicate, Limited, to a productive point, the work representing, approximately, 5000 feet of tunnelling and other underground and surface workings, which have exposed large bodies estimated by the engineer, Mr. Astley, to be 500,000 tons. This ore is of a generally higher grade than that found in most of the other large mines in the locality and averages according to Mr. E. Nelson Fell, a most careful authority, \$10.88 per ton which, considering its extraordinary adaptability to economic smelter treatment, should admit of a profit return of from \$3 to \$5 on every ton mined. Moreover, this estimate of values represents the actual gross value of the ore at the mine, only 95 per cent. of gold and silver is included, and 1.3 per cent. of the copper is deducted and the balance computed for which copper in ore can be sold. If the values in the Snowshoe ores were computed on the same basis as those of the Le Roi, the gross value would be \$17.92 per ton. Thus it will be seen that the indirect smelting, refining and marketing charges are fully allowed for, which renders the computations of profits accurate and reliable. In conclusion it affords us much pleasure to add that the enterprise could not well have been initiated under more favourable auspices, both as regards its low capitalisation, its adequate working capital and the character of its management, and we view with extreme satisfaction the absence of those objectionable features which have contributed to the failure of so many British undertakings of the nature in this Province in the past.

A correspondent writing to the *B. C. Review*, criticises the prospectus of the Snowshoe Gold & Copper Mines, Ltd., because provision has been made for the progressive remuneration of the directors of this company. If the investor were invited to subscribe to the shares at a premium this criticism would be valid. But as he is invited to subscribe at par it is entirely invalid. We

take it that a mining share paying 10 per cent. steadily is worth its par value. Whatever it pays over that certainly makes it worth a premium over the par value. If this particular company were to pay 20 per cent. the directors would receive an extra remuneration of £2,000 per annum. While the shares would stand at a premium of 100 per cent. at least. We should imagine that shareholders purchasing their shares at par would be delighted to see the directors earning this small premium. The shareholders know exactly the terms which they are invited to subscribe and they know also that the directors have no opportunity to earn any extra remuneration without the shares being worth more than has originally been paid for them.

The strike which has tied up the heaviest producing mines in the Rossland camp, is exceedingly regrettable from the point of view of the mineral industry of the Province, the town of Rossland, the shareholders in the mines and the miners themselves. It does not appear to be a sudden bolt from the blue but rather the culmination of a storm which has been brooding over the district for some time. It is perhaps rather interesting than remarkable that it should have broken out at the same time at which a general epidemic of strike fever all over the American continent has become apparent, indicating that there is a subtle unconscious sympathy between labour movements in different places at the same time, deeper and more complex than the causes of local irritation which ostensibly give rise to these storms on the surface of society. It will be remembered that nearly ten years ago the Homestead strike, the United States railway strike and the labour troubles in Colorado and Idaho, all seemed part of a more or less well-defined industrial cyclone. The parallel at the present time is sufficiently close to provide food for thought. Nor, it seems to us, should the local considerations affecting a particular district displace in the mind of the larger, deeper, more complex and more perplexing general question.

In Rossland the strike has been declared in order to raise the wages of muckers from \$2.50 to \$3.00 a day. But in addition to this question a number of other grievances have apparently been causing irritation and counter irritation between the managers and the men. The contract system is one of these, the alleged antagonism towards the union is another.

The men declare that until the wages of muckers are raised to the standard scale they will not return to work; the managers assert that without the greatest economy in labour the mines cannot be made to pay; and in the early stages of the contest at least neither side betrays any intention of giving way to the other. It is to be hoped, however, that before very long some *modus vivendi* will be reached by which this deplorable interruption to the peaceful progress of British Columbia may be put an end to.

Among the small conservative English companies operating in British Columbia, the Hastings British Columbia Exploration Syndicate appears to have been quietly and unobtrusively laying a foundation of permanent and noticeable success. The properties owned by the Syndicate consist of a group of claims at Erie, in the Nelson district, to which the Arlington has given its name, and another group adjoining or in the neighbourhood of the Sullivan mine in East Kootenay. Beyond mere legal requirements development work has been entirely confined to the Arlington group at Erie, which appears now to be in a position to enter upon the stage of steady production. This syndicate reversed the usual order of procedure. It developed and proved its property before endeavouring to exploit it for dividends. During its financial year which ended on the 30th of April last, 1,162 tons of ore were shipped which realised £4,638, a most satisfactory return. The chairman's remark at the annual meeting that the average value of the ore was \$30 a ton does not, unfortunately, in the meagre report we have of the proceedings, convey very much. He must surely have referred to picked ore and not to the average run of the mine which a concentrator has been installed to handle. The precise advantage of concentrating a \$30 smelting ore at a point within easy access to a smelter does not appeal to us. But as the company has been exceedingly well advised in all its operations, doubtless there is in this respect some material omission in the report we have before us. The Hastings company is wise in not attempting to float subsidiary companies to work its property at the present time. It will be better able, later, to detach itself from the active management of the Arlington and to devote its energies to the same painstaking and conservative development in other localities where we hope similarly well-deserved success awaits it.

A very interesting controversy has been waged lately through the columns of the London *Mining Journal*, between Mr. Pellew-Harvey and Mr. J. D. Kendall, on the subject of the "Copper Smelting Opportunities at Vancouver." Much valuable data has been afforded by both sides to the dispute, Mr. Pellew-Harvey maintaining that the time is now opportune for the establishment of works of this character at the point mentioned, while Mr. Kendall discourages the idea, at least for the present, and concludes a very sensible letter as follows: "All that I ask for now is caution. Do not erect a smelter until there is plenty of material for it to consume. Better send a large quantity of ore to the United States smelters than build one at Vancouver before there is sufficient ore in sight to redeem the cost thereof, in addition to paying a fair interest on the money invested. When such a condition arises, and it is quite easy to bring it about by developing the mines in the neighbourhood, no one will be more pleased than myself to see a smelter go up at Vancouver. The mineral resources of British Columbia are enormous, but they

will not bear any amount of reckless expenditure and mismanagement, as seems to have been so widely assumed in the past. The numerous useless mills and smelters that are dotted about the country are only a part of the evidence of these methods. Let us try to do better in the future and so restore the confidence that the Province on its merits really deserves, but which, owing mainly to the reprehensible operations of shareholders and their expert allies, is at present largely withdrawn." We confess to quite sharing Mr. Kendall's views in this regard. But though there is no immediately good opening for the establishment of a smelter at Vancouver, from present indications it will not be long before such an opening occurs, provided a refinery is also established in connection therewith. But if such an enterprise is contemplated, prompt action will be necessary directly the conditions and prospects are sufficiently encouraging, or otherwise the initiative will be taken by the owners of the larger productive mines in such districts as Mount Sicker and Howe Sound, and matting plants will be set up in the immediate vicinity of those properties. It was probably this point that Mr. Pellew-Harvey, as a loyal resident of Vancouver, was anxious to emphasise.

It is impossible not to be painfully struck by the enormous proportion of the gross output of our silver-lead mines which is absorbed in the freight and treatment charges on the ore. A reference to the annual report of the North Star mine, published elsewhere in this issue, will show that over 50 per cent. of the value of its ore was expended upon freight and treatment. In the case of the St. Eugene mine, while the proposition may not be quite so great, the concentrates of the St. Eugene being of higher grade than the crude, clean ore of the North Star, the aggregate amount so paid out is also startlingly large. When the low price of silver, the decline in lead, and the fact that the United States no longer needs British Columbia ores, and that contracts are now based on the London market price are considered, it is quite clear that silver-lead mines in British Columbia must either be exceptionally rich or exceptionally easy to work, to remain profitable under present conditions at all. Another aspect of the question is, that until the smelting and refining of silver and lead are an established industry in the Province these vast charges are an absolute dead loss to the country. They go to maintain industry and support population in the United States. Therefore, even if those charges could not be reduced by the establishment of home smelting and refining, the Province would still be benefitted by these industries to a very considerable degree. But it is a little difficult to understand how, in a country rich in fuel, iron and lime, a saving could not be effected in the expense now incurred in transporting barren materials like sulphur and silica to such places as San Francisco and Antwerp. So that not merely would the establishment of smelting and refining enrich the coun-

try with an important industry, but it would also confer a benefit on the owners of our mines, and enable us to compete on something more like equal terms in the production of silver and of lead. With or without a bonus, so much the better with it, it is only a question of a very short time until the situation in which our silver-lead mines find themselves, will lead to the formation of an important producing market in these metals entirely independent of the United States; and until their present embarrassing circumstances, although they have given rise to great temporary inconvenience, will lay the foundation of permanent benefit to the industry of the Province.

The Mount Sicker Mining Division, V. I., is undoubtedly a most promising field. The mineral outcroppings in this section are numerous, and carry as a rule exceptionally high values in gold and copper. Where development work upon any considerable scale has been prosecuted the continuity and permanence of the ore deposits have been most satisfactorily demonstrated and in the case of the ore-producing mines, the returns from smelter consignments, covering a period of nearly two years, prove that the ore is of a far higher grade than that met with in any other copper-mining centre in the Province. The economic conditions are incomparable, and the opportunities for successful mining probably unique in British Columbia. Notwithstanding the many advantages, however, it is a noteworthy circumstance that activity is here limited to a very circumscribed area and capital, apparently, is not inclined to exploit the territory. A correspondent, in drawing our attention to this state of affairs, offers as an explanation that Mount Sicker suffers from what has proved a curse to legitimate mining in other districts on the Coast, the promiscuous staking and holding of claims by a few individuals, who, taking advantage of the liberal spirit of the law which aims to encourage honest prospecting, manage to acquire great stretches of mineral lands without working them under a system of abandonment and re-location, that is to say, merely transferring the property from one member of the syndicate to another, as occasion requires. In support of his theory our correspondent cites a case in point, where an agent representing large British capital outfitted two thoroughly trustworthy prospectors to prospect the Mt. Sicker district with a view to discovering property worth development. After an absence of several weeks the men returned and informed their employer that while they had come across several good showings the whole country for over twelve miles was staked; that these claims had in very few instances been worked and that the posts invariably bore the same names.

It is not often that the RECORD indulges in editorial references to rich strikes in individual mines. As a general rule such occurrences receive more prominence than

they deserve, and the reports concerning them make up in brilliancy what they lack in authenticity. It is therefore a particular pleasure to congratulate the Ymir Mines, Ltd., on the discovery of what appears to be a bonanza shoot of ore in the Ymir mine. Nearly every great mine possesses such shoots of ore. It is just as natural that in one portion of a metal-carrying vein there should be an excessive concentration of values in particular places, as that there should be excessive poverty in other places. Every vein varies in metal content and there is no practical limit to the variation, either in the direction of poverty or richness. Possibly the lowest average grade of gold ore mined anywhere in the world is mined in the Homestake mine in North Dakota. But the Homestake mine contains also shoots of ore of unparalleled richness. There is a well-defined opinion among miners that an increase in the value of a vein is concurrent with an expansion of the ore body itself. With this opinion the experience of the Ymir is not out of harmony. The bonanza shoot is not only very rich but also very wide. Probably its horizontal extension has not yet been fully explored. It is to be hoped that it will be discovered to be a well-defined and large ore body capable of bringing up the gross average content of the whole output of the mine, and thus greatly increasing the dividend-earning capacity of the property. To illustrate the effect of such a discovery upon the profit and loss account of a mine, a few figures may be given, with the understanding, however, that they are not to be applied too literally to the present position of the Ymir mine. Say that 200 tons of \$9 ore are treated daily at an expense of \$1,000. That leaves a daily profit of \$800. Now, say that 150 tons of \$9 ore are treated and 50 tons of \$40 ore are the same expense. The daily profit is increased from \$800 to \$2,350, or multiplied by three. Of course there is no means of knowing whether this bonanza shoot of ore, when completely explored and defined, will be equal to 25 per cent. of the workable content of the Ymir vein. But it is bound to have a most satisfactory influence to a greater or lesser degree on the profit and loss account of the company.

There is every excuse at the present time for drawing particular attention to such a discovery, because it is an evidence of the recuperative powers of our mining industry which it derives from the vast extent and riches of the mineral resources of the Province. At a time when the Province is suffering so much discredit on account of matters for which it is not responsible, it should at least be given full credit for rapidly accumulating evidences of great variety and extent of mineral wealth. The mining industry threatened in one direction forges ahead in another and the tide of progress is not stayed.

It had been our intention to present this month the opinions of a number of those interested in mining in the Province in reference to the analysis of the various

causes, put forward in last month's issue, as responsible for the check which mining development is accused of having received. A large number of responses have been received. But most of them, from one cause or another, have come in too late for extended comment this month. There is, however, a remarkable consensus of opinion that the MINING RECORD was correct in asserting that the disagreeable features of the present situation are not due, in any important degree, to the conditions, either imposed by Nature or by law, under which mining is carried on in this country, but to inflation, mismanagement and swindling. One correspondent, whose experience has been wide, points out that the present is a phase through which every new mining country has passed, and that the mineral resources of British Columbia are so great, that in this particular country the present check to the inflow of capital will be of very short duration. To concur in his opinion is at once pleasant and reasonable. The correspondence elicited has contained many very kind and flattering references to the good work being done by the MINING RECORD in the interests of the British Columbia mining industry.

It is with much satisfaction that we learn that the Dominion Government has decided to exhibit the admirable collection of Canadian minerals which received so much favourable comment at the Paris Exposition, and is now attracting equal attention at Glasgow, in London next year. The exhibit which will remain in Mr. A. K. Stuart's capable charge, is first to be placed on view in the city or business centres of the metropolis, a suitable site having been selected, and afterwards permanently transferred to the Imperial Institute. The exhibition in the city, for the two months proposed, dating from January, 1902, will unquestionably prove an excellent advertisement of our mineral resources, and advantage might well be taken of this occasion by the Provincial Government to making a special effort in the direction of calling attention, by the distribution of literature and through the financial press, to the opportunities British Columbia affords for the investment of capital. We would further suggest that overtures be made to the Federal authorities for the retention of at least the British Columbia portion of the exhibit in the city by allowing it to remain in the keeping of the Province's Agent-General.

The announcement that the Hall mines have resumed the shipment and treatment of ore from the Silver King mine will be greeted with heartfelt satisfaction. Those at present in control of the property have earned the greatest amount of credit for the manner in which they have stuck to it and have retrieved earlier errors. The character of the present management is such that we do not doubt that shipments have been resumed only when the mine is in a position to maintain a steady regular output. Nothing can have a better result upon the

credit of the Province in London than the gradual rehabilitation of this property and consequent increase in the value of its shares. It is a demonstration of the fact that whatever financial loss and disaster have occurred in the past, their cause has not lain in the poverty of the mines of British Columbia.

The fact that a second railway, now entering the Boundary country, is to construct a branch to Phoenix without delay, is important testimony to the value of the mines in that camp. The control of the railway is closely associated with the control of the Brooklyn and Stemwinder group of mines. While these are under the management of an admitted expert in the smelting of copper ores. The immediate construction of this railway is a practical assurance that the Brooklyn and Stemwinder mines will be made the productive base of another copper smelter in the Boundary country. On all sides it may be said there are evidences that the heart of the mining industry is quite sound in spite of the local and temporary drawbacks which it is encountering.

Another local company, the Fairview Corporation, whose operations have been hampered in the past for lack of adequate working capital, has adopted the expedient of reconstructing upon an assessable basis. In this case, the promise of the mine sufficiently justifies the step, and in good hands the undertaking should yet prove a success. It is satisfactory, meanwhile, to note that the names of both British and local British Columbian wild-cat companies are gradually disappearing from public gaze, while those concerns which have merit, though from one or more causes have been unfortunate, are being reconstructed on more business-like lines.

DOMINION ASSAY OFFICE IN VANCOUVER.

(By Alfred W. Dyer.)

THE first thing that strikes a visitor to the newly inaugurated Purchasing Assay Office in Vancouver, is the publicity attached to the proceedings. All the operations are conducted in full view of the depositor of gold dust, and his gold may be said never to leave his sight from the time it is weighed in to the time, half an hour later, when the gold bar is stamped and reweighed before his eyes.

The office at present cannot be said to be very extensive, although it is capable of handling \$500,000 a day and is therefore, in every respect, equal to the U. S. office in Seattle. In the very great majority of cases it will be practicable to give the value of the dust to the miner within 24 hours of its presentation at the office, and in few cases will the delay extend over 48 hours. Again, in this respect, it is fully equal to the assay office at Seattle, and is, in fact, somewhat more speedy in its handling of the dust.

The method of dealing with the gold in the interim between the present time and that of the establishment of the Dominion mint has not, at present, been definitely decided upon by the authorities at Ottawa but it is probable that the arrangement arrived at will be the purchasing of the gold directly by the office, although it is likely that it will at first be handled, as is the method

at present, by the local banks. After the establishment of the mint there will be no further trouble, as the gold will go to the mint to be there converted into coin. It is not improbable, according to Dr. Haanel, the present Dominion inspector of mines and the future director of the mint, that a branch of the mint will be established in Vancouver should the amount of gold and silver produced in the Province in future, justify the erection of such a building.

The arrangements connected with the new office have been carried out under the direct supervision of Dr. Haanel who, indeed, purchased the machinery as well as setting it up. The machinery was intended for the new U. S. mint at Philadelphia but as the contractors, Messrs. Henry Trœnmer & Co., of Philadelphia, who constructed the balances and the American Gas Company, who are responsible for the remainder of the outfit, found they could give the completed machinery to Dr. Haanel and yet have time to complete another set before the expiration of the contract time, yielded to that gentleman's persistent representations and allowed him to purchase the whole plant for the Vancouver office at a cost approximating \$3,000.

The present building has been leased for a period of five years and is situated in the very centre of the town, in close proximity to the principal wharves and could not therefore be in a more advantageous position. Some credit for the selection of the site is due to Mr. W. Murray, manager of the Canadian Bank of Commerce, under whose advice it was chosen. Mr. Murray, who has been extremely energetic in the forwardal of the Vancouver Assay Office, has done everything in his power to help the Dominion government officials on their arrival in Vancouver.

Going into the office, which fronts on Hastings street, the depositor is confronted with an iron grille running from side to side. On one side is situated the receiving room and on the other the melting room. These are separated from each other, and from the public entry, by clear glass partitions, allowing every operation to be watched by the employees in the office as well as by the public. Back of the receiving room is the computer's office in which is situated a big iron safe for the reception of the gold, which has been built in solidly with brick. This safe has been lent the assay office by the Bank of Commerce. Behind the melting room is placed the engine and the blower for the furnaces. These rooms are separated from each other, and from those in front and rear, by glass partitions. In addition a grille extends from side to side of the brick walls of the building, corresponding with the grille in the front of the office. The gold never leaves the inside of these grilles until the return of the results of the melting has been given to the depositor.

Behind the grille are situated a storeroom, an assay office and a weighing room, which are again separated merely by glass, leaving each operation in full view. This at present comprises the whole of the office, but the upper story is also part of the leased premises so that extensions can readily be made in future should they be deemed desirable.

Thus it will be seen that the public is taken into the confidence of the assay office in the most complete manner, and the method adopted cannot fail to establish the results arrived at as the most reliable and above board that can be obtained. The charges are the same as at the Seattle office, but no attempt will be made to reduce them but rather to fully establish the reputation of the office as being thoroughly reliable.

The present staff are Manager McCaffry, of Winnipeg, a former bank manager who undertakes the financial end of the business as well as exercising a general

supervision; Chief Assayer C. S. Hurter, B. Sc., who has just resigned a position as head chemist with the Carmichael Reduction Works of Boston, Mass., for his present berth; Assistant Assayer J. B. Farquharson, who has had several years experience as an assayer in Colorado and British Columbia, and Melter G. Middleton, who has been up till lately foreman of the C. P. R. machine shops in Vancouver. In addition to these will be appointed a janitor who will be taught the duties of an assistant melter, and a couple of clerks whose chief business will be that of the computation of values.

