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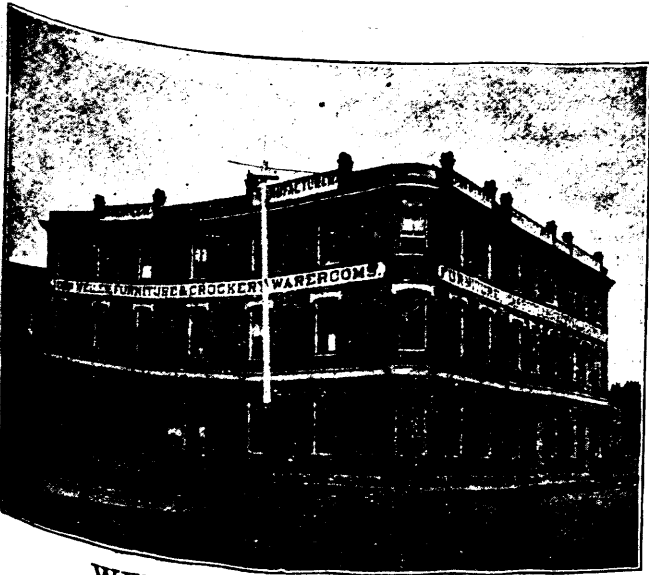
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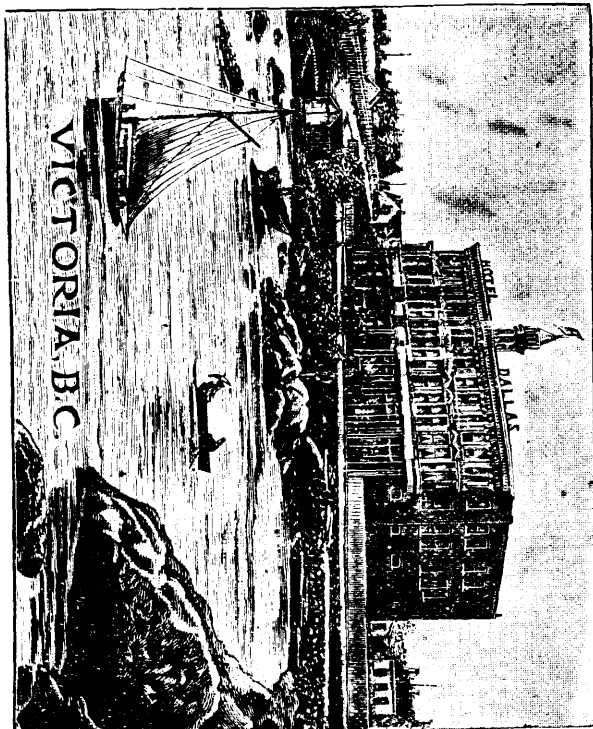
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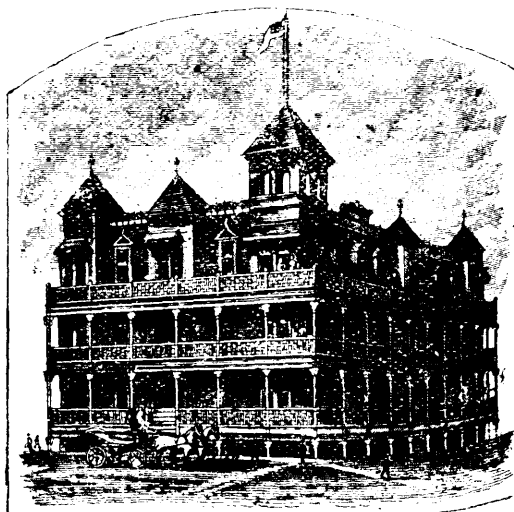
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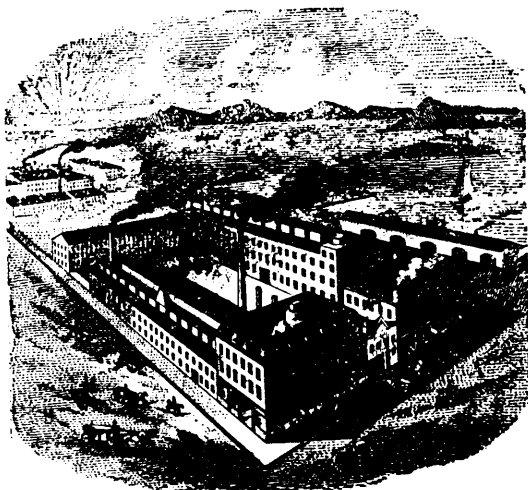
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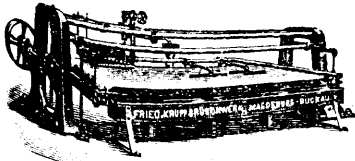
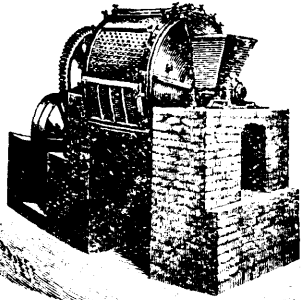
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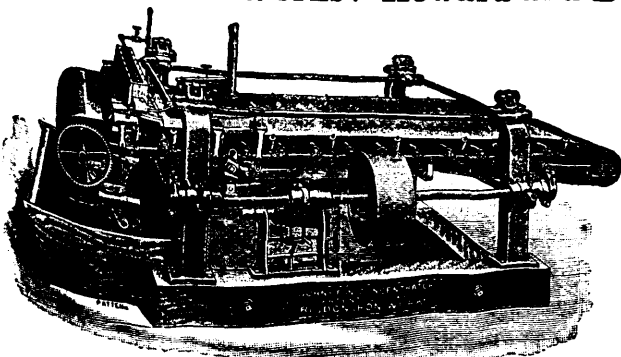
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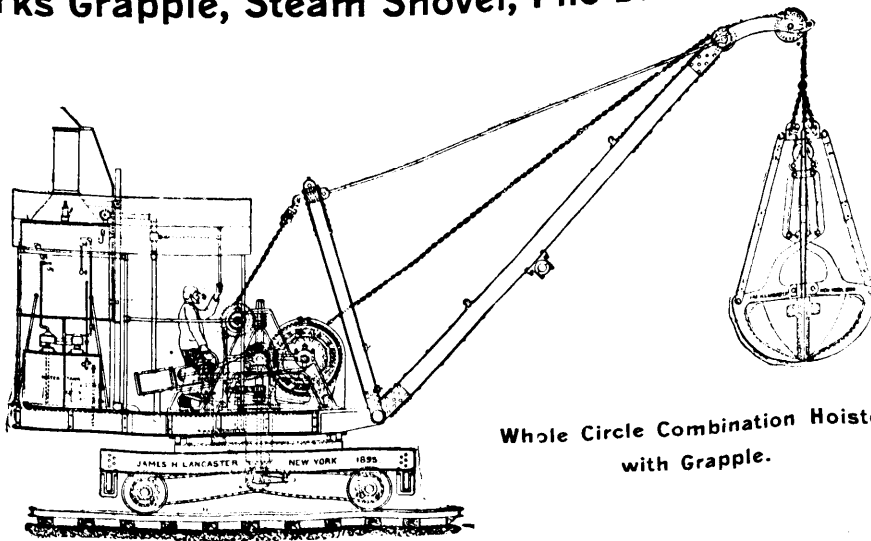
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JULY, 1896.