The method of procedure is as follows:—The depositor on entering the building is confronted by an immense pair of bullion balances which will weigh up to 2,000 ounces, and which are accurate to the 1-100 of an ounce. Here his gold is taken from him by the manager of the office and is weighed carefully in his presence and in that of the melter. The proceeding can also be seen by the computers behind the glass partition to the rear. The gold is then transferred to an iron box which is locked and is taken direct into the melting room; or, should both furnaces be engaged, placed temporarily in the safe. These gold boxes are of special design by Dr. Haanel and were constructed locally by Messrs. Bell & Flett.

On the gold being taken into the melting room, where are situated two furnaces, one of 2,000-ounce capacity and the other of about 900-ounce; the box is opened by the melter in presence of the chief assayer, who directs the nature of the flux which will have to be employed. In the case of Klondike gold this will be in most cases borax glass with the addition of a little nitre to oxidise any sulphides that may be present. The flux and gold are then mixed and placed in a red-hot graphite crucible and placed in the furnace where the melting will have been accomplished within twenty minutes when the office is in full running order.

A small gas engine works a blast for the furnaces which, together with the motor, is a part of the plant purchased by Dr. Haanel.

Each lot of gold dust will be, as far as is practicable, made up into a single bar, up to 2,000 ounces. The crucible is then swung out of the furnace by a patent crane and placed over the pouring table where it is poured into a mould and allowed to solidify. It is then taken out and the slag broken off. The bar is then placed in a nitric bath, extremely dilute, which process is termed the "pickling of the bar," and which serves to move any stains and to impart to the gold its full lustre. It is then washed in clean water and permitted to cool and dry.

In the meantime the slag broken off is pulverized and panned in the ordinary manner for the shot gold, little pellets that are sometimes found in the slag. When the bar is cooled it, together with the shot gold, is placed on the bullion balances and carefully weighed in the presence of the depositor; the whole process so far occupying about half an hour.

Two slices are then taken from the bar, one from the upper right hand and the other from the lower left hand corner, each weighing from a quarter to half an ounce. These samples are weighed by the manager in the presence of the assayers to whom they are given and their value charged up to their personal account, full return of the gold thus being necessary after the assay is conducted.

The sample is then annealed and rolled into a very thin sheet, and assay samples for either assayer being cut out of this sheet. The samples are then taken separately by the assayers who are required in their returns to come within a very close approximation indeed to each other.

For the purpose of assay a separate set of weights are used in which a thousand units weigh but half a gramme. This is done to save troublesome computations. The assay samples are taken to the amount of 1,000 units each.

Klondike gold is usually about 800 fine, the remainder being silver with an occasional trace of baser metal. To the assay sample is therefore added silver in such quantity as to make a ratio of 2 to 1. This is then wrapped up in lead and cupelled in the muffles in the usual manner. There are four muffles being installed, one for each assayer, one extra and one for special work. This is one more than is possessed by the Seattle office. After cupelization the bone-ash cupel is withdrawn from the muffle and placed on an anvil and any bone ash adhering is carefully broken off. All the lead has of course been dispersed. The button is then placed on a clean anvil and beaten flat, and the button annealed and rolled in a jewellers roll. The sheet is twisted into a coil called a cornet and placed into the platinum parting apparatus.

This consists of a basket with 36 divisions in each of which are two holes at the bottom, and each of which contain a small cup in which are five small slits. When all the samples which are to be treated are ready the basket is placed in a bath and covered up. The bath is of nitric acid in equal parts with water, and is brought to a boil for two minutes, thus removing the main access of silver and then is boiled again twice, each latter occasion being for ten minutes, each timed accurately.

After this the basket is dipped into successive baths of distilled water and the samples removed and annealed. It is then removed and is ready for weighing on the balances which are accurate to the 1-100 of a milligramme and are in fact as fine as any in the world, none more accurate being made.

To determine the losses, proof assays are made of chemically pure gold and silver and the corrections applied to the regular assay.

To determine the base metal a sample is weighed out as before but no silver is added and after being cupelled the difference between the weights of the two assays gives the base metal.

The amount of silver is obtained by adding the gold and base metal together and subtracting their total from 1,000 units.

The results of the assay is then returned to the computers who calculate the value of the bar, and the equivalent in coin of the realm is given to the depositor. The assay process is not watched by the depositor who, however, has the privilege of taking a sample of the bar and having it assayed anywhere he pleases and comparing the returns of those of the Dominion office.

BRITISH COLUMBIA IN LONDON.

(From Our Own Correspondent.)

THERE is really nothing to write about this month. Apart from the gyrations in Le Roi, due to the efforts of a number of financiers to obtain control of the property, and to entirely exclude the real influence of the Whitaker Wright group, the market for B. C. securities generally has remained inert. The recent awful discoveries in connection with the B. A. C. and its subsidiaries have sickened the British investor of all things British Columbian for the moment, and when you come to survey the wreckage it is perhaps not surprising that this is so. Imagine the feelings of holders

of B. A. C.'s who, we will say for argument sake, had given 17s. to 17s. 6d. a share, at seeing their security (?) quoted at 3d. to 9d. a piece, and with few takers at even the lower quotation. Le Roi No. 2, Rosland Great Westerns and Kootenays, have been further depressed, by the alarming rumors as to the state of their respective treasuries, and—bearing in mind the history of the group—not probably) without reason. Kootenay mining shares have changed hands at £1, equal to one-fifth their nominal value, or to a discount of 80 per cent. Le Rois themselves have been up and down, chiefly for the reason given above. The *Financier & Billquist* gave the market a fresh scare by challenging the official returns issued in London by the Le Roi people, and although the matter is a purely technical one, the reply put forward by the secretary of the company was rather lame, and did not help to set at rest the fears which had been created. The opponents of the Whitaker Wright group even venturing on a criticism of the cable, the *Financial News*, by a series of questions, drew a further explanation from the Co. (Our correspondent here gives the official statement published in another column).

After having been down to nearly seven, Le Rois recovered to about 8½ and then eased off again, the market remaining in a very nervous condition. A redeeming feature was the strength of Ymirs, which jumped up to over 2 1-4 on the very satisfactory character of the latest news from the property. Hall Mines have been up to about 10s. but did not maintain their best price. Athabascas have broken away to a rubbish value, and generally the market has been in a listless heavy mood, with but little public support tendered to even the best class of shares. The dividend on Le Roi No. 2, (5s.), did not cause any excitement. The market has undergone too much to be easily moved now, and is quite prepared to accept with equanimity—now that it has succeeded in obtaining the compulsory liquidation of the B. A. C.—the surprises that may be in store for it in connection with the winding up of this ill-starred concern. At the examination before Mr. Justice Wright, at which this course was decided upon, perhaps the most surprising admission given in evidence was that dealing with the remarkable transfer of a liability of something like £500,000 from the Globe Finance Corporation to the B. A. C.!!! No wonder the B. A. C. smashed under financial control such as this. Happily under a compulsory liquidation, this and sundry other hitherto absolutely inexplicable matters will be well probed. It is significant that the application to the court by the Stock Exchange creditors was backed by the evidence of Dr. Richardson, the official assignee of the London Stock Exchange itself, who stated in effect that he considered that a good deal of light required to be thrown upon the doings of the group. For the sake of British Columbia it is to be hoped that this light will be of the fiercest possible character, for the downfall of the B. A. C. has hit the British Columbia market very badly, and has as well practically destroyed public confidence in British Columbian mines. Let us hope that the enquiry as it proceeds will prove a complete vindication of the mining industry which has so far been made a cat's-paw for unscrupulous London promoters, whose only aim in the past has been to make as much as possible out of their respective flotations, regardless of the good repute of the unfortunate properties which have fallen into their clutches.

Your comments on the Nimrod Syndicate and its doings attracted considerable attention amongst people closely identified with the company, and also in the B. C. market itself. You will no doubt have seen the explanatory letter addressed by the secretary of the Syndicate to the *B. C. Review* of this city.

AURIFEROUS BEACH SANDS OF BRITISH COLUMBIA.

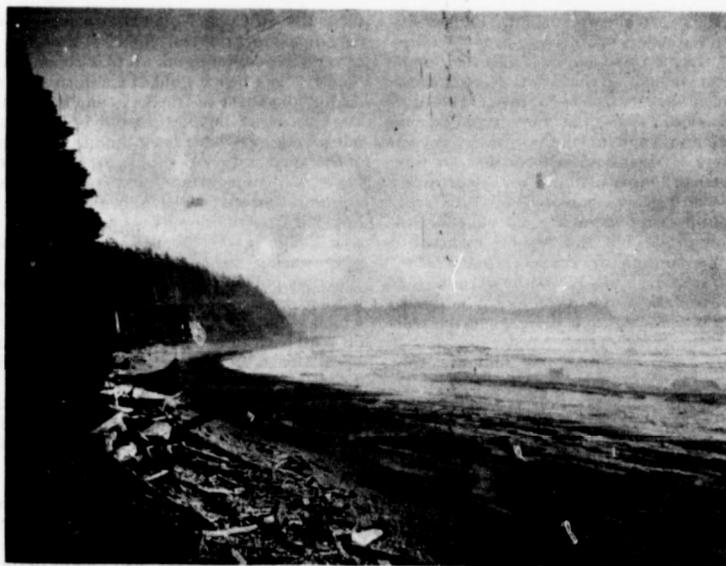
THE excitement connected with the recoveries of gold from the beach sands at Cape Nome, and the success attending the operations at Wreck Bay, Ucluelet, have occasioned a considerable revival of interest in the possibilities of profitably working the black-sand beaches which are of frequent occurrence on the Pacific coast.

These gold-bearing sands extend from the Bay of Monterey, northward, practically as far as the North American continent, but till the coast of Humboldt county, California, is reached the deposits are very limited in extent, and changed by each tide, while the gold is exceedingly fine in size, running frequently thousands of colours to a cent.

Successful attempts to work these sands have been made in different localities for a number of years.

paying quantities in places, and continued exploration extended the area more than 300 miles north and west from Cape Spencer. The actual extraction of gold in paying quantities from the more recent discoveries at Cape Nome are, of course, familiar to everyone. While the successful working of the sands at Wreck Bay indicates more or less continuity of occurrence between California and Alaska, and certainly gives ground for hoping that the black sands of British Columbia will prove a profitable and important source of gold.

As far north as Washington the indications of gold are shown by the black sand, a combination of magnetic iron and hornblende, but going north of Puget Sound, it is found that a new mineral enters into the strata containing the gold, of a much more distinctive colour, viz., broken garnets and pink topazes, giving the colour to the ruby paystreak generally associated in the minds of Alaskan miners with the existence of gold in paying quantities.



SHORE LINE—WRECK BAY PLACERS—WEST COAST VANCOUVER ISLAND.

In 1878, a slight furore was created by the result of some work on the beach four miles south of San Francisco, known as Ocean Beach, where five men made \$125 with a rocker in six days; but the deposits of black sand were so limited that it was found a very short time exhausted the supply.

In 1876 a large company was formed to work by Fruevanners, the beach sands of Humboldt county. It was found that a good profit could be made by this method, but as usual the deposits gave out. However, along the coast of Humboldt and Del Norte counties, the black sand containing the gold was found in paying quantities after each tide, and for years the deposits have been worked, by removing to the interior the richest layers, after each tide, by mule transportation, to be subsequently worked at leisure. These deposits are worked to-day spasmodically, and a special form of apparatus was invented which it is claimed saves the finest gold. Over ten years ago prospectors along the coast of Alaska discovered that the beaches carried gold in

With regard to the origin of these deposits it has sometimes been thought that because new beds of pay-sand are found after each tide, the gold comes from the sea, but close scrutiny will show that this is a fallacy in every case.

Back of these sands are always found bluffs of gravel and sand, and these are gradually receding through the erosion of the waves during the winter storms. In earlier times the beaches were very narrow and the annual erosion was consequently much greater than at present. This erosion, aided by the varying ocean currents, caused natural concentration of the material to take place, the light gray sand being carried away, leaving the heavy black sand and the gold on the beach. Generally this black sand grows richer in gold as the bluff is approached. In the report of the State Mineralogist of California for 1896, it was recorded that a section of this bluff in Humboldt county gave from the bottom upwards:

Gravel, slightly cemented, 10'.

Very soft blue sandstone, 15'.
Gravel, slightly cemented, 30'.
Very soft blue sandstone, 10'.
Small gravel and sand, 85'.

This gravel carries the gold and is the result of the deposition of the detritus carried down by the neighboring rivers. It was deposited in the ocean, from which it was elevated when the entire coast was raised, and is now being again eroded by the ocean.

The British Columbia deposits being for the time passed over, the next series of paying deposits are found along the shore of Alaska, in the Gulf of Alaska. These begin about 155 miles to the westward from Juneau, and extend at intervals along the coast for over 300 miles. At one time Alaska was ice-capped. Then the ice receded to the ravines and the river beds becoming glaciers. These glaciers, having movement, carried the boulders, gravel and sand to the ocean, exactly in the same way as rivers, except that all of the results of erosion were borne to the terminus of the glacier. This terminus was the ocean, where the glacier met with the warm Japan current. From numerous points of the glacier, swift rivers heavily charged with slickens, carried the detritus into the ocean. This ocean bed was raised, so that in those particular deposits, three ancient beaches were exposed. Throughout 300 miles it has been found that the ocean currents carried this gravel and sand to the northwest of each river, so that where a river comes from this one-time glacier, for a shorter or longer distance to the northwest are found the sand and gravel banks called "tundra," containing the gold-bearing sand in successive layers. This tundra is low-grade, but the beaches exposed to the action of storms, contain the concentrated "ruby" sand in paying quantities. It is worthy of note that this sand is always richest towards the original bank, and that its value is renewed each year, when the winters are severe.

It may therefore seem reasonable to suppose that where auriferous beach sand is the result of glacial deposition and subsequent concentration by the action of tide and wind it would contain more and heavier gold than where a similar deposition has taken place at the mouth of rivers. The water will carry only the lighter particles of gold, the glacier all the gold contained in the detritus. In British Columbia and Alaskan beach sands containing gold, the gold is, as a matter of fact, heavier and more easily saved than farther south and gives a better recovery. The existence of gold on wide open beaches, exposed to the open sea and frequently inaccessible by land, places considerable difficulty in the way of discovery and prospecting. A few unqualified successes in this branch of mining will, however, lead to such difficulties being overcome.

At Lituya Bay, on the Alaska coast, over 300 feet of the gravel bank has been broken down and concentrated during the last ten years where it has been fully exposed to the action of the storms. Here is found the greatest proportion of ruby sand making the beach, in several places, to the extent of a mile, look like blood. The ruby sand itself, however, does not carry any appreciable gold unless there is also a good percentage of black sand. The gold apparently does not come from the matrix of the ruby. This matrix is either trap or syenite, while that of the garnets is gneiss and schistose rocks. Fragments containing the topazes in place do not contain any gold, but innumerable gold-bearing quartz pebbles are found in this locality, mixed with the sand and gravel. Very close investigation has not located the source of gold. The country back of the high range contains granites and porphyries, against which lie schists and slates. In the slates are veins of

calcspar, and white barren quartz, none showing more than traces of gold, generally contained in iron pyrites.

It may therefore be concluded that this gold was either transported hundreds of miles, or was the result of the erosion of the primitive rocks, which generally contain minute quantities of the precious metals.

Still farther to the westward, by Yakutat, Kayak, etc., the beach contains sufficient petroleum to prohibit the saving of the gold by quicksilver, but in all this country the glacial action is evident in the original deposition of the sand. Most of these glaciers have now disappeared entirely, but near Cape Fairweather is a dead glacier, where the large river flowing therefrom looks exactly like the tailings from a quartz mill, and discolours the ocean for several miles from shore. The Cape Nome deposits tally with these others except in one particular, the occurrence of coarse gold in the beach sands. The section of the tundra is similar, the samples of sand exhibit the same distinctive ruby, but the gray sand is different; that along the Gulf of Alaska being the product of erosion of syenite, basalts, etc., while that of Cape Nome shows the yellowish grains of decomposing granites. Some of the gold of Cape Nome is very coarse, nuggets up to a considerable size being found. The beach gold of California is very, very fine; that of the coast of Alaska is fine but heavy and cubical. On Vancouver Island the gold is both fine and coarse, but no nuggets have been found. At Cape Nome some of the gold is very peculiar, in that it does not seem to have been transported any distance. It is very fine but angular, and gives the appearance of having been left in place after the dissolving away of the enclosing matrix. This gives the impression that there should be gold-bearing ledges found in place in that country. The only point at which black sand has been profitably worked in British Columbia so far is at Wreck Bay, which is situated a few miles north of Amphitrite Point on the west coast of Vancouver Island, and in the West Coast Vancouver Island Mining Division. The discovery and exploitation of this deposit has undoubtedly been assisted by the fact that it occurs on the tongue of land separating Ucluelet Arm from the open sea and is, comparatively speaking, easily accessible from the shoreward side.

Wreck Bay extends three miles along the coast and about one mile inland. The beach is exposed at low tide and consists of a garnetiferous black sand mixed with ordinary sand and gravel. During the season of 1900, \$12,584 were expended, chiefly in the construction of a flume 9,800 feet long, and in the building of a dam across Lost Shoe Creek. The gold extracted during the same season when work was carried on in a limited way, and under difficulties of some magnitude amounted to \$10,639. For 1901 operations have just begun and give promise of most satisfactory results. The occurrence of the gold is of the type already described as the result of glacial deposition in the bank confronting the beach and subsequent erosion and concentration by the action of wind and tide.

In addition to the Wreck Bay deposit there exists east of the mouth of the Jordan river and about 46 miles west of Victoria, what appears to be an old river bed. The river was probably a glacier stream, and the material which it carried derived from the graphitic slates which extend in a somewhat narrow belt from the Jordan river in a southeasterly direction to Esquimalt harbour, outcropping at Goldstream and Langford lake. These slates are probably of Triassic age and analogous to the rocks found at Boston Bar in the Fraser river and in the Cariboo, Columbia, Omineca, Purcell, and Selkirk mountains. Stringers of quartz which frequently carry gold occur in the slates. The placer deposits

of the Jordan river are therefore most likely an accumulation from large denuded areas of these rocks.

The formation from the Jordan river eastward towards Sooke consists of clay, sandstone, and conglomerate of Tertiary age. For a considerable distance from the mouth of the Jordan, the shore is 25 feet to 100 feet high and composed of blue clay. The beach between the clay and the water line is composed of black sand; while along the top of the clay cliffs there is gravel heavily stained with oxide of iron for a thickness of three to ten feet. The gold in this gravel is not visible to the naked eye, but by panning the black sand becomes concentrated and from it the gold can be easily removed. Near the mouth of the Jordan, the sand is two feet to three feet in thickness and pans from top to bottom, though best values are found at the bottom near the blue clay bed. A probable average would be fifty cents per ton of sand. The deposits could be easily worked, so operations might be carried on at very little

fore wherever possible the simplest machinery compatible with success must be used.

The first and simplest machine used was the "rocker," so well known to everyone connected with placer mining. The rocker used at Ocean Beach in 1878 comprised a punched iron screen, sloping towards the head of the machine and three silvered plates with an inch fall from one plate to the other, over which the fine sand flowed. The sand was shoveled by hand, and the water fed by a helper with a bucket.

On the beaches of Humboldt and Del Norte counties, California, "Toms" are now generally used. These are of two patterns, known as the "Ordinary" and "Oregon." These are described in the thirteenth report of the State Mineralogist.

The "Ordinary" Tom pattern has amalgamated plates. The sand is dumped from a barrow on the "spreader," which is 11 feet long, 2 feet wide at the upper, and 6 feet wide at the lower end. It then drops



FLUME—WRECK BAY PLACERS—WEST COAST VANCOUVER ISLAND MINING DIVISION.

expense. There are also doubtless many unknown, or at least unprospected, deposits of black sand on the west coast of Vancouver Island, and on the northern part of the west coast of British Columbia deposited by glaciers which have long since disappeared or have shrunk to the tops of the mountains, where are destined in the future to yield gold to the adventurous prospector and pioneer.

Various machines have been devised for saving the gold contained in beach sand. Whatever method is employed must be determined by the conditions of each particular locality. These consist of the richness of sand, the accessibility of beach, the presence of water and its natural fall for sluicing or power, and last but not most important, whether steam or gas power can be used without absorbing all the profits. This last is of vital moment in such a country as Cape Nome, where every ounce of fuel has to be imported at very great expense. This question of power also implies a permanent plant, and generally heavy machinery, and that the sand must be transported to the concentrator. There-

3 inches to the "plane" table, 6 feet wide and 6 feet 6 inches long, terminating with a sheet-iron screen, with $\frac{1}{4}$ -inch perforations, and set on the reverse grade, where the gravel, driftwood, etc., are retained and removed frequently by an attendant. The clean sand then passes over a table 6 feet wide, 6 feet long, and covered with corrugated silver plates, thence to the "blanket" table, 6 feet wide, 6 feet long, and covered with a coarse blanket. These tables terminate with a mercury "trap" or "well," 4 inches wide, 4 inches deep, and 6 feet long, where fine gold, amalgam, and quicksilver are caught. The sands then pass to the waste flume. About 50 inches of water and three men are required to operate this machine.

The other pattern is the "Oregon" Tom and also requires no power. It handles about 200 tons of sand in 24 hours, and is considered a success by the operators. It saves more of the fine gold than any machine yet tried on the Humboldt county beach.

The sand is shoveled into cars holding nearly a ton, and hoisted from the pit up an incline to the platform,

and dumped from the car into a hopper; thence it falls on a grizzly or screen where water causes the sand to separate from the larger gravel, which is removed by a square shovel into a waste chute. The sifted sand falls on table which gradually widens to 5 feet, where there is a drop of 4 inches, and the lower part of the table is divided into two parts, each 2 feet wide, by a central rib. At the lower end of the table the material drops 8 inches on an iron plate set on a reversed grade, and perforated with $\frac{1}{4}$ -inch holes. The fine sand passes through the perforations to two "gold-savers," while the coarse sand is raked to one side. These gold-savers are each 25 feet long, 2 feet wide and have 4-inch sides. The bottom is made of a single 2-inch plank, roughened with scratches like those made by a badly set circular saw. A patent amalgamator was tried, but discarded because it required power.

For the work of the company, whose equipment has just been described, it requires 20 men and 20 mules to pack the sand to the works.

In 1876 a company, known as the Black Sand Gold Mining Company, erected a permanent plant, which was eminently successful, as long as the deposit lasted. The company used Frue vanners, which did perfect work and required little power. To-day, if the deposit will warrant a permanent plant, this method would be the cheapest and best to employ. The results of this company showed that the black sand originally assayed \$9.27 per ton, and was concentrated to material assaying \$1,935.43 per ton, with only a trace in the tailings. Twelve tons were passed over each machine in 24 hours and the finest gold was caught. Only $\frac{1}{4}$ horse-power is required to run a machine, and one man can attend to sixteen very easily.

A most successful method is employed at Lituya Bay, where water for sluicing can be obtained. This method looks crude but it is really simple, does almost perfect work and requires no power. All along the Gulf of Alaska, there is found back from the coast an unlimited supply of water, only requiring fluming to bring it to the crest of the beach. Unless fouled by petroleum the gold will amalgamate most readily, and even if fouled, can be saved by blanket sluices, made of barley sacks.

The water is brought from the interior in flumes, 8 inches and 12 inches wide, and carried along the crest of the bluff above the beach. In this flume are placed gates, and the feed flume is carried down to the beach. Stakes are driven into the sand at right angles to the beach, and cross-pieces are nailed to them, giving the proper grade to the boxes. These boxes are 12 inches wide, 12 feet long, and tapered so that the upper will fit into the lower. The number of boxes depends on the width of beach above high tide, that will pay to work. These are called "shovelling boxes," and into them the sand from each side is shoveled, the extreme limit being 12 each way. When this extent is worked out, the boxes are removed to a new series of stakes already in place. From the shovelling boxes the sand and gravel fall on a grizzly of rods or wire, set on reversed grade, the fine sand and water falling through and running over the gold-saving sluice. This sluice is 2 feet wide and 12 feet 6 inches long, with a 2-inch cleat nailed across the lower end. Two pieces of 1 1-2 inch plank, called "riffle boards," each 2 feet wide and 6 feet long, are placed on the bottom and wedged in this sluice. The top of these planks have saw-cuts 1-2 inch deep and 1-2 inch wide, spaced 6 inches from centres, and each of these riffles is divided into four partitions by pieces of sheet iron. These riffles, except the first one are filled with quicksilver, and the fine sand flows over them in a thin stream. From the riffle board, the sand flows over a silvered plate, 2 feet wide and 4 feet long, but

the coarse sand is separated by a punched iron screen, or one of steel wire, which prevents any scouring action. The grade of shovelling boxes is 1 inch to the foot, of riffle boards and silvered plates, 1 1-2 inch to the foot. If the gold is very fine, about 20 per cent. is saved on the silvered plate. In cleaning up, most of the water is first turned off, then the gold which collects on the bottom of the shovelling boxes (and it is considerable) is swept down to the riffle boards. The upper riffle board is removed, upset in the sluice, and washed in the running water of the sluice. The second is washed in the same way, the cleat at the bottom retaining the quicksilver. This quicksilver is now squeezed through cloth on the spot, and put into bottles for the next run. The concentrated sand, amalgam and gold, is then carefully panned in a clean-up tank, and the concentrates saved; the amalgam is cleaned and retorted. The copper plates are only cleaned occasionally.

If water can be procured, this is by far the best of all methods, as it requires no power and very little skill, yet possesses the ability to handle 12 tons in 10 hours to each man shovelling. The amount of water is measured by placing the finger on the riffle board, when it should rise one inch; the amount of sand should be no more than to cover the riffle board.

The method of gold saving at Wreck Bay and its success, so far as described in the Report of the Minister of Mines for 1900, is as follows:—

"The apparatus used for saving the gold is a modified sluice fitted with amalgamated plates. This machine is 30 inches wide and has a large and a small compartment, with a means of deflecting more or less water into either. The larger compartment carries the gravel over the grizzly and does the washing, while the water in the small compartment acts as a carrier for the coarser tailings which fail to pass through the 6-mesh screen with which the apparatus is furnished. After passing through the grizzly and screen, the gravel travels over four amalgamated plates, each 30 inches by 16 inches, and then over a series of riffles and traps, the principal object of which is to prevent any loss of mercury.

"In actual practice, on a clean-up of say \$300, \$250 has been found on the first plate, \$40 on the second plate, \$10 on the third, and nothing on the fourth. The gold, though fine, is particularly clean and free from that 'rusty' character which has proved such an obstacle in other workings of a similar nature.

"The tailings are delivered below high-water mark, and as the ground is worked out the machines can be easily moved along and the flume tapped at a fresh place. For labour, each machine requires about 5 1-2 men, as follows:—

- "One man stripping off non-paying dirt;
- "One man throwing up gravel to platform of machine;
- "One man feeding machine;
- "One man looking after machine and tailings.
- "The part time of one man prospecting ground.
- "The capacity of each 30-inch machine is a little over 25 tons per day of nine hours. There are now six machines on the ground, but practically only one was in working order before the bad weather set in, necessitating a partial suspension of the work.
- "From the Ucluelet Co's claim 600 yards of gravel have been put through the machine, giving a yield of \$9,400, or a little over \$15.50 per yard. This represents the yield of about one-tenth of a claim. An average section of the ground would appear to be as follows:—
- "1. Two feet of non-pay, which has to be stripped;
- "2. Three feet of pay-dirt, the lower 8 to 18 inches of which is fairly rich;

" 3. A fine barren sand, or sometimes clay, underlying the pay-dirt."

During this season the machine was modified, in the following particulars: The swift stream first carries the material over five feet of riffles and then over angle-iron so placed that the apex is upwards and arranged longitudinally within a sixteenth of an inch between each, in the direction of the current. The coarser gravel passes over the grating on to the dump, while the finer material drops through the gratings with such sufficient water to wash it over the plates, into a box perforated at the farther end and thence on to the amalgamated copper plates. In order to prevent loss of amalgam the current is led from the plates to cross-riffles, from the riffles to a box with baffles and thence to the dump.

In conclusion there are rarer metals than gold found associated with the gold in the black and ruby sands. It is very hard to detect them in panning the original sand but they are found in the concentrates in sufficient quantity to be a very valuable by-product, even as high as 5 per cent. These metals are platinum worth \$16 an ounce and the alloy irid-osmium, which is eagerly bought even in such a small quantity as one-eighth of an ounce. Neither of these will amalgamate with quicksilver but are heavier in specific gravity than gold. As a result of this great specific gravity, they are concentrated with the amalgam, and will be collected in the clean-up, but will keep absolutely separate, and can be saved in the pannings with the greatest ease, even though very minute in size.

Platinum will look like dull specks of lead, a leaden gray powder. Irid-osmium looks like fine bright scales and has the appearance of nickel.

It is of moment to remember that this panning should always be done in a wooden box, or tub, and the pannings saved; either for shipment as a whole, or to be repanned for the rarer metals. In the Union mine, Humboldt county, the concentrates carry as much as 5 per cent. of platinum. The pannings at Lituya Bay, carrying an excess of barren sand, would average at least 2 per cent., but in this case the irid-osmium composed the greatest proportion of the metals. Taking even 2 per cent. of these metals as an average the concentrated pannings, only rating the value at \$10 per ounce, would amount to nearly \$5,000 a ton, or \$2.50 a pound. The demand for platinum is greater than the supply, owing to its use in electricity, while full value per ounce will be paid for these rare metals, in order to get the osmium alone. After the success of the Welsbach light, it was found that the "mantles" were very brittle. However, it was discovered that the addition of a very small percentage of osmic acid reduced this brittleness to a minimum, and this company is now open to purchase all the osmium, or its compounds, that can be presented. Wherever beach sand is worked save all the concentrates and test them for these rarer metals. For this reason a simple amalgamating device, such as passing over silvered plates, is not as good to use as riffles or concentrators, canvas, burlaps and blankets.

The fineness of the gold is generally high; as, for instance:

Average of California, \$16.50 to \$19.30 per ounce.
Average of Lituya Bay, \$17.50 to \$18.60.
Average of Cape Nome, \$17.01.
Average of Cape Nome, melted, \$18.50.

The fineness of Wreck Bay gold varies from \$18 to \$20 per ounce after melting. During 1900, 700 ounces were recovered. During the present season the value of the gold produced was, to July 1st, a little over

five thousand dollars. While this amount is insignificant, the returns later are expected to be much more considerable when the number of machines employed for saving the gold are increased.

THE COLLOIDAL STATE AS A FUNCTION IN VEIN FILLING.

(By T. R. Marshall, D. Sc., Edin.)

THE state of a substance when in solution is as yet far from being perfectly understood and there is a strange condition of pseudo solution where substances, which are usually looked upon as typically insoluble, are distributed throughout a mass of water in a state called the colloidal state. Such solutions are often stable under favourable conditions, but when these are altered the substances pass from the colloidal state into segregations of solid matter.

Gold, a typically insoluble substance, can readily be brought into the colloidal state by adding from aldehyde to a weak solution of gold chloride. The deep blue solution of gold is fairly stable but the surface of the water is slowly covered by a pellicle of ordinary metallic gold, which shows the tendency of the gold particles to come together to form the yellow solid. Strong stable solutions of silver are now made in considerable quantity for medicinal purposes.

The solution of silica in water is somewhat more complex as it seems that there is only a certain compound of silica with water which is capable of forming a colloidal solution. This hydrate is readily formed when the silicates in the rocks are corroded by surface water. Under altered conditions the silica is deposited from the solution as quartz, but such is the tendency of silica to assume the colloidal condition that most quartzes are partly dissolved when ground to a fine powder with water. The fact that normally insoluble substances can, under certain conditions, assume the colloidal state forms an easy explanation how such substances as metallic sulphides and free gold, sparingly but widely diffused throughout rock masses, may be transferred and concentrated at some point in segregations.

About eight miles from the coast, up Bear river, there is a narrow ledge of from two to three inches with a complex vein filling of quartz, free gold, galena, black jack, copper pyrites, pyrite, etc. The vein traverses a belt of a dark green basic rock, which has become highly altered in the course of time. Examination of the rock reveals that the hornblende which was much decomposed was the origin of most of these minerals. It is thought necessary by many to explain the transference of the metallic sulphides from the hornblende to the fissure by the formation of soluble sulphur salts. Now, it is possible to obtain metallic sulphides in colloidal solution. When a solution of sulphuretted hydrogen is added to a cold, nearly neutral, solution of Ferric chloride, a blue solution of Ferric sulphide is obtained for a few seconds of time.

The author, in experimenting with nickel salts, occasionally obtained dark brown solutions of colloidal nickel sulphide. The analytical chemist is only too familiar with the difficulty sometimes met with in filtering freshly precipitated sulphides. It is not by any means always due to the fineness of the particles but the tendency of the sulphide to form colloidal solutions. One is therefore justified in assuming that during the slow alteration of the hornblende by circulating underground water, the gold and metallic sulphides simply pass into a state of colloidal solution which are again deposited in the fissure under altered conditions of temperature and pressure, or in some cases of plain salting out.

OPERATION OF THE "HOLE-CONTRACT"
SYSTEM IN THE CENTER STAR AND
WAR EAGLE MINES, ROSS-
LAND, B. C.*

(By Carl A. Davis, Superintendent).

THE cost of mining during the past history of these mines has been excessive, principally by reason of the inefficiency of labour under the wage system. The amount of labour performed per man was unsatisfactory, and Mr. Edmund B. Kirby, the general manager decided to adopt the contract system as a remedy. For this purpose the method now in use was devised by the writer (then and now the superintendent) as best adapted to the local conditions. On March 12, 1900, this system was presented to the miners of the War Eagle and the Center Star. The issue remained unsettled for several weeks, during which the mines were closed. On April 5th an amicable understanding was reached and the miners resumed work on the new terms. The system was introduced by degrees, and the results of a year's trial have shown it to be an unqualified success.

The veins of this district have been formed by "replacement" in fissures of the "shear-zone" type, ranging in width from several feet to 100 feet or more, and fairly regular in strike and dip through the main mass of Red mountain, which consists of augite-diorite, a dark, tough, basic, eruptive rock.

Between the limiting walls the vein material ranges from a hard silicified mass, with only scattering mineralization, to an almost solid sulphide, mainly pyrrhotite, with a relatively small amount of chalcopyrite and pyrite. Consequently the rate at which drilling proceeds varies considerably within short distances; but the monthly average of the number of feet drilled per machine per shift does not vary more than 5 per cent.; thus allowing an accurate determination of the price to be paid per foot of drilling.

Generally speaking, the vein material and the surrounding country rock are very hard and tough, making it unnecessary to timber the headings. In fact, stopes up to 50 feet in width can be made without timbering. Another feature bearing on this problem is the complication of the geological structure by numerous dykes and faults. The pay-shoots are very irregular in outline, sometimes so much so that the payment of contractors in the stopes, by the fathom or any other unit, would be impossible, by reason of the difficulty of measuring exactly the volume of rock broken during a given period. The determination of the amount of ore stoped by making a mine car the unit of measurement for either weight or volume was considered, but had to be abandoned on account of the impracticability of keeping the ore broken by each set of contractors separate, since, at times, the ore broken by several sets of contractors is drawn off through the same loading chute in the mine.

CONTRACT SYSTEMS.

Two methods are employed in measuring the amount of work performed:

1. Measurement of the number of linear feet of advance. This method commonly employed in all parts of the world, is applicable to headings only, such as drifts, crosscuts, raises, winzes, and shaft sinking. In these mines, where payment is made per running foot, the contractors are charged for the explosives, which

are furnished to them by the company at cost. This results in greater economy in the use of explosives than is secured by the practice followed in some Western mines of supplying powder, etc., free. Under such an arrangement the men are not as careful as they would otherwise be to put their holes in the most advantageous positions; and, substituting powder (which costs them nothing) for labour, they make the total cost of the work unnecessarily large. In raises and winzes, the necessary timbering is performed by the company; but in shaft sinking the contractors place the sets in position, subject to the approval of the mine foreman. Blasting is done by the contractors at any time.

2. Measurement of the number of feet of holes drilled. The system, first adopted for use in the stopes, has been shown by experience to possess several advantages over the one above described; so that, in many cases, it is now used even in drifting and crosscutting, and deserves to be here more fully described.

DETAILS OF THE HOLE SYSTEM.

The underground work is carried on by two 8-hour shifts, arranged as follows: Morning shift 7 a.m. to 4 p.m., with an interval of one hour for dinner; afternoon shift, 4 p.m. to 1 a.m., with one hour for supper. The men are raised from and lowered into the mine on their own time (i.e., before and after the terminal times given), making 8 hours the actual working time. In shaft sinking and in occasional headings, three shifts are employed, and the work is carried on continuously during the 24 hours. With the exception of the main shaft, in which the contract includes 12 men, contracts are generally let to four men, working in pairs for two 8-hour shifts daily. Contracts are verbal, not written. No sub-contracting is permitted, and the men share equally in the profits of each contract. In case of sickness a contractor must provide a substitute. If any contractor wishes to leave before the expiration of any contract, he is paid his share of the net earnings according to his proportion of the total number of shifts worked. Prices are fixed and contracts are let at the beginning of each month.

On beginning work, each set of contractors is supplied with a tool chest, provided with lock and key, containing all necessary tools and supplies for machines, for which a receipt is taken. At the expiration of the contract the tools are inventoried, and those missing are charged to the contractors. On the other hand there is no charge for breakage, if the broken tools are turned in and new ones are issued. Machine-drill repairs are made by the company; but it is understood that breakage through neglect or carelessness is sufficient cause for discharge. When desired, a box for steel drills is placed at some convenient point on the level. This box has two compartments: one for sharp steel, placed therein by the tool-packer; the other for dull steel, which the tool-packer collects while replenishing the "sharps."

The first duty of the miners on the morning shift is to pick down the loose ground left from the blasting. When the "back" has been made secure, the machines are set up, and drilling proceeds continuously during the two 8-hour shifts. The location of the holes to be drilled is marked, and their approximate depth and direction are indicated by the foreman. Misplaced holes, or those drilled too deep, are not accepted by the foreman as entitled to be paid for: and an occasional check of this kind is all that is necessary to insure good work. Drilling proceeds without interruption during working hours, and is only stopped on the night shift in time to allow the contractors to take down the machines, clean

* A paper to be read at the next meeting of the American Institute of Mining Engineers.

out the holes, and leave them in shape for the blasting crew, before leaving the working faces at 1 a.m. The number of feet of holes drilled is measured at the end of the shift, at which time a record of the measurement is furnished to the contractors, and a duplicate is delivered at the office.

The blasting crew works between the hours of 1 a.m. and 7 a.m., and its work consists in loading and blasting the holes drilled by the miners. This effects a considerable saving in the consumption of explosives, since these are handled by a few picked men only. Another advantage of this method is that it involves no loss of time by miners and muckers (shovelers) in waiting for the working faces to become clear of smoke.

In headings, the details of the work are, in all essentials, the same as previously explained with respect to the stopes. The number, direction and depth of the holes are outlined by the foreman or shift boss; but when contractors have become familiar with the ground little direction of this kind is needed, the work being practically the same each day. The working hours are the same as in the stopes. On entering the heading in the morning the miners pick down the roof, put up the horizontal bar supporting the machine drill, and proceed with the drilling of the holes in the upper part of the face. While drilling is carried on the shovelers are removing the broken rock from the previous blast. By the time this has been cleared away the machine men are ready to take down the bar, set it again in a horizontal position near the floor of the drift, and drill bottom holes or "lifters." These being finished the machine is taken down; the holes are cleaned out and a floor is laid for the shovelers. Everything is then ready for the blasting, which, as in other parts of the mine, is performed between 1 and 7 a.m. by a special crew.