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Vol. 2.

JULY, 1896.

No. 7.

Notice.

We have organized the following departments in connection with the B.C. MINING RECORD, with the view of forwarding the interests of our many readers, especially those living in the mining districts:

Enquiry Department.

In connection with the B.C. MINING RECORD we have established an "Enquiry Department" for the purpose of furnishing information about the mining resources and mining industries of British Columbia to parties outside the Province who may desire to obtain the same. For this we make no charge, but, on the contrary, will only be too glad to reply to any communications addressed to

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Readers of the B.C. MINING RECORD wishing to obtain any work on mining, metallurgy, geology, assaying, etc., may procure the same by addressing

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Victoria, B.C., or
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Purchasing Department.

For the accommodation of our readers and others living in the mining districts we have opened a "Purchasing Department" in connection with the B.C. MINING RECORD. In this we will act merely as a medium between buyer and seller—we keep no stock of goods on hand. But it frequently arises that people living in the mining districts require articles which they are unable to obtain near home, and which they do not know where to purchase. If these parties will write to us, we will either inform them where the articles can be had and the price of them or we will place their order with some respectable firm. As we have an intimate knowledge of the trade, not only in the Coast cities, but also in Eastern Canada, the United States and England, parties writing us may be assured that if any article they require can be obtained we will get it for them. Where parties know the price of the article they should enclose a post office order for the amount, and we will forward the article. In such cases the express, postage or freight should be added, as we charge no commission to those ordering through us.

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B.C. MINING RECORD, | B.C. MINING RECORD,
Vancouver, B.C. | Victoria, B.C.

Mining Papers on File.

The following papers are kept on file at the office of the B.C. MINING RECORD, Dallas Hotel, Victoria, for the use of visitors who may wish to consult their columns:

The Mining Journal.....London, England
The Engineering and Mining Journal.....New York
The Shareholder.....London, England
Mining and Scientific Press.....San Francisco, Cal
Canadian Electrical News.....Toronto, Ont
The Commercial.....Winnipeg, Man
Mine and Quarry.....Chicago, Ill
Pacific Coast Bullion.....Los Angeles, Cal
Canada Lumberman.....Toronto, Ont
Monetary Times....." "
Western Mining World.....Butte, Montana
Spokane Miner.....Spokane, Wash
Inland Sentinel.....Kamloops, B.C
The Golden Era.....Golden, B.C
The Prospector.....Rossland, B.C
The Ledge.....New Denver, B.C
The Kootenaiian.....Kaslo, B.C
B.C. Mining Journal.....Ashcroft, B.C
The Advance.....Midway, B.C
The Miner.....Nelson, B.C
The News.....Vernon, B.C

Rossland Miner.....	Rossland, B.C.
The Prospector.....	Fort Steele, B.C.
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Notice to our Readers.

The publisher of *The Record* has decided to make biographical sketches of mining men a distinctive feature of the journal. Instead, therefore, of issuing a special number devoted to this class of reading matter, each issue commencing with August will contain one or more biographical sketches with portraits of men prominently connected with our mining industry. Mr. Alexander Begg proposes to spend the greater part of the present month in the Kootenay in the interests of this journal, and collecting data for future issues.

EDITORIAL NOTES.

THE elections are over and a change has taken place in the government of the country which in our opinion will be to the advantage of our mining districts. We have repeatedly called attention to the fact that a tax on mining machinery tended to retard the development of our mines. There is now hope of relief in that direction.

It is well known that the government now in power is not in favour of taxing raw material, and one of the first changes we expect to see is the admission of iron free of duty. This will be a great advantage to Canadian iron manufacturers and will give them a better chance to compete for the trade of our mining districts.

On the other hand a more liberal policy in regard to the admission of mining machinery will enable our mine owners to procure the very best that is made in any part of the world without having to pay dearly to the government for the privilege of doing so.

Now that cabinet making is on the tapis we would again refer to the idea which we mentioned in our May number, of having a Minister of Mines at Ottawa. Mining is destined to be one of the most important sources of income in Canada, and it will afford sufficient work to keep a department of the government very busy. Besides it is a branch which requires special care, and this it can only have by placing a minister at the head of a distinct department having charge of it.

It is not probable that the idea can be acted upon for some time, as the office will have to be created and the department organized, which will take time. But there is one thing the government can do immediately, and this we hope it will see its way to doing.

The government can and should give the new member for Yale-Cariboo, Mr. Bostock, one of the portfolios in the cabinet. Not only does he represent the most important interests in the province—interests on which the welfare of our cities and towns depend in a large degree,—but he himself is intimately connected with nearly every district of British Columbia.

The appointment of Mr. Bostock would be a most popular one throughout the province, and what we specially regard—our mining industries—would have a friend at court.

We feel assured that in any case Mr. Bostock will leave no stone unturned to advance the development of our mining districts, but as British Columbia is entitled to cabinet representation, it will be to the advantage of the whole province if the man who represents interests of such importance to every person living in it is the one chosen to the position. We trust then that the new government will give the matter their best consideration.

Not many days ago the telegraphic despatches contained the important news that an English syndicate had purchased three of the principal mines near Rossland for eight million dollars.

The truth of the statement so industriously circulated through the press is now denied, and the question naturally presents itself, where did it originate and what purpose was served by sending forth an untruth about a matter of so much importance to hundreds of our citizens?

It is well known that powerful English capitalists have had their experts in the Trail Creek District for several months looking over the ground, and it may be that negotiations for the purchase of certain mines have been going on, but the best time to talk to the public about a transaction of this kind is when it has been fully concluded.

So many people are now dabbling in mining stocks and risking the little savings they may have to invest that it is unfair, almost criminal, to knowingly give out false information about our mines.

A rumour should never be allowed to influence any one, but what purports to be a distinct statement of fact is very apt to create distrust or undue confidence, as the case may be, in the minds of those having money invested in mining shares.

It seems to us that the parties responsible for sending out mining news in the press despatches should be called to account for any misleading statements they may transmit over the wires. It is too serious a matter to be trifled with, and correspondents should be obliged to take their information only from thoroughly reliable sources. The newspapers have the remedy in their own hands to guard themselves against "fake" news.

The death of Millionaire Corbin, it is thought, may affect the prospects of the Columbia & Red Mountain Railway, as it is understood his money was largely behind the enterprise. It is possible that such may be the case, but it is more than likely that before his death Mr. Corbin was so committed to the scheme that his estate will be bound to carry it on.

The necessity for the road and the evidently profitable nature of the undertaking will soon enlist the required capital to carry it through even if every one of the original promoters should step out. The building of the Red Mountain Railway in the near future is as sure as another fat divi-

dend from Le Roi Mine at an early day—which is a pretty sure thing.

We observe that the Rossland *Miner* takes the company owning the Wellington Mine to task for importing cheap labour. It seems to us rather early in the day to commence an agitation of this kind. If a company is foolish enough to employ inferior labour, the usual result of engaging cheap men, it is their own lookout, and the unsatisfactory outcome of such a policy will strike them very soon. But why our newspapers should start in on a labour agitation, perhaps ending in strikes and disturbances, just as our mines are on the eve of development, is more than we can see. It is only fanning a spirit of discontent amongst miners and distrust on the part of probable investors. Most mine owners are sharp enough to employ good men, pay good wages and get their work well done.