In headings where a certain number of holes have to be drilled before the whole set or "round" can be blasted, the difficulty with the "hole system" (i.e., the system of payment according to linear feet of aggregate drilling) is in making sure that the contractors finish this work before blasting time, in order that they may not have to lose working time during the blasting, and thus that they may be kept continuously employed. This difficulty is met, either (a) by increasing or decreasing the depth of the holes to be drilled; or (b) by having one or two spare headings or stoping breasts in which contractors can utilize their extra time. The latter expedient is to be preferred, for the reason that to secure the best effect the depth of drill holes ought to be determined on other grounds than that of the time required to drill them.

ADVANTAGES OF THE HOLE SYSTEM.

1. Its applicability in stoping, where the ore stops are irregular in outline, and measurement by weight or volume of the ore broken cannot be easily made.
2. Within certain limits the number of machines in any one stope can be varied at will; and there is no difficulty such as would arise from the necessity of keeping separate the work done by each set of contractors.
3. The system is extremely elastic; that is, the same set of contractors can be employed in different headings or stopes without any resultant confusion in measuring the work performed.
4. Blasting is done only in the interval between 1 a.m. and 7 a.m., and the miners and shovelers are not kept idle, waiting for the smoke and gas to be cleared away from the working faces.

DISADVANTAGES OF THE HOLE SYSTEM.

As above shown, this system has been perfectly satisfactory in stopes. In headings, the disadvantages, as compared with the linear system of payment per running foot, are as follows:

1. Two 8-hour shifts only are employed under the hole system; while by the system of paying according to the linear progress of the heading, three shifts may be employed daily, and blasting done at any time, thus often increasing the rate of advance, which may be a matter of supreme importance in opening new ground, etc.
2. The difficulty, already discussed, of so laying out the work that the round of holes may be completed in the two daily shifts, without an undue loss of time to the contractors.

ECONOMIC RESULTS OF THE CONTRACT SYSTEM.

The following table show the saving effected by the substitution of the contract for the wage system. In this connection I may add that the advantage thus gained by the employer is not loss to the workmen. The miner now receives daily from \$4 to \$4.25, as against \$3.50 under the wage system.

TABLE I.

COMPARATIVE COST OF STOPING.

	Contract (Hole-) System, Per ton.*	Wage System Per ton.†
Drilling	\$0.356	\$0.750
Blasting	0.021	0.115
Explosives	0.100	
Total	\$0.477	\$0.865

TABLE II.

COMPARATIVE COST OF DEVELOPMENT WORK.

	Contract (Hole-) System, Per ton.‡	Wage System Per foot.§
Drilling	\$5.36	\$8.36
Blasting	0.68	2.78
Explosives	2.75	
Total	\$8.79	\$11.14

Equally important with the saving per foot or ton shown in Tables I and II, is the increased speed with which shafts have been sunk and the headings have been driven. For it is clear that, other conditions remaining the same, the output of the mines is governed by the time required to open new ground in depth by sinking and driving levels, etc. In drifting and cross-cutting the average rate of advance per month has been increased from 50.8 feet under the wage system to 97.5 feet under the contract system; this comparison being made on the basis of two shifts (4 men) per day, and a 30-day month, 555 feet of work done under the contract system, compared with the last 200 feet done under the wage system, show the rate of advance per month to have been increased from 27.2 feet to the present average of 58 feet.

* Calculated from 49,849 tons of ore stoped.

† Calculated from 13,818 tons of ore mined.

‡ Calculated from 1,244 feet of headings driven.

§ Calculated from 1,377 5 feet of headings driven.

THE WORLD'S PRODUCTION OF GOLD AND SILVER.

THE *Engineering and Mining Journal*, which has earned a reputation for the reliability of its statistical data, publishes in a recent issue two interesting comparative tables of the world's gold and silver production for the three years 1898, 1899 and 1900, which we reproduce. The world's production of gold

in 1900 was 12,381,454 fine ounces, or \$255,924,654, as against 15,071,141 ounces, or \$311,505,947 in 1899, showing a decrease of 2,689,687 ounces, or \$55,581,293. This unfavourable result was due to the small contribution made by the Transvaal mines, a few only of which were operated during the early months of the year. Deducting the Transvaal output from the grand totals for 1899 and 1900, the statistics show an increase in the other gold-producing countries of \$10,171,000.

GOLD PRODUCTION OF THE WORLD.

COUNTRIES.	1898.			1899.			1900.		
	Fine Ounces.	Kilo-grams.	Value.	Fine Ounces.	Kilo-grams.	Value.	Fine Ounces.	Kilo-grams.	Value.
AMERICA, NORTH.									
United States	3,148,642	97,932.9	\$65,082,430	3,391,196	105,471.0	\$70,096,021	3,781,310	117,610.6	\$78,159,674
Canada	662,796	20,613.9	13,700,000	1,018,371	31,674.6	21,049,730	1,350,593	42,007.8	27,916,752
Newfoundland	3,000	93.3	62,010	2,600	80.9	53,742	2,400	74.6	49,608
Mexico (a)	398,487	12,393.5	8,236,720	448,832	13,960.1	9,277,351	455,204	14,158.3	9,409,063
Central America ...	24,435	760.0	595,096	25,402	790.0	525,034	27,818	865.2	575,000
AMERICA, SOUTH.									
Argentina	6,661	207.0	137,700	3,628	112.8	e 75,000	3,628	112.8	e 75,000
Bolivia	16,617	517.0	343,500	7,256	225.6	e 125,000	7,256	225.6	e 150,000
Brazil	76,613	2,383.0	1,583,700	107,644	3,348.1	2,225,000	127,818	3,975.3	e 2,642,060
Chile (b)	60,000	1,866.2	1,240,000	46,110	1,434.1	e 953,100	43,541	1,354.2	e 900,000
Colombia	179,003	5,567.3	3,700,000	111,272	3,462.2	2,300,000	111,272	3,462.7	e 2,300,000
Ecuador	1,911	59.0	39,500	6,047	188.1	125,000	9,676	300.9	200,000
Guiana (British) ...	99,105	3,082.0	2,048,297	108,269	3,367.5	2,238,040	110,640	3,441.3	2,286,918
Guiana (Dutch) ...	27,532	856.0	568,898	26,977	838.9	557,532	25,239	785.0	521,690
Guiana (French) ...	79,547	2,474.0	1,944,260	80,077	2,490.5	1,655,888	68,353	2,126.0	1,412,857
Peru	31,572	982.0	652,593	41,636	1,295.0	860,616	41,636	e 1,295.0	860,616
Uruguay	2,411	75.0	49,845	1,961	61.0	40,540	1,961	61.0	40,540
Venezuela	46,169	1,436.0	954,365	49,191	1,530.0	1,016,838	49,191	1,530.0	1,016,838
EUROPE.									
Austria	2,299	71.5	47,520	1,854	57.7	38,312	1,854	e 57.7	38,312
Hungary	88,994	2,768.0	1,839,506	96,710	3,007.9	1,999,002	96,710	e 3,007.9	1,999,002
France	5,584	207.0	177,448	Nil.	Nil.	Nil.	Nil.	e Nil.	Nil.
Germany (d)	3,569	111.0	73,771	3,588	111.6	74,169	3,588	e 111.6	74,169
Italy	6,041	187.9	124,867	3,643	113.3	75,301	3,643	e 113.3	75,301
Norway	74	2.3	1,539	74	2.3	1,539	74	e 2.3	1,539
Portugal	219	6.8	11,098	7	0.2	150	7	e 0.2	150
Russia	1,196,634	37,217.0	24,734,418	1,159,214	36,056.3	23,963,016	1,117,054	34,744.0	23,090,862
Spain	1,979	60.0	39,873	387	12.4	8,000	387	e 12.4	8,000
Sweden	4,048	125.9	83,672	3,414	106.2	70,580	3,414	e 106.2	70,580
Turkey	375	11.6	7,751	375	e 11.6	7,751	375	e 11.6	7,751
United Kingdom ...	306	9.0	6,321	2,845	88.5	58,810	6,047	188.1	125,000
AFRICA.									
Transvaal	3,777,009	117,470.3	78,070,761	3,529,826	109,782.6	72,961,501	348,760	10,846.9	7,208,869
Abyssinia	20,126	626.0	416,000	20,126	e 626.0	416,000	20,126	626.0	416,000
Rhodesia	20,981	652.5	433,682	54,241	e 1,687.0	1,127,170	79,354	2,468.0	1,640,251
Soudan	2,701	c 84.0	55,830	2,701	e 84.0	55,830	2,701	e 84.0	55,830
West Coast	34,845	1,083.7	720,248	33,978	e 1,005.7	702,327	36,285	1,128.5	e 750,000
Madagascar	3,151	c 98.0	65,110	11,060	c 344.0	228,622	11,060	e 344.0	228,622
ASIA.									
Borneo (British) ...	8,038	250.0	166,150	11,168	347.3	230,850	16,933	526.7	e 350,000
China	321,296	9,992.8	6,641,190	273,246	8,501.4	5,650,000	208,631	6,470.1	4,300,000
East Indies (Dutch) ..	5,691	177.0	117,623	7,234	225.0	149,527	26,609	827.3	550,000
India (British)	375,704	11,684.9	7,765,807	405,683	12,618.2	8,385,467	448,100	13,936.6	9,262,226
Japan	37,334	1,161.2	771,734	53,994	1,679.4	1,116,129	62,893	1,956.0	e 1,300,000
Korea	55,432	1,724.0	1,145,769	70,954	2,206.9	1,466,690	77,407	2,407.5	e 1,600,000
Malay Peninsula ...	25,000	777.5	516,750	16,459	512.0	340,200	16,449	511.6	e 340,000
AUSTRALASIA (f).									
Unspecified (g)	3,013,763	93,732.3	62,204,481	3,810,130	118,500.0	78,755,372	3,554,286	110,540.8	73,467,110
	21,771	677.1	e 450,000	21,771	677.1	e 450,000	21,771	677.1	e 450,000
Totals	13,900,405	432,327.4	287,327,833	15,071,141	468,695.0	311,505,947	12,381,454	385,103.2	256,924,654

(a) Figures based on exports of ores, matte, etc., and coinage. (b) Computed from exports. (c) As reported by the *Statistique de l'Industrie Minérale*. (d) Production from domestic ores. (e) Estimated. (f) Includes six States and New Zealand. (g) Includes Servia, Persia, West Indies, Formosa, British New Guinea and Philippine Islands.

The largest gains were made by the United States, Canada, India, Rhodesia and Brazil, while in Australia and China there were important decreases.

In one respect the gold situation in 1900 was unprecedented. It has never before happened that the output of a great gold-producing country has been suddenly cut off entirely, or almost entirely. The Transvaal, which produced \$78,070,761 in gold, in 1898, was expected to yield over \$95,000,000 in 1899 and \$110,000,000 in 1900. The war broke out in October, 1899, and the total for that year was \$72,061,501; while in 1900

The Australian figures have been collected with great care from official sources. Their proper compilation and comparison are a matter of some difficulty, owing to the fact that in some of the Australian states the returns are made in ounces of bullion or crude gold, which vary considerably from the fine gold standard, in which all reports ought to be made, and to which our own figures are always reduced. The decrease in Australia's output last year—though the total was still much above that for 1898—was the result of a variety of causes. One of these was the falling off in some of the large mines

SILVER PRODUCTION OF THE WORLD.

COUNTRIES.	1899.			1900.		
	Troy Ounces.	Kilograms.	Commercial Value.	Troy Ounces.	Kilograms.	Commercial Value.
AMERICA, NORTH.						
United States	57,126,834	1,776,829.1	\$34,036,168	59,561,797	e 1,852,564.4	\$36,576,900
Canada	3,078,837	95,761.8	1,814,371	4,446,505	138,300.7	2,730,599
Mexico (a)	55,032,838	1,711,699.1	32,788,505	55,804,420	1,794,167.9	34,269,494
Central America	1,446,795	45,000.0	862,001	1,446,795	e 45,000.0	888,477
AMERICA, SOUTH.						
Argentina	383,561	11,930.0	228,526	383,561	e 11,930.0	235,545
Bolivia	10,432,685	324,490.4	6,215,784	10,432,685	e 324,490.4	6,436,712
Chile (b)	5,772,791	179,552.4	3,439,430	5,772,791	179,552.4	3,545,071
Colombia	3,521,563	109,531.0	2,098,147	2,800,000	87,089.0	1,719,480
Ecuador	81,000	251.9	4,826	81,000	e 251.9	49,742
Peru (a)	6,526,653	203,000.0	3,888,580	6,590,955	e 205,000.0	4,047,505
EUROPE.						
Austria	1,272,022	39,564.0	757,871	1,272,022	e 39,564.0	781,149
Hungary	675,750	21,018.0	402,612	675,750	e 21,018.0	414,978
France	466,189	14,500.0	273,755	466,189	e 14,500.0	286,287
Germany (c)	6,243,326	194,187.6	3,719,773	6,243,326	e 194,187.6	3,834,026
Greece	1,294,917	40,276.1	771,512	1,294,917	e 40,276.1	795,209
Italy	1,081,707	33,644.6	644,481	1,081,707	e 33,644.6	664,276
Norway	154,389	4,802.0	91,985	154,389	e 4,802.0	94,810
Russia	260,809	8,112.0	155,390	163,960	e 5,099.7	100,688
Servia	18,326	570.0	10,919	18,386	e 570.0	11,291
Spain	5,448,019	169,451.0	3,245,930	5,909,418	e 183,802.0	3,628,974
Sweden	73,626	2,290.0	43,968	73,626	e 2,290.0	45,214
Turkey	65,363	2,033.0	38,943	65,363	e 2,033.0	40,139
United Kingdom	191,927	5,969.5	106,770	191,927	e 5,969.5	106,770
ASIA.						
Dutch East Indies	1,286	40.0	766	1,447	e 45.0	887
Japan	1,810,375	56,308.5	1,078,622	1,810,375	e 56,308.5	1,111,751
Australasia	15,326,768	476,712.0	9,131,688	14,063,244	437,412.3	8,636,238
Other countries (d)	48,226	1,500.0	28,733	48,226	e 1,500.0	29,616
Totals	177,836,582	5,529,024.0	\$105,900,116	182,632,653	5,681,363.0	\$112,205,742

(a) Statistics compiled from exports and coinage. (b) Exports of silver in all forms. (c) Silver produced from domestic ores only. (d) The output is mostly from China and Persia. (e) Estimated.

NOTE.—Unless specified to the contrary, the statistics have been taken from the official sources or have been collected directly from the producers by *The Mineral Industry*.

the only production was from the few mines which were operated by the Government in the opening months of the year, and this work was stopped when the British armies reached Johannesburg. Instead of \$110,000,000, the Transvaal appears in our table for only \$7,208,869.

The United States which, in '99, ranked third among the great gold producers, in 1900 showed a substantial increase, which, with the elimination of the Transvaal, put it in the first place in 1900. Australasia dropped from first to second place, while Canada took the third rank, though at a long interval, and Russia the fourth place. These four countries produced together 79.2 per cent. of the total.

in Western Australia, where difficulties of a serious nature were encountered in treating the sulphide ores. Another was the period of increasing prosperity in Australia, which took a number of the men who had engaged in placer mining for a time back to the farm and the factory.

Our contemporary comments on the fact that the large increase in Canada places this country third in the list of gold producers, and states that four-fifths of the increased output was derived from the Yukon Territory. The reference to British Columbia is, however, erroneous, it being remarked that the exploitation of the Atlin country turned the decline of the placer mining into an

increase. As a matter of fact the returns from the Atlin district in 1900 were relatively disappointing when compared with the gold output of 1899, and last year the placer gold yield of British Columbia showed a falling off in consequence of 5 per cent. The increase in gold production of 12½ per cent. from this Province last year was due to the greater development of the lode gold mining industry.

The Ontario mines yielded last year somewhat less than in 1899. In Nova Scotia the production was somewhat more than in 1899.

In the South American countries but little change is to be noted, except in Colombia, where the long-continued revolutionary struggles interfered with mining.

The only European producer of importance is Russia, and the returns from that country include the Siberian

The silver production of the world increased from 177,836,582 Troy ounces in 1899 to 182,632,653 ounces in 1900, a gain of 4,796,071 ounces. The United States continued to hold the first place as a producer, with Mexico second, and Australia and Bolivia following in the order mentioned. The German official returns show a large output of silver, but a large part of the output of the refineries in that country is recovered from imported ores and bullion, and consequently should be credited to other countries, as has been done in the table.

The continued large production of silver and its causes have heretofore been referred to in our columns. There is every reason to believe that the world's mines will keep on turning out the white metal, and that no large decrease need be expected, unless a very considerable fall in price should occur; and there is no reason to expect such a change under present conditions.



VIEW OF KOOTENAY FLATS FROM ALICE MINE, GOAT RIVER MINING DIVISION.

mines. The Russian official returns, after making the usual allowance for gold not reported to the mint officials, show a total production of \$23,090,862, a decrease of \$872,155 from 1899. This was almost entirely due to the disturbances in Eastern Siberia and Manchuria, which interfered seriously with the working of the rich placers on the tributaries of the upper Amoor. The restoration of order on the frontier will doubtless be followed by a large increase, especially as operations will be extended into the rich river valleys on the Manchurian side of the Amoor. There is no doubt that Manchuria will remain permanently under Russian control.

In Asia an increase is shown in the Kolar Field in India. China shows a decrease, naturally, while Japan and Korea increased. In the Dutch East Indies a considerable gain has been noted, from operations at various points.

A PROMISING FIELD, THE GOAT RIVER MINING DIVISION.

THE Goat River Mining Division takes in the southern basin of Kootenay lake. It derives its name from a stream heading in the divide between Kootenay lake and East Kootenay and falling into the Kootenay river. Most of the mining properties which justify the existence of a special mining division are located on Goat mountain which also takes its name from the stream.

The Goat mountain camp lies about a mile or more north of the town of Creston, on the Crow's Nest railway. The whole district is within the argentiferous lead zone of Southern British Columbia which contains the East Kootenay, Ainsworth, Slocan and Lardeau silver-lead mines. But like the other districts it is

marked by local characteristics and peculiarities of occurrence. The first discoveries of mineral in this district date from 1891, when an Indian named Wild Louis brought down a fine specimen of galena ore and displayed it at Rykert's, the custom house on the boundary line between British Columbia and Idaho. At that time many of the prospectors pouring into West Kootenay from the United States, passed through Rykert's and some local excitement was caused by the tale of the rich galena strike. What is now known as the Alice and its extensions, the property on which most development work has been done so far, was staked by two prospectors in partnership with a steamboat captain who plied on Kootenay lake. A tunnel was run intersecting the vein at 100 feet of depth, and drifting for about 80 feet or more. The extraordinary excitement which followed upon the discovery of the very rich ores

built partly at the expense of the government, and partly at that of the York and Lancaster Syndicate, which is to be improved this year so as to make both a good winter and summer road. The property will not become productive on any very large scale until an aerial tramway and a concentrating plant have been installed in connection with it. Under the stimulus of railway construction, two railways running through the district — one the main line of the Crow's Nest Pass railway and the other the Nelson & Bedlington branch connecting with the Great Northern—the district of Goat River is coming to the front again. During last year there were 303 certificates of work recorded, 261 claims located, 137 bills of sale and bonds recorded, and 11 certificates of improvement issued, which marks a distinct advance over recent years. The London & British Columbia Goldfields, Ltd., has several properties under



ORE DUMP ALICE MINE, CRESTON, NO. 1 TUNNEL, GOAT RIVER MINING DIVISION.

of the Slocan reacted against the development of Goat river at this particular time, and afterwards came the slump in silver and general withdrawal of capital from the development of silver-lead mines. The original locators finally sold out to Mr. George Alexander, of Kaslo, for a comparatively small sum, and he again transferred the property to the York and Lancaster Syndicate, Ltd., of Manchester, England, whose manager in British Columbia is Mr. T. G. Proctor, of Nelson. Since last December the ledge has been cut by a tunnel 540 feet long on the 150-foot level. On that level it has been opened up by drifts and an upraise connects the lower with the upper workings. The ore is galena occurring in bunches in a quartz vein. It carries a high percentage of lead, the clean ore averaging 80 per cent. with from 25 to 40 ounces of silver. The vein is easily worked and the ore is suitable for concentration and a valuable smelting ore.

The camp is connected with Creston by a wagon road

development in the neighbourhood of the town of Kitchener and on Boundary creek. The British Columbia (Rossland and Slocan) Syndicate owns a group of claims. There is also a remarkable deposit of iron ore near Creston which is under option to officials connected with the Canadian Pacific Railway company, and on which some preliminary prospecting is being done. There are many other promising prospects in the district.

About half a mile from the Alice, W. P. Sloan and G. A. M. Young have a group of promising claims. On the Iris a tunnel 100 feet long has been driven, and farther up the hillside another tunnel has been commenced to crosscut the 10-foot vein exposed at this point. The ore assays from 100 to 160 ozs. silver, 70 per cent. lead and a small amount of gold, per ton. There is also a 35-foot shaft on this vein. On the Edith, belonging to the same group, there is a 25-foot shaft from which a considerable quantity of high-grade ore has been taken.

The owners of the Black Knight Group, on Goat mountain are driving a tunnel on their property this season; they are reported to be taking out some excellent copper-gold ore.

On the St. Patrick Group of claims, owned by Messrs. Couch and Sloan, and situated at the base of Goat mountain, there is a vein 20 feet wide. Sufficient work has not yet been done to arrive at any conclusions as to the values in this vein, although it is highly mineralized and exceptionally good assays have been obtained. A



NO. 1 TUNNEL, ALICE MINE, CUTTING LEDGE AT 100-FT. LEVEL.

trial shipment of half a ton was sent recently to the Trail smelter and the returns were 9 per cent. copper, 10 ozs. silver and \$5 in gold per ton. Prospecting with the diamond drill will be the form of development pursued in the spring, as it is believed large bodies of ore exist.

The Blenheim Group, comprising the Blenheim, Black Prince and Queen Anne, owned by G. Alexander, of Kaslo, and situate about four miles southeast of Duck creek, is a very promising property. On the Blenheim a shaft has been sunk 43 feet, and encouraging values in copper and gold have been obtained.



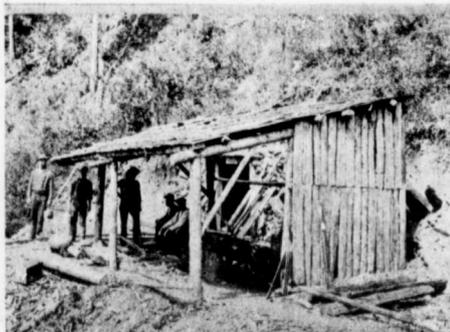
CABIN, ALICE MINE.

On Goat creek, which empties into Kootenay lake, about 15 miles from its head, a large number of claims are situated and active work is being carried on on several of them, although no shipments have been made so far. Prominent among the claims on this creek are the Marratt, La Salle and William Tell, all of which were recently acquired by the Imperial Mines Company, Ltd., having its head offices at Kaslo, B.C. Operations were begun in August and have been carried on vigorously.

A crosscut tunnel, 130 feet, has been driven and the vein tapped at 100 feet depth, the showing encountered being very encouraging, while plenty of ore is being taken out to pay the expenses of development.

Adjoining the Maratt Group is the property of the Valparaiso Gold Mines, consisting of the following claims: Valparaiso, Government, Sunset, O.K., Starter, Franklin and Jackson.

The Valparaiso Gold Mines, Limited, was incorporated in May, 1900, for the purpose of acquiring and de-



NO. 2 TUNNEL, ALICE MINE, CUTTING LEDGE AT 250-FT. LEVEL.

veloping the above claims. Since commencing work large and comfortable quarters have been erected for the men, and a crosscut tunnel 230 feet long has been driven, tapping the vein at a depth of 125 feet. Drifts have been extended both north and south on the vein, and it is the intention of the management to commence another crosscut tunnel lower down the hill, to be used as a main working tunnel. The vein, which lies in a granite formation, is from 5 to 25 feet wide, the ore carrying values in gold of from \$5 up, per ton. At present 12 men are employed doing development work.

Altogether it would seem as if the Goat River district possessed prospects sufficiently encouraging to make a successful bid for development capital, and within a comparatively short time to enhance the productive mineral resources of British Columbia.

MINING PROSPECTS IN THE WINDERMERE DISTRICT.

By CHARLES F. NICHOLSON.

(Certificated Provincial Assayer Peterborough, B.C.)

THE granting of a charter for a railway from some point on the Crow's Nest Pass line of the C.P.R. northward through the valleys of the Kootenay and Columbia rivers, has proven a great stimulus to those interested in the mineral deposits of Windermere district.

Transportation with the Windermere district has been the serious obstacle to its development. It is the same process of gradual evolution that must be worked out here as it was worked out in the history of the older camps of the Province. Nowhere in the Province, with the exception perhaps of the Boundary country in Kettle River district, are the conditions so favourable for economical mining as in the Windermere district.

First, the mineral deposits, so far as located, are on Toby and Horse Thief creeks and tributaries. Along these streams railways may be constructed without dif-

faculty. Indeed it is altogether likely that capital will take advantage of the abundant and never failing water-power in these streams and construct electric trams to reach the mines. With tramways up these streams, there are no properties which could not deposit their products into ore bins along the line by means of aerial trams.

Second, Windermere lake and the Columbia river, which flows out of the northern end of the lake, lie in a rich and fertile valley capable of producing all the supplies for the sustenance of the mines. Thus nature has furnished the conditions for economical mining of the ores and supplying the camp at minimum cost.

The mineral deposits of this district are on the western side of the Columbia, and vary in distance from the river from 17 to 30 miles. The formation is lime and slate upheaval until it stands nearly vertical. The strike is about ten degrees west of north. It has been stated that the ore deposits are contact and not permanent, but on investigation reveals intrusive diorite which has fissured the surrounding rock which, yielding at the line of least resistance, has given apparently contact ledges, but which, I believe, on development will prove to be fissures. On the divide between Boulder and Law creeks, which are tributaries to Horse Thief creek, is an ore deposit of this character, apparently a contact, yet the ore can be traced from one creek bed to the other, and the summit is fully two thousand feet above the creeks. A surface showing of from eighteen inches to two feet is an ordinary showing. The values in galena ore vary from 50 ounces to 500 ounces in silver and from 50 to 80 per cent. lead. There has also been considerable copper ore discovered. One sample of chalcopryrite from a ledge of one foot clean ore, carried 32 per cent. copper and 30 ozs. silver. On many of the ledges there are shoots of grey copper which carry high values in silver and some gold. There is gold in nearly all the properties but in many cases it occurs only in traces in low values. Some high values have been found, but the ledge does not appear to be evenly charged with the metal.

At the present time 1000 tons of sand carbonates are being taken from the Peterborough landing of the Columbia river to the Trail smelter. This ore is from the Paradise mine on Spring creek, and 17 miles from Peterborough. When the snow left the ground in the spring of 1900 the Paradise was a claim of unbroken ground. A camp was formed in June and in the following February 1000 tons of ore was sacked, and a good share of it had been hauled to the river for shipment. The ore was rawhided the first five miles from the mine to the wagon road. This road extends from Peterborough to Spring creek, following the course of Toby creek for most of the distance. The contract for hauling the ore from the mine to the steamboat landing, and thence by boat to Golden was \$7.50 per ton. A remarkable feature in the development of the Paradise mine, is that the 1000 tons of ore was taken out and not a stick of powder used. The pay dirt is granular and was taken out with pick and shovel and sacked as it came from the face of the drift. The values are sufficient to leave a handsome margin after cost of mining, freighting and smelter treatment, is deducted. The ore is a carbonate of lead. It is mixed with a granular sand, hence the term sand carbonates. The values are silver and lead.

This summer the wagon road is being extended some five miles up Toby creek to another tributary. On North Fork creek is the Delphine mine which made a profitable shipment in 1900. The ore was taken out by pack train, but the cost was so great that work on

the property was discontinued until better transportation facilities were furnished. There is a considerable quantity of ore blocked out in this mine and it is understood work will be resumed as soon as the wagon road is completed. The Paradise and Delphine are owned by Messrs. Hammond and Bruce.

The Richmond Mining Company of New York, has a bond on the Monarch group of claims on North Fork. They have only begun operations and are well satisfied with the work accomplished. The superintendent in charge is confident that the property will develop into a mine.

Last week a camp was formed and work commenced on a road from Peterborough to Horse Thief creek, thence along that stream to the Macdonald mines, some thirty miles from town. The Macdonald mines were formerly known as the Red Line. This property was once bonded and the bond thrown up because the owners did not grant an extension of time. In the spring of 1900 it was rebonded for \$50,000 and the money was paid some two months before the bond fell due. The development work shows a large ore body, and the road is being built to enable the property to join the best of shippers. Ore is now being blocked out and the intention is to get it down to the river this coming winter.

There is a feeling of confidence in the camp. The old-timers who have held down claims for the past 17 years begin to see the dawn of better days they have long had visions of, and are doing good hard development work which promises to show extensive ore bodies. The time is most favourable for capital to come in. The ore is here and the values are good. With capital behind the development work there would, in another season, be a tonnage in the district that would bring railway transportation.

THE POSITION OF THE LE ROI.

THE secretary of the Le Roi Mining Company, Mr. F. A. Labouchere, has addressed an important communication to the *Financial News* with regard to the position of the Le Roi, in response to that journal's request for information on the following points: (a) What amount of ore is, approximately, in sight, and what is its value? (b) What is about the amount of the company's indebtedness to the Bank of Montreal? (c) What amount of matte and ore is there on the dump as an offset against the overdraft?

Mr. Labouchere, in reply says:—

"The financial position on June 1st was as follows:

ASSETS.	
Matte in transit to refinery	\$400,000
Matte in course of treatment	150,000
Ore in smelter yard	431,200
Ore purchased	60,000
Supplies, coke, etc.	25,000
Expenditure on capital account.	37,000
New construction smelting works	12,500
	\$1,115,700
LIABILITIES.	
Debt to Bank of Montreal	\$380,000
Advance from bank on second-class ore dump	150,000
Monthly expenses	219,900
	\$749,900
Balance assets over liabilities	365,800
	\$1,115,700

"It is estimated that the ore on the second-class dump, against which the above advance of \$150,000 has been made, will, when shipped, realize a net profit of over \$400,000.

"With reference to the ore reserves in the mine, our manager (Mr. Macdonald) stated in October last that the amount of ore in sight at that time was, approximately, 1,050,000 tons, valued at £3,000,000. Arrangements are now being made to gauge the amount in the mine on the 30th inst., the end of the company's financial year, when it is anticipated that the ore reserves will be found to have increased in ratio to the extensive development work which has taken place. The situation at the Northport smelter has, as far as we are aware, in no way changed since our cable inserted in your issue of the 19th, which was to the effect that one furnace had been re-started with non-union labour, and that the others would be re-started as opportunity occurred."

To an interviewer from the journal already quoted, Mr. Labouchere gave some further important information as to the position of the mine. He was asked:—

"When you say that there is in sight £3,000,000 of ore, are you taking into consideration what has been opened up since October?"

"No," replied Mr. Labouchere. "We were then only down to the 900-foot level, nor had any driving been done at this depth; but we are now down to the 1100-foot level, and over £4,000,000 is now in sight. Our capital, as you know, is £1,000,000 in £5 shares, which now stand at about 3 premium; so that the total market valuation of the mine is £1,600,000. As I have told you, the ore in sight amounts to £4,000,000, and the cost of working is well inside 60 per cent.; so that the remaining 40 per cent. is clear profit. This 40 per cent. on £4,000,000 amounts to £1,600,000; so that the market value of the mine is represented by the ore in sight alone, without taking into consideration the machinery (worth about £500,000) and the whole of the remaining possibilities of the mine."

"There has been a good deal made of your indebtedness to the Bank of Montreal. How much do you really owe them?"

"Only £108,000; but this is more than covered by ore and matte in transit. For instance, we have £80,000 worth in matte on its way to the refinery, matte in treatment £30,000, ore in smelter yard £86,000, and high-grade ore purchased for fluxing purposes represents another £12,000; so you see that the debt of £108,000 is covered by nearly double its amount in immediately available assets."

"Besides this, have you any other moneys?"

"No; except a few thousands in cash on this side; but we do not want it, as we can always get an advance up to 50 per cent. on matte and ore at the smelter."

"Now, with regard to the strike. Is it likely to extend from the smelter to the mine?"

"No; it is not likely; and with regard to the smelter, I may tell you that its present capacity is 1,200 tons per day; but before the end of next month it will be 1,500 tons per day, and this will considerably reduce the cost of treatment; indeed we shall be able to treat \$7.00 ore."

"About £2 12s.; but then, as I have told you, we have been lately treating only low-grade stuff."

With regard to the amount of ore in sight, Mr. Labouchere has since written to the *Financial News* to explain that "I expressed it as my opinion that, in view of the developments that had taken place since October

last, there should be at least £4,000,000 worth of ore; but a definite statement on the subject can only come from Mr. Bernard Macdonald (the mine manager), and such statement will be embodied in his report for the year ending 30th of this month."

COMPANY MEETINGS AND REPORTS.

NORTH STAR MINING CO.

THE following is the text of the Directors' Report submitted at the second annual meeting of the North Star Mining Company, held at Montreal on the 26th instant, and covering the year ending 31st May last.

"The directors are glad to be able to submit such a favourable statement of the company's operation during the past year. The property is in excellent running order, and the report of the company's manager makes it evident that the development work establishes the existence of large additional ore deposits, the contents of which are from their nature difficult to estimate. From the report of the manager your directors feel confident that as there are large areas yet to explore, additional ore bodies will be discovered.

"Although conditions in the mine are, as stated above, most satisfactory, yet your directors deplore the extremely unsatisfactory conditions existing at the present time for the reduction and marketing of the company's ores. These have greatly been aggravated by the low price of lead, but they are primarily due to the excessive charges for smelting, and the high rates of transportation, as a result of which 50 per cent. of the value of the ore is taken for freight and treatment. Owing to these conditions, and in view of the strong financial position of the company, it has been thought wise to curtail shipments, as the directors believe that better markets can ultimately be obtained.

"In conclusion, your directors beg to ask your careful attention to the report of your manager, Mr. Frank Robbins, and to the financial statements of the company, both annexed hereto."

MANAGER'S REPORT.

During the year 2,141 feet of prospecting and development work have been driven. By means of this work we have discovered the extension of the original ore channel to the south. This is so recent a discovery that, at this time, it is impossible to estimate its extent or its importance. It is not my desire to raise your expectations, with reference to this, too high; but in justice to the shareholders, to whom I understand this report will be submitted, I cannot let its discovery go unannounced. As I continually have expressed in my weekly reports, I have always felt sanguine that the continuation of the ore deposits was to be found, and I regard this as a confirmation of my belief.

The only other development resulting from the prospecting (I may say that the major part of which has been in connection with this and the preceding) has been in pit No. 16—500 feet (cir.) south-southeast (S.S.E.) of the main, or 60-foot tunnel. Here we almost immediately encountered a new and separate channel or deposit of low-grade mineral which we have been exploiting in anticipation of finding in connection therewith a body of shipping ore. So far this has not been accomplished, but the conditions are most promising. This, as I have said, being a new channel, the finding of shipping ore therein would be of the highest importance. It may be well to state that practically all the

work done here is in mineralized rock. In places there are small quantities of really first-class shipping product, while in others there is a larger quantity of low-grade ore easily susceptible of concentration into a good shipping product.

The average value of the ore, from the mine run of the past year, has been 22 ozs. silver, and 52 per cent. lead.

Before concluding this subject let me say that I have every confidence in the future of the mine; I firmly believe that not only will the present ore channels be found to yield a large quantity of ore in their extensions, but that the development work will disclose others quite as important and valuable.

The only surface improvement which was found necessary during the year was the erection of an ore bin at the upper terminal of the tramway. This has lessened the cost of loading the ore.

The tramway has been a perfect success and has required few, if any, repairs, beyond the ordinary care of keeping it in order. The most expensive part, the standing cable, shows practically no signs of wear, and the running cable has many months of life in it before it requires renewal.

The machinery and buildings are all in first-class condition, and the mine is in good working shape.

FINANCIAL STATEMENT.

For twelve months ending 31st May, 1901.

ASSETS.		
Mines, Mineral Claims and Assets		\$1,129,400 20
Permanent equipment	63,636 91	
Office furniture	870 47	
Mine supplies and stores on hand, as per inventory	10,790 62	
Accounts receivable	7,449 17	
Ore in transit	\$ 13,206 25	
Cash on hand and in banks	262,407 37	
Cash deposited with Canadian Pacific Ry.	9,345 04	
		284,958 66
		\$1,497,106 03
LIABILITIES.		
Capital stock	\$1,500,000 00	
Less in treasury	200,000 00	
		\$2,300,000 00
Accounts payable	1,309 52	
Dividend No. 5 Payable 15th June.	39,000 00	
Profit and loss	156,796 51	
		\$1,497,160 03
WORKING ACCOUNT.		
To Cost of mining, developing and prospecting	\$ 75,431 83	
" Freight and treatment	354,324 27	
" Ore tax	6,950 33	
" Tools and appliances	221 32	
" General expenses	726 05	
" Montreal office expenses	1,308 75	
" Directors' fees	4,000 00	
		\$442,962 55
" Balance transferred to profit and loss	282,550 19	
		\$725,512 74
By Proceeds of ore sales	\$ 719,195 51	
" Miscellaneous receipts	6,317 23	
		\$725,512 24
PROFIT AND LOSS.		
To Dividends 2 to 5 inclusive	\$156,000 00	
" Balance	156,796 51	
		\$312,796 51
By Balance at credit of profit and loss	\$ 30,246 32	
" Balance from working account	282,550 19	
		\$312,796 51

MINING IN BRITISH COLUMBIA.

(By E. Jacobs.)

It is not practicable to adequately deal with mining in British Columbia, within the limits of one short article so the following review must necessarily fail, in some respects, to do full justice to so important an industry, presenting as it does many aspects and extending over a long period in its development. There is much included in the earlier records of the industry that is very interesting, but since the present intention is to give prominence to its later commercial and industrial phases most attention will be given to the progress of the last ten years.

The following brief account of earlier mining in the Province is summarized from articles which appeared in the British Columbia Mining Record five years ago, together with extracts from reports of the late Dr. G. M. Dawson, for years director of the Canadian Geological Survey. The celebrated David Douglas, the botanist, in the early twenties discovered the Blue Bell mine (silver-lead) on Kootenay lake. Coal was discovered at Fort Rupert in 1835, and some development was done by the Hudson's Bay Company, but these workings were abandoned in 1851 for those at Nanaimo, also on Vancouver Island, where coal mining has ever since been carried on. The early discoveries of gold in small quantities range between the years 1850 and 1857. In 1850 specimens came from Vancouver Island and Queen Charlotte Islands. An incipient mining boom took place on the latter in 1851-2. Dr. Dawson says that from one little seam or pocket of gold at Gold Harbour, Moresby Island, between \$20,000 and \$75,000 were reported to have been taken. It is stated by others that more was lost in the harbour in the operation of mining than was recovered. However, much or little, the find ended there. About the same time Indians from the Skeena river brought pieces of gold to the Hudson's Bay Company's fort, but several expeditions to find its source met with failure. In the interior gold was found in the Natchez Pass and the Similkameen as early as 1852, and in '54 Colville Indians were known to have had nuggets in their possession. Bancroft, in his *History of British Columbia*, states that Chief Trader McLean procured gold dust from Indians near Kamloops in 1852. Various authorities place the first finds at various places. However, between 1855 and 1857 discoveries were made on the Thompson, Fraser and Columbia rivers, and the news of these together with the dispatches of Governor Douglas, soon attracted attention to British Columbia as a possible gold field.