Some companies have already tried cheap labour and given it up. They found that good men were worth good wages, and decided to pay them. Companies who are mean enough to try and save a little on their pay list will soon find out their mistake. There is no undertaking where the services of a good workman are more valuable than mining. The leakage through employing cheap labour will soon show on the company's balance sheet. A labour agitation is not necessary to open their eyes.

We observe with pleasure that Rossland has not given up the idea of incorporation. We note also in this connection that the newspapers of that rising town are calling upon the residents to use individual exertion in keeping it in good sanitary condition. With incorporation this would not be necessary. We verily believe that before five years Rossland will have a population of between 30,000 and 40,000. It will be a great railway as well as mining centre, and if there are any in the town who now oppose incorporation in order to save themselves a few dollars in taxes they are doing a great injustice to the whole community.

In commenting upon the sensational news dished up by the American newspapers to their readers the Trail Creek *News*, in an editorial, gravely instances a case where a man named Martin Reilly is described as having discovered "a nugget weighing 20,000 tons, assaying \$55 per ton in gold." We feel like saying: "Oh! give us a rest." But if the statement did appear we sympathize with our contemporary in the fear that it will be the cause of a tremendous rush of gold-seekers (or "suckers") to Trail Creek.

The *Trail Creek News* is issuing a "Board of Trade" illustrated number of the paper on the 15th July. Success to you, friend *News*, and don't forget to send us a copy.

The *Nelson Tribune* having made the statement that Hewett Bostock owns the *Kaslo Kootenayan*, the latter paper remarks in most unparliamentary language that the editor of the *Tribune* is a—prevaricator. The distance between Kaslo and Nelson probably accounts for this outburst.

We are glad to note that the newspapers of the Kootenay appear to be in a flourishing condition, but a number of them are like a lot of Kilkenny cats—always quarreling among themselves. A friendly rivalry between places is to be admired, but the Kilkenny system is not glorious, nor will it be found profitable in the end.

It is like the Irishman who put a lot of his master's game cocks in the same pen, when of course they tore each other to pieces. On being remonstrated with for his folly Pat replied: "Sure, how did I know they'd be after fighting with one another; weren't they all on the same side?" It is so with the Kootenay papers—they are for Kootenay against the world. What, then, is the use of their tearing each other to pieces?

Premier Turner has returned from a visit to Kootenay. There are some districts crying out for roads. It would have been a good opportunity to interest the Premier in such necessary undertakings by interviewing him. Mr. Turner while in Vancouver on his way up country expressed himself in a newspaper interview as enthusiastic over the bright prospects of the mining industry, and we feel sure he will aid its development to the full extent of his power.

The Alberni District is exceeding in richness the most sanguine expectations. It will certainly be one of the greatest mining camps in British Columbia, and the operations of the Messrs. Dunsmuir and others interested with them have been so successful that it has inspired the greatest confidence in that locality. New companies are being formed for development work, and before the end of the summer it will rival Kootenay in activity and promise.

But it is not Alberni alone—the whole of Vancouver Island is known to be rich in minerals. A number of years ago, during the gold excitement in California and Australia, it was predicted by an eminent authority that British Columbia would

prove to be the richest mining country in the world for gold and silver, and that Vancouver Island would be the richest part of the province. We would not be surprised to see the prediction verified.

But there is another mineral which is not receiving the attention which it deserves. We refer to iron, of which there are several valuable deposits on Vancouver Island. In a future issue we intend to give a full description of these, and we believe that the time is not far distant when the iron industry will be one of the most important in the province.

The rapid progress gold and silver mining is making in the Dominion, especially in British Columbia, raises the question why Canada should not have a mint of its own. The time is ripe for the Government to take steps in this matter, and we trust it will soon occupy the attention of the authorities.

Once more we call attention to the gambling in mining stocks which is now going on in this province. Small investors are being induced to buy shares in mining companies, and in many instances we fear the money thus invested will be lost. The stocks of many of the companies are dangerous things for the general public to take a hand in. The investor has to depend entirely on what his broker tells him or on common report. He has no means of verifying what he hears, nor is he able to sell at the proper moment to save himself. It is a case of going it blind.

The broker may or may not be honest in what he says. The commission on the transaction is what he is after. The information he receives for his clients may or may not be reliable. There is no check. The only way is to get the stock exchanges in proper working order, so that only sound companies may be listed. When that is the case the safest plan for the investor is not to touch stocks that are not listed.

The shares of a number of companies are being offered on the market which we feel sure would be refused by any examining committee for listing purposes, and those who buy such shares run a good chance of losing their money.

Companies are formed to test and develop mere claims or prospects. In other words, the public in these cases are asked to bear all the burden of expense and run all the risk. If the mine turns out well it will enrich the promoters of the same.



HEWITT BOSTOCK, ESQ., M.P.
Yale-Cariboo.

pany and probably give a profit to those investing in it. If the mine proves a failure the promoters of the company are no poorer than they were and the investors lose all the money put into it. We warn the public to watch for such companies and have nothing to do with them.

Second Lecture on Metals and Metallurgy.

By W. PELLEW-HARVEY, F.C.S.

GENTLEMEN: Last week I took you hurriedly through the subject of sampling ores and gave some idea how to detect the nature of the ore itself. To-night, according to the notice in the paper, I should take up the treatment of ores at the works, but I have had conversations with many who attended the last lecture and have been requested to repeat in some measure what has already been gone over, as many would prefer to be more thoroughly posted on the detection of ores than on the smelting of ores. I am anxious to please the majority, and think, perhaps, it will well to go over somewhat the same ground as last week. Instead of treating the metals with solutions we will treat the ores themselves. Mr. MacFarlane will again assist in this. If there should be any difference in the reactions from those already given these will be explained. You will understand that in dissolving one metal the reaction is very clear, while in dissolving an ore containing three or four metals the reaction will be somewhat interfered with.

In our last talk we took up the subject of the detection of gold, silver, copper, lead, antimony and tin. I do not think I referred to the detection of bismuth. Practically the metal we are all seeking is gold. Gold by bulk is but a small percentage of any ore, and to detect it in a sample containing other metals is rather a difficult thing to do. Reference has already been made to the method of panning it to rid it of all impurities after being well crushed. This is the miner's method, and corresponds in principle to the concentration process at the works. In taking a small piece of quartz with visible gold in it you will often find associated with it something that looks very much like gold and has often been mistaken for it. This substance is most likely to be mica. Mica may be detected in several ways. Though it may look like gold while held in a certain position, if that position is changed there will be a change in the colour, while gold itself looks the same in every position. Then if you should pick out a piece of gold and put it under the hammer it will beat out thin and is soft, something like lead, while mica will break up in fine particles of white, floury-looking substance. Mica puzzles a good many prospectors and is found in samples very frequently. In panning a crushed sample the gold will remain and the mica will float away.