It is an old story now how people hurried from San Francisco to Victoria by thousands and set up their tents; of how they rushed up the Fraser river, many crossing the Gulf of Georgia in open boats; how they crossed the Isthmus of Panama or rounded Cape Horn, or plodded wearily overland from Eastern Canada. Victoria became a city in a day and the Mainland solitude was converted into a Crown colony in a year. Up to 1858 nothing but preliminary work had been done, consequently little was known of the mineral resources of the Province. In that year, however, gold mining really began, and from that period dates the history of mining in British Columbia. The increase in the production of gold was rapid and from \$705,000, which is a rough estimate of the output in 1859, it rose in 1863 to \$3,913,553. In 1861, after laborious journeyings of daring prospectors, Williams and Lightning creeks, two of the most noted gold producers of British Columbia were discovered, and in this and the following year most of the other rich creeks in Cariboo became known.

Then began that second rush which is the most notable event in the history of British Columbia, and one that has had the most lasting effects in determining its future. The finds were very rich and the lucky prospectors, who became owners of claims, amassed large sums of money in a very short time. Dr. Dawson wrote of these creeks: Williams creek has yielded more gold than any other stream in British Columbia. As examples of its yield in early years, Steele's claim gave a maximum yield of 409 ounces or \$6,524 a day. Over \$100,000 in all was taken from this claim of 80 x 25 ft. In 1862 Cunningham's claim produced gold to the value of nearly \$2,000 a day for the season, while on several days as much as 52 lbs. weight of gold was taken out. The Adams' claim yielded to each of its three partners \$40,000 clear. These claims were above "the canyon" in shallow ground. The deep ground below "the canyon" was first bottomed towards the end of 1861 by the Barker Company (whence the name of the town, Barkerville). The Diller company was the next successful in this and it is creditably stated that here, on one occasion, 200 lbs. of gold, worth \$38,400, were obtained in one day. In 1863 three claims below "the canyon" yielded \$300,000, and twenty claims were steadily producing from 70 to 400 ounces a day. Four hundred miners were at work on Williams creek in this year—"the Golden Year." The aggregate of Williams creek for the first seven years of working, for which no returns are available, was very large. In 1861, \$200,000 worth of gold was taken from Campbell's discovery claim and the adjacent Whitehall claim, both on Lightning creek. Attempts were made almost from the first to reach the deep channel of this creek, but after much work were abandoned in 1864. Sinking was, however, resumed in 1870, and having proved successful, led to the subsequent great developments. The rich character of some of the ground on this creek may be illustrated by stating that at one time the Butcher claim yielded 350 ounces a day, the Aurora 300 to 600 ounces, and the Caledonia 300 ounces.

Space limitations prevent the hardy prospectors being followed northwards into the Omineca country in 1869; into the rich Cassiar district, which in 1872 and later yielded gold to the value of \$5,000,000 or \$6,000,000, or into the Yukon, where gold was found in paying quantities in 1880. It may be noted though, that the total yield of placer gold which, in 1862, reached its maximum amount of \$3,913,563, after fluctuating during several years, fell in 1869 to \$1,774,987, and though 1875 saw a temporary substantial recovery, to \$2,474,000 the decline continued steadily until in 1882 the total was below the \$1,000,000 mark, and thereafter the total reduction fell until the minimum was reached in 1893, the total for that year having been only \$356,131. Since then there has been a gradual increase, so that the showing for 1899 of \$1,344,900 was the best year since 1877.

It will be observed that the foregoing summary deals almost exclusively with placer gold mining. From the published annual reports of the Provincial Department of Mines it is learned that the total value of coal mined in British Columbia up to 1860, was \$149,548 and that in that year the production was \$56,988. In 1884 the total was \$1,182,210 and, although there have been fluctuations since, the movement has on the whole been upward, the maximum having been attained in 1900, with a total value of \$4,318,785. Coke has been added to the mineral products of the Province during the last five or six years, commencing with \$7,825 for 1895-6 and increasing to \$425,745 for 1900.

The Geological Survey statistics show that lode min-

ing of metallic minerals in the Province commenced in 1887, in which year silver and lead were reduced to a combined value of \$26,547, and in 1888 of \$104,813. For some unexplained reason the only lode product for 1891 was silver, \$4,000. In 1893 lode gold appeared in the records for the first time, with a value of \$23,404, and the following year copper made its first appearance adding \$18,234. In 1894 the total value of silver, lead and copper produced was \$650,328, whilst in 1900 it was \$6,616,376, this being a tenfold increase. It is interesting to here note that gold, which in 1894 was only \$530,531 (placer \$405,516; lode \$125,015) increased in 1900 to \$4,732,105 (placer, \$1,278,724; lode, \$3,453,381), and copper from \$16,234 in 1894 to \$1,615,289 in 1890. The following tables are taken from the annual report of the Minister of Mines for 1900:

TABLE I.

Total production for all years up to and including 1900.

Gold, placer	\$62,584,443
Gold, lode	12,812,860
Silver	13,649,809
Lead	7,619,956
Copper	4,362,583
Coal and coke	49,140,917
Other minerals	1,984,640
	\$152,155,208

TABLE II.

Production for each year from 1891 to 1900 (inclusive).

1891	\$3,521,102
1892	2,978,530
1893	3,588,413
1894	4,225,717
1895	5,643,042
1896	7,507,956
1897	10,455,268
1898	10,906,861
1899	12,393,131
1900	16,344,751

Another table is added below for the purpose of showing the very important position the part of the Dominion lying west of the Rocky mountains occupies, in regard to Canada's total production in 1900, as compared with that situate east of the Rockies. It will be seen that the total value of metallic minerals, coal and coke, produced in British Columbia and the Yukon is \$38,369,751 as against \$15,140,801 for the remainder of the Dominion.

	British Columbia.	All Other Provinces.	Dominion Total.
Yukon Dist.			
Gold			\$22,275,000
Gold	\$4,732,105	\$ 709,647	5,441,752
Silver	2,309,200	421,398	2,730,598
Copper	1,615,289	1,447,830	3,063,119
Lead	2,691,887	68,634	2,760,521
Iron	1,740	583,158	584,898
Nickel		3,327,707	3,327,707
Zinc		9,342	9,342
Coal	4,318,785	8,349,690	12,668,475
Coke	425,745	223,395	649,140
Totals..	\$16,094,751	\$15,140,801	\$53,510,552

As the output of coal in British Columbia is rapidly increasing and attention is now being directed to its

iron deposits, it appears as though it will not be long before the mineral production of the Province will be greater, not only in the total as at present, but as well in all the individual minerals (excepting perhaps, nickel and zinc) than that of the remainder of the Dominion east of the Rocky mountains.

NOTE. — It will be observed that there is a difference of \$250,000 between the total mineral production of British Columbia as shown above and that given in the table immediately preceding. This amount is the value of "other materials" included in the latter total for 1900.

From the exhaustive and annual report issued by the Provincial Department of Mines, already referred to, it is gathered that placer gold is produced chiefly in Cariboo, Cassiar (including Atlin), East Kootenay, Lillooet and Yale districts; lode gold in West Kootenay, Lillooet, Yale (Camp McKinney), and the Coast districts; silver in East Kootenay, West Kootenay, (Ainsworth, Nelson, Slocan and Rossland), and the Coast; lead in East Kootenay and West Kootenay, (Nelson and Slocan), and coal at East Kootenay, (Crow's Nest Pass) and Vancouver Island. One of the features of the year 1900 was the material increase in the production of copper and gold from the mines at Rossland. The current year bids fair to see a still larger increase there, whilst the Boundary district will also add considerably to the output of these metals, and Mount Sicker and Alberni Canal mines, on Vancouver Island, give promise of also contributing an appreciable quantity. East Kootenay is showing a very heavy increase in lead (it is estimated that one mine alone produced 18,000,000 lbs. during 1900) and to some extent in silver, whilst the Slocan is regaining the ground it lost — as a result of labour troubles — during 1898-9, as a producer of silver and lead. New coal fields are to be opened up shortly in the Crow's Nest Pass, Nicola Valley, and near Fairview in the lower Okanagan. An endeavour will be made to work the iron deposits near Kamloops, those on Texada Island and others on the West Coast of Vancouver Island. The production of placer and hydraulic gold in the Cariboo is increasing considerably, whilst Atlin, Bennett, and Chilcat districts are full of promise of a greatly enlarged yield. Gold from milling quartz will have additions from the Nelson district and, to a smaller extent, from Camp McKinney.

There are numerous extensively developed and equipped mines in the Province, a few of them being the Consolidated Cariboo Hydraulic Company's mine at Quesnelle Forks, Cariboo, where a total expenditure for ditches, flumes, dams, piping, etc., of \$549,292 has been incurred, with the result that gold valued at \$881,146 has been obtained; Le Roi, Centre Star and War Eagle, at Rossland; Athabasca, Silver King, Yellowstone and Ymir, near Nelson, B.C.; Mother Lode and Old Ironsides group, near Greenwood; Cariboo, at Camp McKinney; Van Anda, on Texada Island; the Crow's Nest Pass coal mines, near Fernie, and the big coal mines of Vancouver Island.

Steam power is used at most of the mines, but some are using water-power or electricity. Besides the three great rivers of the Province—the Fraser, Columbia and Kootenay—there are many streams, generally mountain torrents, each giving a tremendous head and furnishing ample motive power for individual properties. In the Slocan especially these are utilized for concentrators and other machinery. Electric power has not hitherto given such generally good results in Rossland mines as could have been desired, but it may be that the appliances in use there were not altogether suitable. Not-

withstanding this the power plant at Bonnington Falls, Kootenay river, has lately been increased to a total capacity of about 4,000 horse-power, with a further large extension now being made. The Kettle River Power Company intends to develop the 6,000 horse-power derivable from the Kettle river at Cascade, Boundary district, and plant to develop the first unit of 2,000 horse-power is to be installed shortly, about 100,000 having already been spent in preliminary work. The Granby Consolidated Mining & Smelting Company has a power plant on the North Fork of Kettle river, giving 835 horse-power and an increase by 300 horse-power is being made.

The mines near the Coast generally have the advantage of water transportation, and many in the Kootenay and Boundary country are tapped by railways. Other districts are seriously handicapped by the absence of facilities for cheap transportation, but since each succeeding year sees the construction of new roads and railway lines, this obstacle to more rapid progress is being in part removed.

More reduction works are being established as the demand for them increases. Smelters have been erected at Pilot Bay, Nelson and Trail, in the Kootenay; at Grand Forks, Greenwood and Boundary Falls, in the Boundary, and at Van Anda, Texada Island. The smelter at Northport, Washington, is within 20 miles of Rossland, and other smelters in the United States also treat ores from British Columbia. The biggest stamp mill in the Province is at the Ymir mine, where a battery of 80 stamps is in operation. There are other stamp mills, concentrators, etc., but it is evident that an enormous quantity of plant and machinery will be required to meet the rapidly growing requirements of ore production and treatment.

Much outside capital has already been employed in connection with the mining industry of the Province, but much more is needed for the more extensive development of its enormous mineral resources. Eastern Canadian money has been put into mining and smelting enterprises at Rossland, in the Boundary and elsewhere. United States capital has done much towards developing mines at Rossland and in the Slocan, and the British Columbia Copper Company, Ltd., of New York, has spent more than \$650,000 on its Mother Lode mine and smelter, near Greenwood, with returns now coming in. A comparatively large amount of British capital has also found its way into British Columbia mining enterprises, but all these combined will very probably fall far short of the aggregate that two or three years hence will be similarly employed in the Province, so big will be the future of this important industry.

The following are some of the British Columbia mines whose total dividends to date have each exceeded \$100,000. More have paid totals ranging from \$10,000 to \$50,000, but the list given, though incomplete, will serve to show that an appreciable large amount has been returned by the mines over and above the still larger total of earnings that has been expended in development and equipment. Nearly all of these figures are taken from the New York *Engineering and Mining Journal* or the British Columbia *MINING RECORD*:

Mine.	Locality.	Total Dividends.
Payne	Slocan	\$1,438,000
Le Roi	Rossland	1,305,000
War Eagle	Rossland	545,250
Cariboo	Camp McKinney	487,087
Slocan Star	Slocan	425,000
Idaho	Slocan	292,000
Reco	Slocan	287,500

Mine.	Locality.	Dividends.
Hall	Nelson	\$220,000
Whitewater	Slocan	209,500
North Star	East Kootenay...	195,000
Centre Star	Rossland	175,000
Ruth	Slocan	165,000
Le Roi, No. 2	Rossland	144,000
Ymir	Nelson	144,000
Rambler-Cariboo	Slocan	105,000
St. Eugene	East Kootenay ...	105,000

A few words in conclusion as to the attitude of the Provincial Government towards the mining industry. At last year's session of the local legislature authority was given to appoint a commission to enquire into the working of the mining laws of the Province, but nothing definite has yet been done in this matter. There is a feeling among mining men that there is a disposition to unduly burden the mining industry for revenue purposes, but there is not, on the whole, much ground for reasonable complaint. The opinion is general that it will be well for the legislature to avoid tinkering with the mining laws, for the less frequently they are altered the greater the security felt by those investing capital in the industry. Apart from the two per cent. tax levied on the output of the mines (less freight and treatment charges), which mine owners are endeavouring to have remitted, it is agreed that further legislation is not called for. The Provincial Department of Mines is doing excellent work. It endeavours to give information relating to mining districts and, as far as it can do so, about individual mines, especially to prospectors, but it very properly refuses to express any opinion at all as to the values of mining stocks. It has its own assay office, where assays are made for the public at the usual rates; laboratory; students' laboratory and a mineral museum. A room 32 x 76 is reserved exclusively for the exhibition of ores, etc., of commercial value, from the mines of the Province, classified according to the mining divisions from which they are obtained. There is a separate room for the general mineral collection. Examinations of assayers are also held here, incompetent persons being prevented by law from practising as assayers.

The action of the Dominion Government in not only establishing assay offices in Vancouver for the receipt of gold from the Yukon, but also in offering—according to telegraphic advices—a rebate of one per cent. on all gold from that territory upon which royalty has been paid, brought to the Government works at that city is highly commendable, and other things being equal should undoubtedly have the desired effect of directing the gold produced in the Yukon district into Canadian instead of, as largely heretofore, into American channels. There is one point, however, which is not quite clear, and that is whether the authorities propose purchasing the gold either direct for minting purposes, as is done in Seattle, or guarantee the cost of handling to the banks, or, again, whether the miner will still be obliged to pay the charges made by the banking establishments for receiving the product. If no provision is made in this regard, while the position will be sufficiently improved to place Vancouver on an equal footing with Seattle as a gold-purchasing centre, there will be no particular inducement to the miner to discriminate between the two markets, though the mining population

of the Yukon being largely American, the American city of Seattle is more likely to receive the preference. It is to be hoped that this suggestion will be taken into consideration, in order that none of the advantages which should be gained by the line of action recently devised may be lost.

FLOTATION OF THE SNOWSHOE GOLD AND COPPER MINES.

THE prospectus of the Snowshoe Gold and Copper Mines, Ltd., was issued in London, England, last month. The company has a capital of £250,000 (\$1,250,000) in 250,000 shares of £1 (\$5.00) each. Of these 150,000 shares are to be issued to the vendors, fully paid, as the purchase price for the property sold (the Snowshoe group, in Greenwood camp); 50,000 were offered for subscription at par, to provide working capital, and 50,000 are reserved for issue at a later date as and when required. The subscription list was opened on June 24th, and closed on June 27. None of the shares in the company were underwritten, and no commission other than the usual brokerage of 6d. (12 cents) per share were to be paid to obtain subscriptions to the issue offered. The minimum subscription on which the directors were to proceed to allotment was fixed at £30,000 (\$150,000), and as promises in excess of that amount were received from the directors and their friends allotment was to be made upon the closing of the lists. The vendors take the whole of the purchase price of the property in shares.

The directors of the company are the Earl of Chesterfield, chairman; George S. Waterlow, D. L., J. P., deputy chairman; Charles Guy Pym, M. P., H. Lewis Jones, M. D., and Anthony J. McMillan. The bankers of the company are the Bank of British North America.

The company has been formed to acquire the Snowshoe mine, near Greenwood and certain adjoining properties—the Pheasant, Alma Fraction and Fairplay Fraction mineral claims. The group comprises a compact area of about 120 acres. The Snowshoe and Pheasant are Crown granted and steps are being taken to obtain Crown grants for the others. A contract between the vendors—the British Columbia (Rossland and Slocan) Syndicate, Ltd.,—and the new company provides that the latter shall complete the purchase from F. J. Finucane of the three last-mentioned mineral claims. The company takes over the whole group as from March 1st, 1901, and will refund to the vendor company all expenses incurred, or to be incurred, by it in connection therewith on and since the said date, such expenses amounting, approximately, to £5,000 (\$25,000).

The Snowshoe mine, after remaining for some time in the hands of the original prospectors or others, was in 1899 acquired by the British Columbia (Rossland & Slocan) Syndicate, the promoter of the new company. A lot of work has been done upon the property, totalling about 5,000 feet of development. The vendor syndicate has spent in erecting buildings, installing machinery, and on development work in opening up the mine, more than £25,000 (\$125,000).

Mr. J. W. Astley, M.E., of Rossland, consulting engineer to the vendor syndicate, under date April 29th, 1901, reported to his principals as follows:—

"Since November 21, 1900, most of the development has been carried on in the tunnel on the southern part of the property, and has placed in sight an additional large quantity of ore. The number of lineal feet driven in drifts, crosscuts, raises, winzes, etc., during the six months is 982 feet, and of this amount 459 feet is in ore.

The total number of lineal feet of development on the property is 4,921, of which 1,782 feet is in ore.

"The development on the Fairplay Fraction is encouraging. It consists of a shaft 42 feet deep in a mass of brecciated material, the cementing matter being iron pyrites carrying gold values. It is entirely different to the Snowshoe ore, and as far as known has no connection with it. Work will be resumed in this shaft as soon as the snow has melted and surface water drained off.

"A seven-drill compressor was installed at the beginning of the year as a temporary addition to the plant to carry on the work until a more permanent plant shall be installed.

"The continued success of the Granby smelter and its treatment of low-grade ore, which is identical with the Snowshoe ore, has given a fresh impetus to mining in the Boundary district. Since my last report the smelter has doubled its capacity, and the Knob Hill and Old Ironsides mines send down 600 tons a day, and preparations are now under way to double this output. The Dominion Copper Company have recently put 100 men to work on their mines, and have ordered a large quantity of machinery. The British Columbia Copper Company have blown in their smelter at Greenwood, and are treating from 350 to 400 tons of ore per day, and have offered very favourable freight and treatment rate on Snowshoe ore. This goes to show at what a low rate this ore can be treated at a profit. Before these smelters were in operation in the Boundary district the freight and treatment charges were \$7 per ton, and it is only since these smelters commenced operations that the charges have been reduced.

"There are two projects under consideration now for another railway to compete with the C. P. R., and this will mean cheaper freight rates. The railway from the Republic mining district is almost certain to be completed this year, and then all the ores of that district will be reduced at the Boundary smelters. Everything points to the fact that the Boundary district is destined to be a very large smelting centre. Smelting is already being done there as cheaply as anywhere else in the world."

The following are extracts from a report on the Snowshoe mine made by Mr. E. Nelson Fell, manager of the Athabasca Gold Mines, Ltd., Nelson, B.C.:

"The railroad traverses the property at a convenient grade and afford conditions which could not be surpassed for cheap loading and transportation to the smelters at Greenwood and Grand Forks."

Of the ore body in the Snowshoe tunnel Mr. Fell says: "This ore body is continuous for 300 feet, with one interfering dyke about 25 feet thick. . . . A station has been cut and a small hoist installed in this tunnel, and from it a winze has been sunk 31 feet. Nothing but ore is exposed at this point, and the vein measures 59 feet wide horizontally, and 39 feet at right angles to the dip. The regularity of the ore and its excellent appearance at this point are impressive. I took a representative sample across 25 feet of the vein at this point, with the following assay results:—Gold, .32 ozs.; silver, 1.60 ozs.; copper, 3.30 per cent.; iron, 13.50 per cent.; lime 24.20 per cent.; silica, 20.10 per cent.