The principal point to be studied in gold mining is to ascertain whether the amount in the sample is sufficient to warrant that it will pay for the mining, freighting, extracting, etc. It is not always easy for the miner to ascertain this; he can get an assay made and know there is so much gold to the ton there. Yet while the ore gives an assay of \$100 for gold, one may not get more than \$60

out of the ore by smelting. Freighting the ore to the smelter is often expensive work. To obviate that you may have to treat it on the spot, which may be done in a variety of ways. Of this I will speak further on. I wish you to understand that it is most unwise to rely entirely on an assay for actual cash returns later on. I have some little knowledge of making assays myself. (Laughter.) I am supposed to give to a customer not only the amount of free gold, but of all the gold the sample contains as determined by fire assay. The fire assay corresponds to the smelting test. But before smelting the ore may have to be milled, passed over plates and caught by amalgamation with mercury. If the ore contains sulphurets the gold may be coated with sulphur or arsenic. This prevents the gold from amalgamating. The coating can best be removed by roasting. This will incur in many cases considerable expense, and, apart from this expense, there is also some mechanical loss.

Last week I showed you a test for the detection of metallic gold. This consisted in dissolving the gold in a solution of *aqua regia*, made up of three parts of hydrochloric acid with one part of nitric acid. The latter alone will not attack gold, but the two in combination will rapidly dissolve it. If to the solution you add some sulphate of iron you will get a very decided precipitate, which is metallic gold. I think it best to repeat the test to-night, for as a field test I believe it will be very valuable for prospectors, and is one I would like you to make a note of. In this precipitate the gold is divided very finely as atoms of gold; it is difficult to explain how fine the atoms are. I will repeat the process now shown you. First the gold is dissolved in hydrochloric and nitric acids; this is diluted with water and a little more hydrochloric acid added; to this solution is added a solution of sulphate of iron. This throws the gold down in a brown precipitate, and on being allowed to settle the solution is poured off. The precipitate is then placed in a crucible and heated and a yellow bead of pure gold obtained. There would be no loss except mechanical loss.

I have here a sample of Albarni gold ore in quartz matrix, the richest ore I have ever seen, running \$5,000 to the ton. Last week I told you that these tests by acids were very useful, and I used them in preference to the blow-pipe test on account of the complex nature of the ores of this country. Another simple test for gold, apart from the fire test, is to add to a similar solution to the one just now used some crystals of chloride of tin, when you will immediately get a pretty purple colour, usually called purple of Cassius. Perhaps Cassius was the name of the person who found it out in the first place and it was named after him. When out in the field you should be able to rely somewhat on your own tests; when it is convenient and desirable get an accurate return from an assayer. But in a test of this kind the prospector could estimate the amount of gold himself very readily by filtering the precipitate and using a small balance to weigh the amount after drying it.

We will now pass from the subject of gold tests to that of gold concentration. Concentration is one of the most important factors in the success of gold mining. Suppose you have an ore containing pyrites—say arsenic, iron and copper pyrites—with gold associated with the pyrites and the sample containing more or less quartz. To

ship the whole mass to the smelter would mean that you were paying freight on fully two-thirds of valueless quartz by weight, leaving out of each ton not more than one-third of a ton containing value. In mining camps as a rule there is a concentrator which will do custom work; that is, so much a ton is charged for concentrating ore. In concentration there is always a small loss that cannot be avoided, caused not only by the handling, a mechanical loss, but also at times a loss from the dissolving of a metal by water, as might be the case with certain silver ore.

We will pass the diagrams of mining machinery to-night. In regard to the crushing of ores, many ores can best be crushed by stamp mill. Suppose you have a quartz which contains no free gold, though gold is present. After crushing the rock by stamps the crushed material would be passed over to the concentrator. The Frue Vanner is the best machinery, I think, for concentration. In this machine is placed a rubber belt six or eight feet long, according to the amount of work to be done, and four or five feet in width, with elevated sides. A motion is transmitted to it by three rollers, one at either end and one near the centre, the whole forming a triangle or V-shape, the upper portion being slightly inclined from the horizontal. Water is poured down over it, carrying off the lighter material; the heavier sulphides remain on the belt and are moved towards the stamp mill. These sulphurets are carried forward by the belt until the whole passes into a trough of water, when the concentrates are washed from the belt into the trough and allowed to settle. The speed required is an important point, and must be carefully regulated according to the weight and size of the crushed material. After a little experience it is possible to save from the concentrates all the metal, with the exception of a very small percentage, perhaps 3 per cent. or 4 per cent., loss. The concentrates may then be treated by the chlorination or cyanide processes. All quartz not containing free gold is by this process removed, that is by the Frue Vanner, thus saving much of the cost of shipment.

Last evening we gave you a test for metallic copper. To-night we will show you a test for copper, using a carbonate copper ore. This will show you that no matter in what form the copper exists the reaction will be the same; there will be the same definite colouration. This carbonate of copper is from near Golden, in East Kootenay, and contains about 50 per cent. copper. It is worth more than ordinary copper on account of the ease in smelting. We first crush the ore and place in nitric acid and the whole is heated until the ore is dissolved. This is diluted with water and some ammonia added. The solution immediately turns dark blue. If you have associated with the copper some nickel the nickel will also show a blue colouration. These carbonate ores are found only at short depths in a mine; as soon as you get deep in a mine they immediately change to copper pyrites.

The prospector and miner going into the field should be able to test for the various ores without any great scientific knowledge on the subject. If any of the ore he seeks is found as a sulphide, that is a combination of sulphur with the metal. These sometimes carry a large percentage of copper, iron, etc. Ores of this class are usually more difficult to treat. The difficulty may be got over

by taking a small sample and crushing it and heating it on a shovel. The heat will drive off sulphur, arsenic and volatile matter, leaving the ore in a state that is readily attacked by acids, and having got rid of the sulphur it will have no effect on the colouration of the test. If you wish to avoid roasting, however, take nitric acid and add it to the crushed ore. This will give the same effect.

I will now take up a copper ore more difficult than the last. On first sight I would call this an iron ore, and it does contain a large percentage of iron, but associated with the iron there is about 3 per cent. copper and \$4 to the ton gold. This sample looks exactly like the Rossland ores. The iron contained in the sample is practically valueless. How do you find out if there is copper here? It cannot be detected by sight, but can be found by the test just given. Dissolve some of the ore in nitric acid and add ammonia. I will not go into the calculation for finding the percentage of the copper contained in the ore; that is outside of the prospector's ordinary work. This sample is from the Coast, and equals in value the first discoveries on Trail Creek. Some people tell us it is impossible to find gold in the range near us, but I fail to see why we should not get gold here as rich as at Trail Creek. My theory is, you get gold where you find it. To take any vicinity and say the formation is against the discovery of gold there is, I think, an exploded theory just now. Some of the greatest mining engineers of to-day were sent to South Africa to report on the probability of gold existing there. They returned and told their clients it was impossible to find gold there, as the formation was against it. Some one having more practice than theory, basing their opinions on what had been done in other parts of the world, decided to sink upon the formation. In consequence they come down to valuable auriferous conglomerates. To one not accustomed these conglomerates would look valueless. The gold is not associated with the gravels, as our Cariboo deposits, but with the finer material making the cement between the gravel.

The ores most frequently met here are iron, copper, lead, gold and silver, but it is often valuable for the prospectors to know other ores and other tests for ores than those just mentioned, especially in this new country. For instance, the sample I hold in my hand would likely be passed over as valueless by one seeking only for the usual metals of the country. This is a cinnabar ore, a sulphide of mercury. One of the first tests for cinnabar is to scratch the sample with a knife; the streak will show a bright crimson. A rough field test for this ore is to dissolve a little in nitric acid and add a solution of caustic potash, which gives a yellow precipitate; or, again, if you are in the field and have an idea the ore is cinnabar, pulverize a sample and place it in a basin and mix with it a little lime, which can usually be got in the field; heat all together, and pass a gold coin over the fumes arising from it; keeping the coin cool you will have a mirror of mercury collect on the gold coin. Or, better still, if you have the proper apparatus, pulverize the ore and place in a test tube with some chloride of lime. Close the top of the tube and place a small tube therein so bent that it will pass into a basin of water. Heat the bottom of the tube containing the dry ore and lime, keeping the upper part of the tube and the small tube

cool. The mercury will condense and flow into the basin of water which holds the small tube. This test for mercury should be made a note of, for as an assayer I find prospectors sending in all sorts of rocks thinking they have found mercury, and assayers' tests are expensive items. It is better for the miner to make a cheap test for himself if he can do so.

Other ores we might mention in this connection are cobalt and bismuth. Samples of these ores are here before me. The sample containing bismuth is, you will notice, very heavy. There is antimony associated with it here. It contains about 23 per cent. of bismuth. In testing for these metals dissolve a crushed sample in nitric acid to oxidize it; then add potash in excess. If it is bismuth you will have a white precipitate; if cobalt a green colouration, or rather more of a blue than green. Bismuth is worth, I think fifty cents per pound. The idea that bismuth ore is very valuable is all right if the ore exists in a great state of purity. If, as in this case, there is antimony combined in a large percentage, the cost of reducing it from the ore and getting rid of the antimony will be found to be very expensive and would give less actual returns than a low grade pure ore. This sample comes from East Kootenay. It contains 23 per cent. bismuth. This is considered a big percentage. A firm in London was inquiring about the claim. They got a shipment of five tons from there. Ore very similar to this was sent, but they found some of it contained only traces of bismuth. Under the circumstances they decided to let the thing alone. It seemed to be in pockets or bunches. They found out from Western mining men that bismuth is often found in that way. Cinnabar is found associated in leads at times, but scarcely ever in definite ledges. As a rule it is disseminated through the mass of rock, and often costs all it is worth to mine it.

We spoke a short time ago of finely divided atoms, and in the copper tests given we found these atoms gave a blue colouration to the solution of copper in nitric acid when ammonia was added. Perhaps it would be of interest to you to hear how finely the atoms are divided to give the colour. Pour the solution in a quart of liquor. A quart of liquor contains 14,500 grains by weight. All the liquor in the quart will be coloured blue. This blue tint is caused by the atoms of copper splitting up. If the 100th part of this solution is taken away and added to another quart of liquor or water it will still show a blue tint; 14,500 multiplied by 100 gives us 1,450,000. Out of seven parts of the colouration copper contains but one part, while the nitric acid contains six parts. Therefore if you now multiply 1,450,000 by seven you will get the percentage of the small particles or atoms contained in that water. You think this is very fine. So it is, but it might be even yet continued. This will illustrate to you how fine atoms may be, and are, according to the atomic theory. If we wish to prove that the solution yet contains copper we may do so by introducing the blade of a knife, when the copper will form on the steel by reason of its affinity for it.

When in prospecting you find any rock at the surface carrying pyrites you may expect to find mineral below. There is an old saying in Cornwall that if you have an iron capping you most likely have metal beneath. Iron pyrites are found

in various forms, often as cubes, sometimes massive. You might be inclined to think the cubes were valueless, but they may contain gold; on the other hand, they might not. Pyrites are often associated with quartz, and when exposed to the surface the metal oxidizes away. I have here a sample of honeycombed quartz. The cavities were once filled with pyrites. Such cavities may contain concentrated gold. In taking assays from such samples you do not get correct assays of the body of the ore. From the surface quartz you would get a higher assay than anywhere in the mine perhaps. Some of the mines I have examined in Kootenay had their surface covered with this honeycombed quartz, caused by the oxidizing of the pyrites by the action of the atmosphere. The pyrites have become split up and washed away, leaving the gold in the cavities. Invariably in sinking upon this ore you soon get below this chemical change, and if ore is still present it will be in the form of a sulphide. I am speaking a little bit out of my line, perhaps, but I call attention to the fact, as a miner in getting in machinery to treat his ore must act gradually. He may, perhaps, put in a small stamp mill to crush what appears to be a free milling ore, and after going down ten or twenty feet he may come upon a non-milling sulphide.

I have here a sample containing gold and silver, — brittle silver, an unusual ore in this country. I have no doubt but any ordinary miner would pass that by as an ordinary ore. Where you have brittle silver, especially if associated even in small proportion, it brings the worth of the ore to average a good deal.

Perhaps it may be well to call attention to the difference between galena and some ores looking like galena, specular iron ore, for instance. I will give a test for this outside of the weight of these two ores. The sample of specular iron ore I hold looks very much like steel galena. By steel galena I mean the cubes, which look very fine, like broken steel. In some parts of Kootenay steel galena carries silver, sometimes to a great extent. In some parts of Kootenay steel galena carries much more silver than in others. In the Slocan country the steel galena is of poorer grade than the cube galena, while in East Kootenay, at the North Star Mine, it is the reverse; the cube galena is poorer in value in silver than the steel galena. My theory for this is that in East Kootenay there is zinc ore associated with it, and zinc is known to have an affinity for silver, and perhaps causes the galena to change to a finer grain with silver.

I will compare the galena with specular iron ore, because it is more often mistaken for galena than most ores. I have known a case in which this ore was actually shipped by a man who thought he was shipping galena. The test for specular iron is this. Crush the ore and heat it in nitric acid until dissolved; dilute the solution and add to the solution a few drops of ferriocyanide of potassium; you then have a dark, blood-red colour. If it were galena you would have no colouration at all. You were shown last week that if a lead ore was dissolved in nitric acid and the solution diluted, and to it some hydrochloric acid added, a white precipitate would immediately appear. If you then had any doubt as to its being lead, or specular iron instead, you might make the test for iron; or to prove the white precipitate was

lead, add ammonia; the white precipitate will remain unaltered if it is lead.

It might be well to say a few words on tin ores and the methods for their detection. In the county in which I was born tin mining is one of the principal industries. Strangely enough, all the mines of tin in Europe were first started as copper mines. The copper found there capping the tin was a sulphide of copper, yellow iron pyrites. Around these ledges of ore we have granite—the country is full of granite—considering the amount of granite we have near us it may be advisable for the miner to watch for tin ore. Tin has been discovered and mined in vast quantities in the Straits Settlements. It is in the form of stream tin. The mining of the ore is altogether avoided—that is deep level mining. It is procured as we procure gold in Cariboo, from alluvial washings. On this account, and on account of the cheap labour in that Eastern country, they are able to get the tin from the streams and place it in direct competition with the Cornish tin mines to such an extent that these mines, once so famous, are on the eve of closing down solely on account of this competition. The Cornish mines are producing ore from veins three-quarters of a mile in depth. I was working in a mine in Cornwall where the depth gave a temperature of 72 degrees. You can understand that in comparison with surface mining the cost of bringing out the ore from these depths and placing it in the market would be very great, and many of the Cornwall mines have been working for quite a while at a loss. Tin is worth about thirteen cents per pound, and unless your ledge should yield more than 5 per cent. tin it would hardly pay the cost of mining and dressing. Should the ore be cassiterite, which is a whitish looking ore, it would have to be roasted, which is an expensive process. So unless tin should be found in the streams it is not such a bonanza as many think. I would not be surprised should tin be found in some of our creeks. The formation is favourable.