"The commercial value of this would be \$10.88 per ton, which is very satisfactory, and should yield a profit of from \$3 to \$5 per ton"

"While it would be possible to quarry from the surface and extract from the mine many thousands of tons of ore which could be sorted and handled at a profit, I should not recommend its adoption at this time."

Mr. McMillan, who has been in England chiefly in connection with the flotation of the Snowshoe company, may be expected in the Boundary sometime in August.

RECENT PUBLICATIONS.

Induction Coils, by H. S. Norrie (Norman H. Schneider). Second edition, 265 pages. Illustrated. Spon & Chamberlain, New York. Price \$1.00.

THE popularity of this book is sufficiently demonstrated by the fact that the publishers now announce a second edition. The style throughout is clear and concise and the illustrations ample. Mr. Norrie's work is free from formulæ and technical details and can therefore be read with interest, and the information he conveys grasped by those who have not had the advantage of an electrical education. The largest portion of the book, as the title denotes, is devoted to the construction and operation of induction coils and their necessary adjuncts, this portion will undoubtedly prove of value to the amateur coil builder. Owners of the now popular automobile with electrically ignited gas engines, who are anxious to understand the details of coils used for gas lighting, will also find here the information required. Mr. Norrie gives the reader the benefit of his personal experience in the construction of induction coils and condensers and shows how the annoying breakdowns, which the amateur too frequently experiences, in high-potential coils constructed by him may be avoided. The last three chapters contain a brief account of Hertz and Tesla effects, Roentgen Rays and Wireless Telegraphy. The student who wishes to build for himself the necessary apparatus for experimenting with these fascinating discoveries will find in this book sufficient information to enable him to construct suitable appliances.

Transactions of the Association of Civil Engineers of Cornell University. Vol. ix, May, 1901.

In this report the following papers are reprinted: The Development of Iron Bridge Construction, by Chas. S. Davis, C.E.; The Buffalo Breakwater, by Major S. Symons; Some Observations on Interurban Electric Railways, by Walter J. Sherman, C.E.; The Horizontal Thrust of the Niagara Falls and Clifton Arch, by R. A. Pendergrass, C.E.; Tunnel Lining Without Traffic Interruption, by Willard Beahm, B.C.E.; Notes on Metallic Arches, by A. U. Saph, M.S.; Air versus Water, by John F. O'Rourke, M.Am. Soc. C.E.; Chicago Harbour, by R. B. Wilcox, C.E.; New York Central Bridges, by C. N. Green, C.E.; Some Dams recently constructed by the Spring Brook Water Supply Company, by John H. Lance, C.E.; and Riverside Viaduct, by John W. Ripley, C.E.

The Statistical Year Book of Canada.

We are in receipt of the Statistical Year Book of Canada, for 1900, published in connection with the Department of Agriculture. The volume, as usual, contains a large mass of interesting statistics published in such a form as to be convenient for reference. While the section dealing with minerals is a handy compendium for reference purposes, there must be noticed some obvious defects in the portion of it relating to British Columbia. It entirely ignores the copper and silver-smelting industry of British Columbia. Exports of the metals, copper and silver from British Columbia, are all returned under the head of ore, instead of copper matte or silver bullion. It would surely be possible for the official statistician to amend the Year Book in this respect another year. There is not a department of statistics more important to those interested in the mining industry of British Columbia, than the proportion of the product of our mines which is treated at home and leaves the Province in the form of matte or bullion.

The map which accompanies the Year Book is a most extraordinary production. In British Columbia it does not indicate, among others, the towns of Nelson, Revelstoke, Grand Forks, Greenwood or Victoria, while it gives prominence to Rossland (which it places on the wrong side of the Columbia river), Midway, Lytton, Hope, Port Moody, Vancouver and New Westminster. It indicates coal at the extreme north of Vancouver Island, but there is nothing to show its presence in the neighbourhood of Nanaimo. By the way, it also mentions Olympia, Astoria and Portland, in Washington state, leaving Seattle to the imagination. The map, be it stated, bears the date of 1901.

CORRESPONDENCE.

(The Editor does not hold himself responsible for opinions expressed by correspondents.)

WHITE'S CANADIAN COMPANY LAW.

To the Editor B. C. MINING RECORD.

SIR:—I have just received your issue for the month of July, No. 7, containing a review on *White's Treatise on Canadian Company Law*, and reading over the article I wish to draw your attention to the following clerical errors: 1st, You put the price at \$1.00, it should be \$8.00; 2nd, You seem to say throughout your article that the treatise is made specially on the Dominion Companies' Act only. I think that if you had read through carefully the book, you would have found out that the Companies' Act of the different Provinces are also taken upon, because, all the Provincial Acts are included under the Dominion Companies' Act, and as the author says in his preface: "The basis of this book has been the Companies' Act of the Dominion. The arrangement of that Act has been generally followed, and where the Provincial Acts are not in effect the same, these differences have been pointed out."

Yours very truly,

C. THEORET,
Publisher, Montreal.

THE MINER'S INCH AND THE DISCHARGE OF WATER.

To the Editor B. C. MINING RECORD.

SIR:—Referring to my paper on "The Miner's Inch," a portion of which was published in your last issue, it is my wish to have this standard of measurement embodied in the Act but certain objections were made to parts of it, namely, that it was not suitable for measuring water for power and electric companies, and I have changed it somewhat to accord. My only wish is to have a uniform standard adopted. At the same time it is a very convenient thing to know that certain orifices at certain heads will deliver a certain number of Miner's Inches of $1\frac{1}{2}$ cubic feet. I think these changes remove all objections and cover the whole ground. Could I ask you either to substitute my last definition for the one in my paper, or if this cannot be done to publish it separately. I may state that the Californian legislature has just passed an Act fixing the standard Miner's Inch as being equal to a discharge of $1\frac{1}{2}$ cubic feet per minute. The following is an amended definition of the Miner's Inch:

The Miner's Inch shall mean a discharge of one and one-half (1-2) cubic feet per minute.

When measured through an orifice it shall mean one-twelfth (1-12th) of the quantity which will discharge through an orifice six (6) inches wide and two (2) inches high, made of two (2) inch planks, planed and made smooth. The water shall have a constant head of $6\frac{1}{4}$ inches above the centre of the orifice and discharges up to and including 101.5495 Miner's Inches of 1-2 cubic feet of water shall be as in the following table:

Dimensions of Orifice in Inches.		Head in Inches over Centre of Orifice.	Number of Miner's Inches of water per minute.	Discharge in cubic feet per minute.
6	2	6.25	11.9858	17.9787
12	2	6.25	24.2485	36.3727
18	2	6.25	36.3851	54.5776
24	2	6.25	48.6865	73.0298
4	4	6.25	15.6998	23.5497
6	4	6.25	23.5560	35.3340
12	4	6.25	47.2853	70.9279
18	4	6.25	71.6296	107.4444
25 $\frac{1}{2}$	4	6.25	101.5495	152.3242

Large quantities of water for mining, power, electric and other purposes may be measured at any convenient point by discharging over weirs, through orifices or by any accepted and correct method of measuring water.

Smaller quantities of water for ordinary mining or other purposes, where delivered from ditches, flumes or canals, into smaller ditches or sluices, shall be measured at the point of division of the branch ditch or sluice. It shall be taken from the main ditch, flume or canal through a box or reservoir arranged at the side, and the water shall have no appreciable velocity of approach. The orifice shall be fixed vertically at right angles to the delivering waterway, and the edges and corners shall be square and sharp, and the top, bottom and sides of the orifice shall be at right angles to the pressure board. The issuing vein shall be fully contracted and the discharge shall be freely into air. The distance between the sides and bottom of the waterway and the sides and bottom of the orifice shall be at least three times the least dimension of the orifice.

THOS. DRUMMOND, M. E.

Quesnelle Forks, B. C.

THE MONTH'S MINING.

KAMLOOPS.

THE shaft on the Iron Mask has been sunk to the 300-foot level, where a station is being cut and development will be prosecuted. A 20 h.p. boiler and steam pump are being put in place, and the engine at present in use will be used for hoisting purposes only. It is very difficult to obtain information regarding development on this property.

The progress of the dredge on the North Thompson is being watched with interest, the heavy machinery having been got into place, the construction of the dredge will be completed a few days after appliances for the gold-saving tables are to hand. The company hope to have the dredge in running order about the first of August.

The Glen Iron mine is now shipping about seven car loads of ore a week to the Hall Mines smelter.

BOUNDARY DISTRICT.

(From Our Own Correspondent.)

The following is a statement of the Kettle River Mining Division mining records and receipts, and of other

provincial revenue received at the Government office, Greenwood, during the six months ended June 30th, 1901:—

Free Miners' certificates	\$1009 00
Location records	279 00
Placer records	3 00
Certificates of work	476 00
Certificates of improvements	16 00
Conveyance records	174 00
Water grants	2 00
Abandonments	13 00
Letters of administration	1 00

CASH RECEIPTS.

F. M. certificates	\$5661 50
Milling receipts, general	3118 26
	—————
	\$8779 75
Trade licenses	180 00
Revenue tax	3054 00
Miscellaneous	29 09
General	96 65
Marriage licenses	75 00
Registration fees	87 00

\$12301 40

Mining operations in the Boundary district are at present largely confined to three camps, with Greenwood camp a long way in the lead as regards output of ore. In that camp there are the Granby Company's Old Ironsides and Knob Hill group, the Dominion Copper Company's Brooklyn, Idaho and Rawhide mines, and the Snowshoe Gold & Copper Company's Snowshoe mine, all being actively developed. Of the 194,000 tons of ore which is about the aggregate of this year's shipments for the whole district, 119,063 tons are to the credit of the Granby company's mines. The Dominion Copper

THE
PRODUCTIVE
AREA.

Company has not sent out any ore so far this year, but is doing a deal of development work preparatory to making comparatively large shipments to its own smelter, the construction of which will, it is stated, shortly be proceeded with. Nor is the Snowshoe yet shipping any ore beyond an occasional carload for test purposes, its contribution to this year's total being only about 320 tons. It is, however, making ready to send out regularly a considerable quantity of ore whenever the time shall be ripe for shipments to be made to greater advantage to the mine than is practicable under existing conditions, of its having to share the margin of value above cost of mining with the railway and smelter companies, which takes so much of the returns as to leave too small a proportion for mines that are not dependent upon them for money to keep up their development work. The Snowshoe, like the Granby and Dominion companies, is in a position financially to establish its own reduction works, and failing arrangements that will give it a larger proportion of the values its ores yield than is at present obtainable, will in its own good time do so.

Next in importance is Deadwood camp, in which the British Columbia Copper Company's Mother Lode mine, the Montreal and Boston Copper Company's Sunset mine, and the Morrison Company's Morrison mine, are at work. Of these the Mother Lode is the only shipper, its output for the current year having totalled 43,840 tons to July 17th. It sends down to its own smelter between 300 and 350 tons daily, or a little more than half the daily output of the Granby company's group. The Sunset now has a lot of ore in sight, and ore bins are being put in and the preliminaries being arranged for a spur to connect with the railway which passes within one hundred feet of the mine workings, so it is

probable that ore will be sent to the smelter regularly ere long, commencing most likely some time in the fall. At the Morrison, a policy of further development is being continued, but it is not the intention of the management to enter upon ore shipping immediately, pending the conclusions of arrangements that will give the mine a profitable margin above cost of extraction of the ore.

Summit camp has only two mines at work just now, viz., the B. C. and the R. Bell. The former was the subject of a special article in last month's RECORD and there is little to add to the information then given. Its ore output for the current year to July 17th aggregated 28,259 tons. A new stope was recently opened, this giving a depth of 75 feet of ore between the 250 and 325-foot levels. The average daily tonnage sent to the Trail smelter has lately ranged from 170 to 180 tons. The R. Bell has lately sent out half a dozen cars of ore to the Granby smelter, at Grand Forks, and it is claimed that this ore is the best in respect of value, yet sent out of the district in bulk. Development is being continued with the object of opening up shoots of ore at greater depth than those now being taken out of the mine. The Blue Bell which is situate in the neighbourhood of the B. C. and R. Bell, has suspended work, presumably for the reason that money is not forthcoming to pay the few men who were employed on the property. The company that is supposed to have been

AN OVER-
BOOMED
CONCERN.

organized in one or other of the North-eastern States, has had the benefit of some undeserved puffing by irresponsible "penny-a-liners" at Greenwood and Phoenix, especially the latter, but so far its achievements have not appeared to warrant the prominence given them. However, it requires little more than gall and an elastic conscience to impress some so-called journalists, whose chief qualification for newspaper work is a facile pen. On its merits the Blue Bell appears to be a promising property, but it is likely to continue to have a checkered career so long as its development shall be directed by an incompetent man. Fortunately an experienced practical miner was in charge of the work below ground, but he was handicapped by not having a free hand. Left to himself he would, in due time, demonstrate whether or not the Blue Bell would make a mine, but not otherwise. A "splash" was lately made by the Rathmullen company, who put on fifteen men for a few days, but at present only two or three are at work on the claims. It is stated that Hon. Geo. E. Foster, who is interested in this much-embarrassed organization, is expected to arrive in the district from the East shortly, but it appears that something more than his arrival will be necessary to restore confidence in the Provincial management of the Rathmullen.

Other mines at work in the district at the present time are the Jewel, in Long Lake camp; the Winnipeg, in Wellington camp; the Lake, in Skylark camp; and the No. 7, in Central camp. It has been announced that work will shortly be resumed on the King Solomon, in Copper camp, and the Golden Crown will be at work again by the end of August. The Rock creek placer veniure, which was to have accomplished great things—according to the Greenwood brokers who induced

"BOOMING"
AND
ROCK CREEK.

local people to take shares in it—has not yet fulfilled anticipations, but since the management has been taken from those who temporarily stranded it and it is now in the hands of men who are determined to give the "booming" system, under which it was arranged to work the creek claims, a fair trial, success, if it be attainable, will be attained.

More money has been subscribed and a close watch is being kept that it shall be expended to greatest advantage, so that it is now an undertaking that is being carried out upon strictly practical lines. Whether the boom method of working is suitable for Rock creek remains to be more fully demonstrated, but at any rate shareholders are now assured that their money is being carefully and economically used.

As the smelting averages were not correctly printed in last month's RECORD, two printer's errors having shown the average as less than they really were, it may be well to repeat them and bring them up to the end of June. The total quantity of ore treated at the Granby smelter, Grand Forks, to the end of May, was 155,518 tons. The tonnage for June was 18,510 tons, making 174,028 tons in all, of which quantity 62,387 tons were smelted during the latter part of 1900, and 111,641 tons during six months of the current year. The daily average for the half year was about 617 tons, this being for two furnaces. The British Columbia Copper Coy's smelter, at Greenwood, working with one furnace, smelted to end of May, 36,687 tons, and during June, 11,206 tons, making 47,893 tons in all. Omitting the ten days in February the smelter was running, the daily average for the four months to June 30th was nearly 368 tons. The Standard Pyritic Smelting Company's smelter has not yet commenced work.

ROSSLAND.

(From Our Own Correspondent.)

The strike at the mines here and at the Northport smelter is the all-absorbing topic. In Rossland business keeps fairly good but over seven hundred men have left the camp, and others are making arrangements to move out if a settlement is not reached by the end of the month. The four mines of the Le Roi group, and the War Eagle and Centre Star properties, are all closed up as tight as the proverbial drum, and except the pump men and shaft engineers who are kept in their places by the union to prevent any harm happening to the mines, not a man—union or non-union—is at work.

Up to the present moment no attempt at settlement has taken place, and the policy of drift is the only one in evidence.

Mr. Kirby, of the War Eagle complains that the men did not give him sufficient time—24 hours—in which to consider their ultimatum, and has hinted that some deal might yet be made, but the union men so far have not responded. It is stated that Bernard MacDonald, the general manager of the Le Roi and admittedly the central figure on the companies' side in the fight now in progress, asserts that he has been grossly misled by his shift bosses and foremen as to the real intention of the men—they having told him that all non-union and many of the union men would refuse to obey the strike order and quit work. The Rossland Board of Trade attempted to interfere in the matter and based their action on the ground taken by the Rossland Miner, that the vote on the strike or no strike question taken by the union was illegal on two points:—1. Want of sufficient notice of the meeting. 2. Want of a sufficient majority of resident members according to the union constitution. A communication stating these facts was sent to the union Executive as the result of a lengthy conference between a special committee of the Board of Trade and the union Executive committee, who now have full charge of all matters connected with the strike.

On receipt of the letter in question the union replied

asking for time to consider the points raised, and requesting that no further steps be taken by the Board of Trade committee until their answer was received, which they promised would be the case within 24 hours. The next step was the appearance of the Rossland Miner the following morning with the Board of Trade's letter under startling head lines charging fraud and all manner of evil against the union, together with a leading editorial to the same effect. The following day the Board repudiated the Miner's act, but the union men declined to move further in the matter and the incident ended.

The miners had a great turn out at their annual picnic on the 16th, and the speeches delivered by the labour leaders on this occasion were models of moderation and good feeling.

Mr. Macdonald states that he has fully reported all matters to London and is awaiting further instructions.

The Homestake made its initial shipment about the middle of the month, and as a result the stock has fallen from 13c. to 5c. and even lower.

The manager, Sam Hall, says the values were somewhat disappointing, but that he is only on one side of the ore body and looks for better returns later. No official statement has been given out and the bear element has pounded the stock all its own way.

The Spitzee—in the heart of the town—has continued to make a very good showing and has announced a trial shipment in August of a few car loads.

The White Bear company has been reorganized but will not recommence work until the present trouble is over. The new St. Elmo, Iron Mask, and a few smaller properties are working as usual, they having agreed without demur to the increased pay asked for by the muckers.

The ore shipments from the camp for the first half of the current year exceed 200,000 tons. Last year at the same date the output was 72,080 tons for the first half of 1900. Appended for comparison is the output for the first six months of the years given.

ORE TONNAGE	Tons.
For the first six months.	
January to June, 1897	30,008
" " 1898	39,365
" " 1899	66,576
" " 1900	72,080
" " 1901	204,500

The details of the ore shipments for the current six months of this year are approximately as follows for the first half of 1901 :

	Tons.
Le Roi	104,298
Le Roi No. 2	20,270
Centre Star	51,918
War Eagle	19,050
Great Western	8,058
Iron Mask	2,233
I. X. L.	189
Monte Cristo	20
Spitzee	80
Velert	565
Evening Star	74
Portland	24
Giant	52

Total tons..... 206,857

The total for last year amounted to 217,636 tons. The Trail smelter has three furnaces going, but unless the strike is shortly settled will be obliged to close down. The Northport smelter remains practically closed but the superintendent states that he is running one furnace with non-union labour.

F. C. M.

SHOAL BAY.

(From Our Own Correspondent.)

During the past month this district has been inundated with mining experts, much to the advantage of the district, for since the closing down of the Dorothea Morton capitalists have fought shy of this part of the Coast. But now, at last, a party has been found enterprising and energetic enough to bond two properties here, and to commence work on same. They are the Shoo Fly and Nellie C mineral claims situated at the head of Fanny Bay. The former is being worked for iron, the latter for copper and gold, and both have excellent showings. For the benefit of those who may be wishing to obtain claims with really good showings at reasonable figures, I may mention two claims on Discovery Passage, the Camp and Hard Cash mineral claims, on both of which work has been done with good results, the leads increasing in size with depth, and I understand the values also.

News has just reached me that the B. C. Exploration Co. are very hopeful for the Colossus M. C. one of their properties in Estero Basin, on which several thousand feet of tunneling has been done. Should this property turn out well, the district will boom.

YMIR.

(From Our Own Correspondent.)