In Cornwall the mine owners test their samples for tin much as our placer gold miners test for gold—on the principle of panning. The ore is placed on a panning shovel, something like a big, square grain shovel; the sample is crushed fine and panned with a side shake, thus getting rid of all the gangue, leaving the tin and wolfram. In Cornwall wolfram is always associated with tin. This is got rid of by roasting. They invariably roast tin ore before sending it to the smelter. Block tin is produced from smelted tin. It is similar in appearance to bar silver; it has not quite the same white, metallic look, but is more of a grayish colour. It was the intention when these lectures were started of giving a course on metallurgy; in fact, my arrangement with the Government was to speak on metallurgy only. The subject of the treatment of ores is rather an advanced one for the miner, and I thought it advisable to go back to the point we started from. I am sorry I have not had an opportunity of going into the treatment of ores received at the smelter. It would no doubt have been of great interest. A certain amount of information must necessarily be given leading up to the subject, and this information, educating up to a certain point, could not be given in one or two lectures. The difficulty comes in knowing where to draw the line. I am very anxious to be understood by all. To make every-

thing very plain it has been found better to go over much of the same ground twice.

A point I wish to mention is this. If any gentleman here should feel that he was not sure of the ground I have gone over and is anxious to be able to make tests himself, I would be most happy to set apart one or two afternoons and have you meet at my office and go through these practical tests yourself, with the assistance necessary from me to aid you in making rough assays and metal tests.

This lecture course now practically concluded, was commenced by the government for the purpose of finding out what interest would be taken in such matters in the various towns. I believe all have been pretty well satisfied with the course, and having got a taste of a knowledge of mining and ore testing, it will lead them to want more. I believe the government intend starting classes next fall. As I said to you before, I do not know whether these classes will be held in Vancouver nor who will manage them. I am not anxious to undertake the work as I am very busy. I would rather see it in the hands of someone having more time. The government course will consist of instruction in ore treatment, ore testing, assaying, mining—in fact, everything in connection with the mining and smelting industry that the ordinary prospector and miner would wish to follow up. We have a great many good practical miners and prospectors in the field, but their practice is all they have to guide them; they need a little theory to help that practice, and I hope the course the government intend to take up will successfully accomplish this.

A hearty vote of thanks was proposed and seconded, and the gentleman seconding the motion remarked: "I take much pleasure in seconding the motion. Mr. Pellew-Harvey when in London some time ago brought considerable notice of British Columbia to the people there. While I mention this I would like to say I see many here to-night who have been to most of these lectures, and I am sure they were interesting to and enjoyed by all. Mr. Carlyle is no doubt the right man in the right place. I think we should have an expression as to what he may do; I think myself that he should have a free hand. If he is tied down to a certain place I think the advantage to be derived by us will be small. If he is allowed to go about in the different parts of the province and do the work in his own way I think it would be of the greatest possible benefit to the province. No doubt a great deal of good has been done by these lectures. I think this department should be taken away from politics and brought out on a practical basis, a mining basis, not a political machine at all, and I think we might throw out this intimation to some of our cabinet ministers. (Hear, hear.) I see by the papers of Nelson that the government sending lecturers to Victoria and Vancouver to lecture on mining, is like sending lecturers to Kootenay to lecture on the salmon industry. There reason is we are not a mining people here. They are wrong; the people here have an interest in it. At the same time it shows that if the department will show their hand and go to the trouble of disseminating this knowledge through the country, and particularly in the mining districts, great good will be accomplished. Our lecturer, Mr. Pellew-Harvey, has been a long time in this province, and he has always shown



QUESNELE FORKS, B.C.

himself agreeable to all, and ever ready to disseminate knowledge in these matters. He has been put to considerable work and trouble lately. I have much pleasure in seconding the motion. (Applause.)

Mr. Pellew-Harvey: I have much pleasure in acknowledging your cordial expression of thanks to me. I feel that as you have paid for these lectures you are deserving of all that you have received from my hand. Leaving that aside I would like to make a remark or two on a subject of vital importance to the people of Vancouver. This must be understood as being altogether outside of the lectures, and something with which the government has nothing to do.

I had a letter last week from one of my friends who are members of some of the largest smelting firms in England, saying they had received various communications from me and had posted themselves also by visiting this country, and asking me to report to them fully as to the chances of making a success of smelting on this coast. Now, as you are all aware, I started this question of smelting with regard to Vancouver a long time ago. Others have taken the matter up, and it now appears as if we were going to have a smelting people, men with strong minds. I do not speak from a personal point of view; I do not want to bias anyone; I wish to be understood. The erection of a smelter here would be a big undertaking, and to be a success it should be erected at the best point and have a sufficiency of capital far exceeding the actual capital required for the smelter. The cash to be advanced for the erection of a smelter is nominal compared with that necessary to make smelting a great success. The first charges are light; it is necessary to have big backing after the smelter is erected. Then it is necessary to watch the best channels of trade to carry off the products of the smelter. A smelter before starting should be supplied with the various grades of ore necessary for economic treatment. Our advantages offered for a smelter are many. We have good railway facilities, and are in direct communication with all points by water; freight on ore by water we know is cheap. Again we have the advantage of cheap fuel. In Ontario they have to import fuel for smelting. Our manufacturing industries are increasing; considerable development will be seen this coming summer. If this matter of a smelter comes up—and I hope it will definitely very soon—I hope the enterprise will be started by practical men who will put a practical plant in operation. I believe there will be considerable development done this summer. English companies who have hitherto spent their time and money in South African investments are now turning their attention to B. C. as a profitable field for investment under the British flag. From letters I am constantly receiving I believe we are on the eve of important industrial developments; if so this will direct the future of mining in British Columbia.

The proprietors of *The B. C. Mining Record* at considerable expense have undertaken to reproduce these lectures in their journal from their stenographic report. This will give an excellent opportunity to follow the course or to check over your notes; this course is recommended.

Fort Steele.

FORT Steele, the distributing point for the Fort Steele mining division, is situated on a bench overlooking the Kootenay, at its confluence with the St. Mary's river, and Wild Horse creek. This plateau on which the town is built has an elevation of about one hundred feet above the water level, and is bounded on the north and west by the Kootenay river, on the east by a stretch of rolling country of about two miles in width, which intervenes between the river and the first range of the Rocky mountains; on the south by the gulch through which flows the Wild Horse creek, comprising in all about four hundred acres of almost level ground, that portion fronting the river to the west being laid out in town lots, which are being placed on the market for sale by the owner, Mr. R. L. T. Galbraith. The property was originally located by the late Jno. T. Galbraith in the spring of 1864, at the time of the discovery of the rich gold placers in the Wild Horse creek, who established a ferry and trading post at this point; consequently it was known for years as Galbraith's Ferry. In 1888 the ferry was replaced by a bridge, which being carried out during the high water of 1894, necessitated the building of the present structure, at a cost of \$17,000. In 1887, when a division of the mounted police came in here under the command of Major Steele, this was the site chosen for the erection of barracks, etc., and in the natural course of events a town began to spring up in the vicinity, which finally became known as Fort Steele. From that time to the present it has gradually increased in importance, on account of its commanding situation, all the main trails of the district converging to and passing through this point, besides being during the season of navigation, in direct communication with the outside world. The coming summer will see a large improvement in this respect, as in all probability there will be at least four if not more steamers plying up and down the river, between Jennings' on the Great Northern and Fort Steele, enabling travellers from the south to reach Fort Steele from the railroad in about two days, while on the down trip, arrangements will be made so that a party leaving Fort Steele in the morning will arrive at Spokane Falls at an early hour the following day. There will also be a steamboat route to Golden on the C. P. R. Boats will run up the river to Canal Flat, connecting there by means of tramways, etc., with the head of navigation on the Columbia river, so that people coming into the country may have a choice of routes, either by way of Golden on the C. P. R., or by Jennings on the Great Northern.

During the winter months communication has been confined chiefly to the wagon road to Golden, a distance of about 160 miles, but last winter through the enterprise of some of the Fort Steele residents, a sleigh road was put through connecting this point with Kalispell, on the Great Northern, 130 miles to the south.

Since the mining interests of this section of the province have been attracting the attention of outside capital, Fort Steele has developed into quite a thriving community, new buildings are being continually erected, and quite a large business done with the surrounding country, it being the natural distributing point for all supplies necessary in the mineral and agricultural pur-

suits, besides being a port of entry, headquarters for the local government agent and Indian agent. There are two stores, three hotels, Prospector printing office, blacksmith shop, resident doctor, public school with a good average attendance, assayer, surveyor and engineer, two livery and feed stables, two barber shops, a laundry, and quite a number of private residences.

From the present outlook of affairs the country in the vicinity will soon be the scene of extensive mining operations. At present the North Star mine, distant about twenty miles in a northwesterly direction, is producing about thirty tons daily, which is being transported by wagon road to the river, at a point about seven miles above Fort Steele. It is the intention of the owners to ship this ore by boat to Jennings', which is the natural outlet, and will be the principal route for that purpose, until a railroad is built into the country. A contract has been let to the steamboat men for the transshipment of 5,000 tons of ore during the coming season.

Considerable work is being done in this section of the country, notably on the St. Eugene mine, a large silver-lead property situated on the Moyre lake, and close to the old Walla Walla pack trail, distant about thirty miles. In all probability the owners of this claim will ship some of their ore; also the bondholders of the Dibble group, who have been doing development work this winter. These claims are situated in a gulch of the Rocky Mountains, about ten miles east from Fort Steele. Then up Wild Horse Creek there are numerous gold quartz properties being opened up, besides the four placer mining companies who are making extensive preparations for work during the summer. In fact, there is every prospect of a decided advance in mining matters. Fresh discoveries are constantly being made in the vicinity of the North Star and Sullivan groups, which goes to show that there is an immense deposit of silver-lead ore in that section. This fact has been now so well established, that before long some enterprising capitalist, who fully grasps the situation, will erect a smelter at a convenient point. Then these large bodies of ore may be worked to advantage. There would be no difficulty in obtaining everything necessary for the carrying on of smelting operations. Coal from the Crow's Nest coal fields, only fifty miles distant; lime and iron in abundance; the supply of timber and cordwood inexhaustible, with unrivalled water power on many of the tributary streams.

As far as agricultural pursuits are concerned, there are quite a number of farms and ranches scattered up and down the valley. Among these may be mentioned Cranbrook, the property of Col. the Hon. James Baker, distant about ten miles in a westerly direction from Fort Steele. This is one of the choice spots in the valley, being composed of fertile prairie land, through which flows a tributary of the St. Mary's river, surrounded by miles of rolling bunch grass hills, sparsely timbered, which afford excellent pasture for horses and cattle. Then to the south for about fifteen miles, extending along the foot of the Rockies on the east side of the valley, are quite a number of valuable ranches, which support moderately large herds of stock, and on which large crops of hay and oats are grown. To the north again, towards

Canal Flat, are some choice locations. About twelve miles from Fort Steele by the wagon road and on the bank of the river, is situated what is known as Wasa, the property of Mr. Nils Hanson, who settled there in the year 1886. He has a saw-mill, hotel and store at this point, and has spent quite a large sum of money in improvements, has a good system of irrigation, a young orchard well advanced and in a healthy condition, a carefully managed garden in which is grown all kinds of vegetables, usually producing quite a large crop of tomatoes, which with proper attention seem to ripen without much difficulty. On the banks of the St. Mary's river, about seven miles westerly from Fort Steele, is located the R. C. mission, with an Indian school under the charge of the Sisters of Charity. In this institution there are at the present time twenty-five boys and twenty-five girls. There is no doubt it has a great tendency toward the amelioration of the condition of the Indian population, making them more contented with their lot. In this vicinity there are deposits of black sand which carry a certain percentage of gold; and some time in the future, no doubt, the contiguous banks will be worked by companies. Gold quartz discoveries have been made in the dykes of rock crossing the river above, but as to the actual value and extent of these lodes it would be a mistake to express an opinion until further development work has been done.

By reference to the agricultural report it will be seen that this section of country is blessed with a fine climate, the following being an extract:

Highest average temperature during 1894, 64.8.
July.

Lowest average temperature during 1894, 16.5.
January.

Highest temperature, 95.2, July and August.

Lowest temperature, 29.3, February.

Total rainfall, 12.7 inches.

Total snowfall, 36.0 inches.

In reading this report it ought to be borne in mind that 1894 was an exceptional season. For the last two winters the snowfall has been very much lighter and the cold much less severe. Prospectors can without much difficulty remain out in the mountains through the region for nearly seven months of the year. It would be just as well also, in view of the expected rush into this part of the province, for everybody on the outside to clearly understand that it would be a great mistake for any man to come in here with the expectation of obtaining work, the labour market being well supplied; in fact there is an oversupply at the present time. The only class for which there is an opening are prospectors and miners who can outfit themselves, and spend the season prospecting, and not be hampered in their movements from the want of funds. No doubt as the mines open up there will be a demand for all kinds of labour, but in the meantime unless a man has the means to support himself, he had better think twice before venturing.

A description of Fort Steele and vicinity would not be complete without mentioning the existence of the Fort Steele Mining Association, which came into being about a year ago, with the object of bringing this section of the province to the notice of the outside public. It has accomplished quite a

lot in that direction, having been ably assisted in this respect by the *Prospector*, which has attracted considerable attention from papers all over the continent owing to the unique character of its appearance, and the evident intention of its editor to give full and reliable information concerning all the mining interests of the section.

Hot Springs Camp.

THE oldest mining camp in West Kootenay has awakend into new life. For the past four years it has been sleeping. Only one or two properties have been shipping; so that outside of assessment little work has been carried on.

The Skyline has over 600 tons of ore at the mine ready for shipment, and intends to ship from twenty-five to fifty tons a day throughout the season. At present they are working in a chute of ore four to eight feet wide, that assays from three to eighteen hundred ounces per ton. The Pilot Bay smelter is now taking about fifty tons a day of the ore hauled down this winter.