Two strikes, the importance of which can hardly be over-estimated, have just been made at the Ymir mine and go far to place that property amongst the richest mines of the world. Twenty-six feet of forty-dollar ore is now exposed on the No. 4 level of the Ymir, and when it is remembered that the large profits already earned by the company, have all been won from ore averaging less than \$9 per ton, it will be readily recognized that the strike increases the value of the mine in a quite sensational manner. Indeed it can be said today that the ore body now exposed in the Ymir mine is of such dimensions and richness, and has been developed in such a thorough manner that it represents an actual value which is unsurpassed by any mine in the Province, while it is moreover in the hands of an English company, one of the few operating in the Province whose finances are properly administered.

The strike was made on the No. 4 level, just west of the dyke which intervenes in this and all the upper levels. Before reaching this dyke on the No. 4, the ore was of much the same width and value as in the levels above, but as soon as the dyke was passed it was found that the shoot had widened out considerably while the value had materially increased. After the shoot had been crossed for fifteen feet, a mine-car sample was taken across that width and assayed the results being immediately cabled to the head office in London, as follows: "Mine-car sample, level No. 4 west of the dyke—sample assays gold, \$35; silver, \$5 per ton of 2000 lbs. Represented width of fifteen feet. The average width of the vein is greater." Subsequent work proved the ore to be twenty-six feet wide and to average \$40 across that width.

The other strike referred to was made on a claim next to the Ymir claim, and owned by the company. It was formerly supposed that the ore shoot now being worked was the only one on the property, but on the former claim ore was found on the surface, which is taken to indicate another shoot in the same vein. A force of men have been put to work on this discovery.

The Ymir company is now employing about 200 men and it is probable that this force will be largely added to for the work of this fall. The new cyanide plant which is being erected will cover a large space and the

building covering it will be 300 feet long, requiring half a million feet of lumber. A contract for this lumber has been let, the work to be done with the company's own saw mill. Excavation work is now progressing for the foundation for the cyanide plant.

Neil Cochrane, M.E., of Rossland, is now here to lay out the autumn work on the Big Four group, owned by the British Lion Syndicate, of Ontario.

The mill at the Arlington mine is now completed and running full blast, while the Second Relief stamp mill will be in running order within two months.

AINSWORTH, SLOCAN AND NELSON.

(From Our Own Correspondent.)

A cyaniding building 500 feet long is being erected at the Ymir mine. The plant will have a capacity for treating 90 tons of ore per day. A body of ore 26 feet wide and averaging \$40.00 per ton was recently struck on the fourth level at this mine. A contract has been let to drive a 200-foot tunnel on the Commonwealth ledge, Crawford Bay district, considerable work has been done on this property already; it is expected that this will show up the property in such shape that regular shipments will be made. The Nelson smelter is now treating about 140 tons of Silver King ore per day. One hundred and thirty men are employed at the mine.

In the Slocan district operations will shortly be resumed on the Reco group. A contract on the Texan claim of the Reco group having already been let. About 90 mine are working at the Rambler mine, and the force will shortly be increased and the shipments augmented. A meeting of the company was held on the 25th of July and the subject of the erection of a concentrator discussed. A force of 120 men is employed at the Slocan Star mine and mill. Shipments amounting to 186 tons were made last week.

Another noteworthy event of the month was a car load shipment of ore from the Noble Five—the first for many years. A recent strike of six inches of dry ore running 7,860 ounces silver to the ton has been made on the Silver Glace. The mines at Sandon, are all working a more or less limited number of men. The Slocan Star employs 125; the American Boy, 35; the Payne and Last Chance, 30 each.

SLOCAN CITY MINING DIVISION.

(From Our Own Correspondent.)

There is nothing of very special interest to note for the month in the district. Claim owners are practically all busy with assessment or development work and reports generally are very satisfactory. The tonnage from the district for the seven months just about equals the whole of last year's output, or about 2750 tons. The Arlington is responsible for over 2000 tons of this, the balance being divided amongst nine others.

On Ten-mile creek, the month gives us the bond on the Iron Horse, \$19,500, taken up, work progressing favourably on the Enterprise mill and the trail reworked as far as the snow line. Active development on the Phoenix, Viking, Tamarac, Esmeralda, Morning Star, Silver Star, Hampton and others.

Mr. R. P. Rithet, of Victoria, president of the Arlington Recoitabi Mining Co. has been here in conference with Mr. Collom, the managing director, and Mr. DuBois, the superintendent of the Arlington. These mines are progressing most satisfactorily. The Arlington people have been picking up claims along the creek quietly for some time and they are doing considerable development work at different

points. The combined pay-rolls have some 150 names and are steadily increasing.

The V. & M. are surveying their group for Crown Grants and also locating the flume line and compressor plant. Work has begun on the development of the Myrtle group by the Tattersall Bros. at the head of the creek.

Lessees are taking out ore from the Fourth of July, Hoodoo, and Free Gold, all on the First North Fork of Lemon creek. Ground sluicing has exposed the lead on the Rose and Mr. F. Dick has taken up a small crew to begin development. This has shown probably the highest gold value found in the camp. No definite news about either the Chapleau or Kilo. The country near the head of the creek is very busy and good reports come from many of the claims, though the snow is still very troublesome up there.

THE LARDEAU.

(From Our Own Correspondent.)

The free-milling gold belt, in the Lardeau district, continues to attract considerable attention. The properties now being worked are developing nicely, among the most promising of which is the Oyster group. The area of free-gold ledges is found to be more extensive than at first supposed. Several important transactions are reported of late. Among others the Camborne group has been bonded, a first payment of \$4,000 having been made.

The Eva mine of this district, was also recently bonded by the Imperial Development Syndicate, Ltd., to the London & B. C. Gold Fields for \$250,000. There are a number of free-milling gold ledges on this property. The developing work consisting of numerous open cuts, tunnels and winzes, shows that the ledges maintain their size and ore values at depth. Mr. A. F. Rosenberger, of Nelson, has bonded the Oyster group on Lexington mountain, adjoining the Eva mine. Development work will be started at once. Mr. Rosenberger has also bonded the Sir Wilfrid group, the Noble Four group and the Excelsior claim on Pool creek, for the purpose of developing which he has organized a local syndicate. The Lode group of this district was also bonded last month for \$100,000. From all indications a bright future lies before the district.

NORTHEAST KOOTENAY.

(From Our Own Correspondent.)

Notwithstanding the backwardness of the season, which is a month later than usual, a fair number of miners, prospectors and parties looking for investments are coming in and distributing themselves through the various mining localities in the Golden and Windermere divisions of this district.

In the Golden division parties are out on the Middle and North Forks of the Spillimacheen river, on the Blue Water, north of Donald, and on Ice creek, a tributary of Beaver, Foot river, southeast of Leancoil station on the C. P. R. It is thought that the Boston & Bannison Mining Co. will resume work on their properties, which are situated near the head waters of the Middle Fork of the Spillimacheen, about 30 miles from Carbonate Landing on the Upper Columbia, above Golden. A considerable amount of work has been done on these claims, and it is thought that the

developments already made will warrant the erection of one hundred ton reduction works as soon as a wagon road can be got in. A road from Carbonate or from some other point in that neighbourhood into the McMurdo and Upper Spillimacheen country would enable many other promising mines to resume operations, and would open up many new claims in a mineral belt which has every appearance of being able to produce copper, gold, lead and silver on a large scale.

The Certainly G. & M. Co. is expected to work the properties on Fifteen-Mile creek and Canyon creek, which were closed down last fall, and it is said that the Good Luck Co. will continue opening up their claims on the South Fork of Canyon creek.

Work is to be commenced on the Sunday mineral claim next week by an Eastern Township company.

The principal mining activity prevails, however, at present in the Windermere division, and is likely to increase very much as the season advances.

The Provincial Government is dealing in a very liberal manner with the Windermere country, in the way of roads and trails. A good road was built last fall from Athelmar and Peterborough, on the Columbia river, some 12 or 14 miles up Toby creek, and is now being carried on a distance of 5 or 6 miles farther. This road gives access and shipping facilities to a great number of claims on Toby creek and tributaries, including the Paradise which has already sent 1000 tons of Carbonate ore to Peterborough landing, 500 tons of which has been forwarded to the smelter at Trail, and the remainder is being shipped by the steamer "Duchess" at the rate of 50 tons each trip. Amongst the other mines which will benefit by the construction of this road are the Mineral King, Delphine, Hot Punch, Monarch and Majestic, all more or less developed properties and likely soon to become shippers.

Another road now being constructed from Peterborough 20 miles up Horse Thief creek, will give access to the McDonald creek and other mining camps. The Red Line or McDonald creek mines have been purchased by a strong American company, and work will be prosecuted on a large scale, I am informed, as soon as the road is completed.

Dutch creek and Findlay creek are attracting considerable attention and are developing some good copper, gold and silver-lead claims. There are also excellent gold quartz prospects on Findlay creek, and a good wagon road up the creek 10 or 12 miles, with trails in different directions for many miles beyond the end of the road into the mountains.

On the Upper Kootenay river, above Canal Flat, there are indications of coal and copper which may be worth attention.

A telegraph line from Golden to Windermere has just been completed by the Dominion Government, and will add greatly to the facilities for transaction of mining and other business.

The U. C. Navigation & Tramway Co. are bringing their steamer "North Star" from Jennings, on the Great Northern Railway, up the Kootenay, then through the canal at Canal Flat, and down the Columbia lakes and river, for service on the latter between Golden, Carbonate, Spillimacheen, Peterborough, Athelmar and Windermere. This will add 150 tons or more to the carrying capacity of the company's fleet on this route, and taken in conjunction with the activity of the government in building roads and trails, may be looked upon as a fair indication that mining development and ore shipments are increasing and likely to increase in a satisfactory manner.

PATENT OFFICE REPORT.

MESSRS. R. BRITAIN, Patent Attorney, of Vancouver, sends us the following particulars from the Canadian Patent Office Record for April, just to hand.

Four hundred and thirty-nine patents were issued this month, of which number British Columbians received five, a very fair proportion. All were taken out through the local office, and the following brief description shows that they are thoroughly characteristic of Provincial requirements.

Mr. H. Burnet, C. E. D. and P. L. S., Victoria. Removable Point for Rock Drills. In this device the tempered point is detachable from the drill shank, and is secured by a dovetail so designed that the percussion tends to tighten the hold on the point while it can be readily removed for change or renewal. This drill should commend itself to prospectors and mining men generally, as it saves the necessity of carrying a supply of entire drills; one shank and a number of ends of varied temper being all that is required.

Mr. B. J. Munn, New Westminster, is the holder by assignment of a Can Feeding and Spacing Device, which provides an extremely simple and effective means for feeding cans to any machine at regularly spaced intervals.

T. Bell, Vancouver, is the inventor of a Concentrator for the recovery of placer gold, which is familiar to mining men generally, and has been previously referred to on receipt of his U. S. patent.

W. G. Trethewey's Automatic Coupler for air brake and steam-heating pipes, is familiar to Vancouver citizens as having been on trial locally for some little time past. It was recently taken east to Montreal for lengthened trial and examination by the C. P. R. officials. Mr. Trethewey has gone with it, and we have no doubt will be successful in securing its adoption by the leading railway companies, who should be only too willing to acquire a device which will prevent the necessity for men going between cars to couple the pipes.

A description of the fifth is withheld at the request of the inventor.

A. Hardman, New Westminster, has a device by which the vapour from cooking vessels is conveyed and delivered to the flue of the stove, and thus dispensed from dispersing itself through the room and house, the objection to which is so frequently felt and forcibly expressed. I understand Mr. Hardman is manufacturing this device and is prepared at an early date to put the same on the market.

G. C. Ingram, blacksmith, Vancouver, has just received his Canadian patent for a simple, yet useful improvement in a Horse Shoer's Knife, designed to save the hand of the operator from abrasion while paring the hoof. The value of such a device to a workman having much shoeing to do, should be well worth the trifling extra cost of the knife.

C. Brash, Victoria, Ore Concentrator.

J. W. Falls, Ymir, B. C., Air Compressing Machine.

C. Schallberger, Vancouver, has received a patent in the United States on a Protective Coating to be applied to piles or woodwork exposed to the attack of teredos or pile worm. The rapidity with which the teredo will destroy woodwork below water is a serious matter, as the expense and inconvenience of frequently renewing an extensive wharf area must be considerable. As soon as the efficiency of this protection is demonstrated, the inventor will not lack encouragement.

CATALOGUES, CIRCULARS AND TRADE NOTICES.

MATHEMATICAL INSTRUMENTS.

MESSRS. P. & R. WILTSTOCK, of Berlin, Germany, have issued a new edition of their illustrated price list. Among the mathematical instruments to which attention is particularly directed, are some very beautifully finished mining transits, transit theodolites and mine tachymeters.

AN ATTRACTIVE METHOD OF ADVERTISING.

Messrs. Baker & Co., metallurgists in platinum, of Newark, N. J., U. S. A., well known to many of our readers as consumers of crude platinum, are presenting to their patrons a very useful and attractive novelty in the form of a dating stamp. This firm also publishes a brochure entitled "Platinum," describing the ore and giving simple methods for its identification. This brochure is free on request.

A PRIZE-WINNING PHOTOGRAPH.

The prize of \$50 recently offered by Mr. H. D. Crippen, manufacturer of the Jackson Hand-power Rock Drill, has been awarded to Mr. Emily Rice for his flashlight photograph of a Jackson drill in practical operation. The photograph was taken in the Lennox tunnel, Hecla, Wyoming. Mr. J. D. Kazar, who was operating the drill at the time, speaks loud in its praise, and sends this letter.

Hecla, Wyoming, Feb. 4, 1901.

MR. H. D. CRIPPEN,
52 Broadway, New York City.

Dear Sir,—I have been using one of your steel Jackson Hand-power Rock Drills continually since Dec. 24th, 1900, running same one hun-

dred and fifty feet underground in one of the hardest of granites, in which men (double-handed) do well to make five to six inches per hour. One man with the Jackson drill is now doing from eighteen to twenty inches per hour. The drill runs like clockwork, and is easy to handle.

Many here are interested in the drill, and I have agreed to send drill and a man over to our neighbour mining company who, I am satisfied, will send you an order for a Jack-on drill as soon as they once see the same at work. You may use my name for reference at any time.

Yours truly,

(Signed) J. D. KAZAR.

A DEMAND FOR VICTOR TURBINES.

Messrs. The Stillwell-Bierce and Smith-Vaile Co., of Dayton, Ohio, send the following information: Our engineer, Mr. C. P. Folsom, has just returned from Canada, bringing with him a large order for Victor high-pressure turbine water-wheels, the wheels to be used under 240 feet working head. The wheels were ordered by the Ouatichouan Pulp Co., Ouatichouan, P. Q., Canada, whose mill will have a daily capacity of 30 tons of pulp. The order includes 1000 h. p. wheels for driving the pulp grinders, one 500 h. p. wheel for driving the screens and wet machines, and one 100 h. p. wheel for driving their electric plant.

THE KINGSTON SCHOOL OF MINING.

This school has just issued its 1901-1902 calendar, containing time tables of courses and other information useful to students at the institution, or those who propose to enter as such.

MINING STATISTICS AND RETURNS.

ROSSLAND.

	1901.	1900.	Increase.
	Tons.	Tons.	Tons.
Shipments for January (revised)	30,894	24,933	5,961
" February "	26,778	6,960	19,818
" March "	34,172	279	33,893
" April "	40,160	6,834	31,326
" May (estimated)	47,000	25,704	31,296
" June "	32,000	17,161	14,839
" July "	6,000	17,399	*11,399

*Decrease.

The total production of this district for the seven months ending July 31st, approximates 216,000 tons.

EAST KOOTENAY.

The St. Eugene mine shipped 2,200 tons of concentrates during June. The North Star mine continues to send out 1,000 tons monthly.

YMIR DISTRICT.

The official returns from the June run at the Ymir show that 80 stamps ran 27 days of nine hours, with estimated profit on operating of \$23,080. This brings the total net profit made during the first five months of 1901 up to over \$108,500, or an average of over \$21,700 per month.

SLOCAN.

The total amount of ore shipped from the Slocan and Slocan City Mining Divisions for the year (Jan'y 1—Jan'y 20) has been 12,434 tons.

BOUNDARY DISTRICT.

The tonnage of ore shipped by Boundary District mines during July to 24th, inclusive, so far as has been ascertained from the mines is as under:—

Old Ironsides and Knob Hill group	13,484 tons.
Mother Lode	7,232 "
B. C.	4,405 "
R. Bell	270 "
No. 7	128 "

Total

Aggregate of all district shipments to (July 24) 299,944 tons.

COAL EXPORTATIONS.

THE foreign coal shipments from the Vancouver Island collieries for the half year ending July 1st, aggregate 508,598 tons. The shipments in June were divided as follows:

New Vancouver Coal Co.	34,061 tons.
Union Colliery	28,763 "
Ladysmith	12,920 "

Total

For the three weeks ending July 20th, the New Vancouver Coal Co. exported 32,097 tons to California and Puget Sound ports. According to the U. S. Consular Agent at Nanaimo the value of coal exported for the quarter ending July 1st was \$437,570.

METAL MARKET—JULY.

THE silver market has remained dull and without tendency to improvement in price. London quotation 27d. per ounce, New York $58\frac{1}{2}$ cents.

COPPER

Copper has been dull and featureless with very light demand. Lake $16\frac{1}{2}$ @ $16\frac{3}{8}$. Electrolytic $16\frac{1}{4}$ @ $16\frac{3}{8}$. London price £67.13.9 per ton.

LEAD.

Good business is reported as doing in lead in an active market. New York, $4.37\frac{1}{2}$; St. Louis, 4.40. London price shows a further decline. Latest quotation available £12.2.6 per ton equal to \$2.62 per pound.

SPELTER.

New York, \$4.20; St. Louis, \$3.75; London, £16.2.6 per ton, equal $3.58\frac{1}{2}$ cents per lb.

Canadian Pacific Navigation Co., Ltd.—Alterations in TIME TABLE—Effective July 30th, 1901—ALASKA ROUTE.

Name of Steamer.	Leave Victoria	Leave Vancouver	Leave Skagway
Islander	July 31	July 31	Aug. 4
Hating	Aug. 10	Aug. 5	Aug. 9
Islander	Aug. 20	Aug. 10	Aug. 14
Hating	Aug. 30	Aug. 15	Aug. 19
Islander	Sept. 9	Aug. 20	Aug. 24
Hating	Sept. 19	Aug. 25	Aug. 29
Islander	Sept. 29	Aug. 30	Sept. 3
Hating	Sept. 9	Sept. 4	Sept. 8
Islander	Sept. 19	Sept. 9	Sept. 13
Hating	Sept. 29	Sept. 14	Sept. 18
Islander	Sept. 9	Sept. 19	Sept. 23
Hating	Sept. 19	Sept. 24	Sept. 28
Islander	Sept. 29	Sept. 29	Oct. 3

Steamer leaving Victoria 1 a.m. connects with S. S. Hating at Vancouver.
 Steamers Danube and Amur alternating, leave about every 7 days for Skagway.
VICTORIA—NEW WESTMINSTER ROUTE, STR. "R. P. RITHET."
 Steamer leaves Victoria, Tuesdays, Thursdays and Saturdays, at 7 a.m. Leave New Westminster, Sundays, Wednesdays and Fridays, at 7 a.m. Calling at Plumpert's Pass, Stevenson, Ladners, and Fraser River Canneries.
 J. W. TROUP, Manager, Victoria, B. C.
 E. J. COYLE, Asst. Gen. Pass. Agent, Vancouver, B. C.

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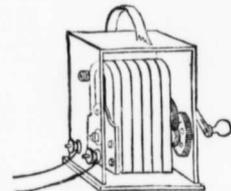
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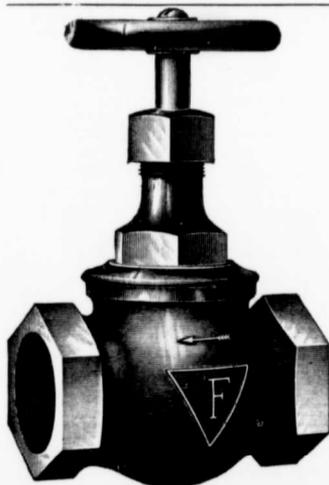
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