The concentrator at the No. 1 mine started up on the first of the month, and will be run day and night, as they have several thousand tons ahead, and have the mine in shape so that they can easily supply the mill hereafter. They have several hundred tons of carbonates sacked, ready to ship as soon as the roads are passable for the teams.

W. W. Warner, who has a lease and bond on the Neosho, has several hundred sacks of ore ready to ship, and is at present taking out and sacking twenty-five to fifty sacks a day. This ore runs 140 to 600 ounces.

Some Spokane parties have taken a lease and bond on the Norman (south extension of the Neosho), and will commence work at once.

The Little Phil and Black Diamond are still working on the No. 2 vein, and the last shipments netted \$26.00 a ton. They intend putting in a large concentrator this summer.

The work which was suspended some four weeks ago on the Terminus tunnel will again start up on the fifteenth, and continue till the vein is reached.

Clark & Van Hook have eighteen inches of clean shipping ore on the Tariff. They have shipped several car loads during the past two months, and it is said to net them a snug profit.

Stalburg & Company have leased the Mill Point and will commence operations at once.

Work on the Highland is continued and a contract was let the past week for an up-raise near the breast of the lower tunnel, which is in some 800 feet. The up-raise will be about 400 feet.

There is now over \$100,000 worth of ore blocked out in the mine. Mr. Corbin, the owner, intends erecting a concentrator at once.

Forbes & Fling, who took a bond off S. Weese on the Bruce claim, have, so it is reported, decided to put in a plant of machinery at once.

The Canadian Pacific Mining and Milling Company have their 1,400 foot long flume nearly completed, and have a 120 h.p. air compressor and Pelton wheel in place, and will be ready to start their drills about July 15th. They will, no doubt, erect their concentrator at once now, as the Boulder tunnel vein has been opened during the past month, and it is a mammoth showing, being over thirty-seven feet between walls, several feet of good shipping ore, and the whole body a fine concentrating ore. This company's group of pro-

erties, when opened will be a rival to the famous Blue Bell, just across the lake, which now employs sixty men and is shipping 200 tons of ore a day to the Pilot Bay smelter, which latter company own and operate it in connection with the smelter.

Among the properties that have been bonded and leased the past few weeks are the United, Union, Old Timer, Tenderfoot, Glengarry, Antigo, Twin, Star, Wantopa, Yankee Boy, Luther, Spokane and Trinket.

Most of these will start up during the next month; many of them will commence shipping at once.

It is reported that the Dreea and the Highlander will both be worked this season. They are of high grade dry ore.

All in all the outlook for the Ainsworth camp the coming season is very bright.

Dredging.

THE region about Quesnelle will, this summer, present a scene of extraordinary activity in gravel mining. The six principal dredging companies, owning leases on the Fraser and Quesnelle rivers, are satisfied of the richness of their claims, and are backing their opinions with a free expenditure of money for machinery and supplies, while many smaller concerns, and individual miners, will be at work drifting and sluicing on the benches and bars.

If the reported results of preliminary tests may be relied on, the gravel of this whole region, both above and below water, is incomparably richer than that of California, to mine which so many millions have been expended in machinery and plant, and, as there are no statutory restrictions against dumping tailings into the rivers of British Columbia, capitalists are at liberty to handle their properties to the best advantage, without let or hindrance.

As to dredging, the results of the present season's operation should definitely determine whether the system is a paying one, and enable capitalists to judge as to investments. It should, also, determine which kind of dredge will accomplish the best results, and at what cost.

Up to this season patentees of dredges, and promoters of dredging schemes, have had much difficulty in enticing capital in their enterprises, for lack of exact knowledge as to what the various types of machines would accomplish in the rivers of British Columbia. They have been obliged to theorize and make predictions by calculation, or cite the experience of companies in other parts of the world; but, as moneyed men are aware, theories however well worked out on paper, may be wholly inoperative in practice, and it has not been easy to induce them to take stock.

The year '96 will, however, remove all uncertainty, and, if it proves a success, dredging will take its place among the other practical methods of gold mining, and receive the prompt support of investors.

The Deer Park Country.

(From our Special Correspondent).

THIS is the gateway to an immense mineral belt to the southwest with abundance of timber and water power sufficient to run the machinery

of a large city, with enough agricultural land to supply garden produce for a large community. There is clay enough here to supply brick for the entire province. More than 1,000 deer roam upon the place, and there is grazing land adjoining for thousands of cattle and horses.

Since coming into the Kootenay country I know Deer Park as the hunter's and sportsman's paradise, and where the surplus stock of the Kootenay is taken to winter, the climate being so mild and grasses so plentiful that stock winter there without having to be stable fed or requiring attention of any kind, and come out in the spring sleek and fat.

Last winter, while hunting in the Park, Messrs. Bates Bros. and Sapandowski and Coppack did a little prospecting. They found plenty of large, well defined ledges, which, upon investigation, were found to contain abundance of mineral similar to that of the Trail Creek country. A number of locations were made and development work begun which showed up so well that they quietly located much of the country. It has since become known that these great ledges are a continuation of the Trail Creek mineral, and that it is even more abundant, and possibly richer.

Messrs. Topping and Peterson, of Trail, took a hand in locating and development, and were so well satisfied with the outlook that they bought 1,800 acres of land in the Park on the lake front where they have laid out the most beautiful townsite to be found in the province. Lots are being bought as fast as placed on the market. Lumbee is now on the way from Nakusp for a number of buildings, one of which is an hotel by Messrs. Topping and Peterson to be 40x100 feet. I am also going to move there at once to get in on the ground floor in the Queen City and camp where I was fortunate enough to secure four lots in the best location in town, and when people are thoroughly alive and awake and when the townsite people are going to advertise and push the place. These men do not need to name the town after themselves to make it great and famous. Deer Park will continue to wear its present name, its grassy slopes and terraces, and some of its fine shade trees which are scattered over it as if placed there especially for beauty and pleasure, as if just for picnics. But I fear that the water front will soon be shorn of its natural beauty and instead of grazing ground and deer licks will become such a busy, hustling city as we seldom see in these parts. Instead of going out a few hundred yards from camp before breakfast, as now, for a deer, we shall have to buy our meat.

There are now about 200 people prospecting in and about the Park. The ground is all staked far back from Robson towards the Needles and later on will extend across the Slocan Lake.

I hardly thought of writing anything for publication, but should you feel disposed to use any part of it you may do so.

We will have a photographer at the Park soon and I shall get all the views I can for you, and will write you something more about this part of the province.

Another item and I shall close. Bates Bros. & Peterson are driving a tunnel on the Wild Horse—at the Park—and are in about sixty-five feet. They expect to strike the ledge at about seventy-five or eighty feet, and at about the sand depth.

Camp McKinney.

CAMP McKinney is fifty miles from Penticton on the ridge between the forks of Rock Creek at an altitude of 5,000 feet. The road from Midway runs along the Kettle River most of the way over high valley lands. Twelve miles along this road brings you to Rock Creek, from which a horse trail cuts across a steep mountain zigzag, thus greatly shortening the distance. Having ascended the path the road is again struck, and leads you over broad stretches of rolling prairie where herds of cattle and horses graze, and through which Rock Creek has cut a deep canyon fringed with timber. Then you cross the south fork and steadily climb for several miles through dense forest until the camp is reached high on the ridge.

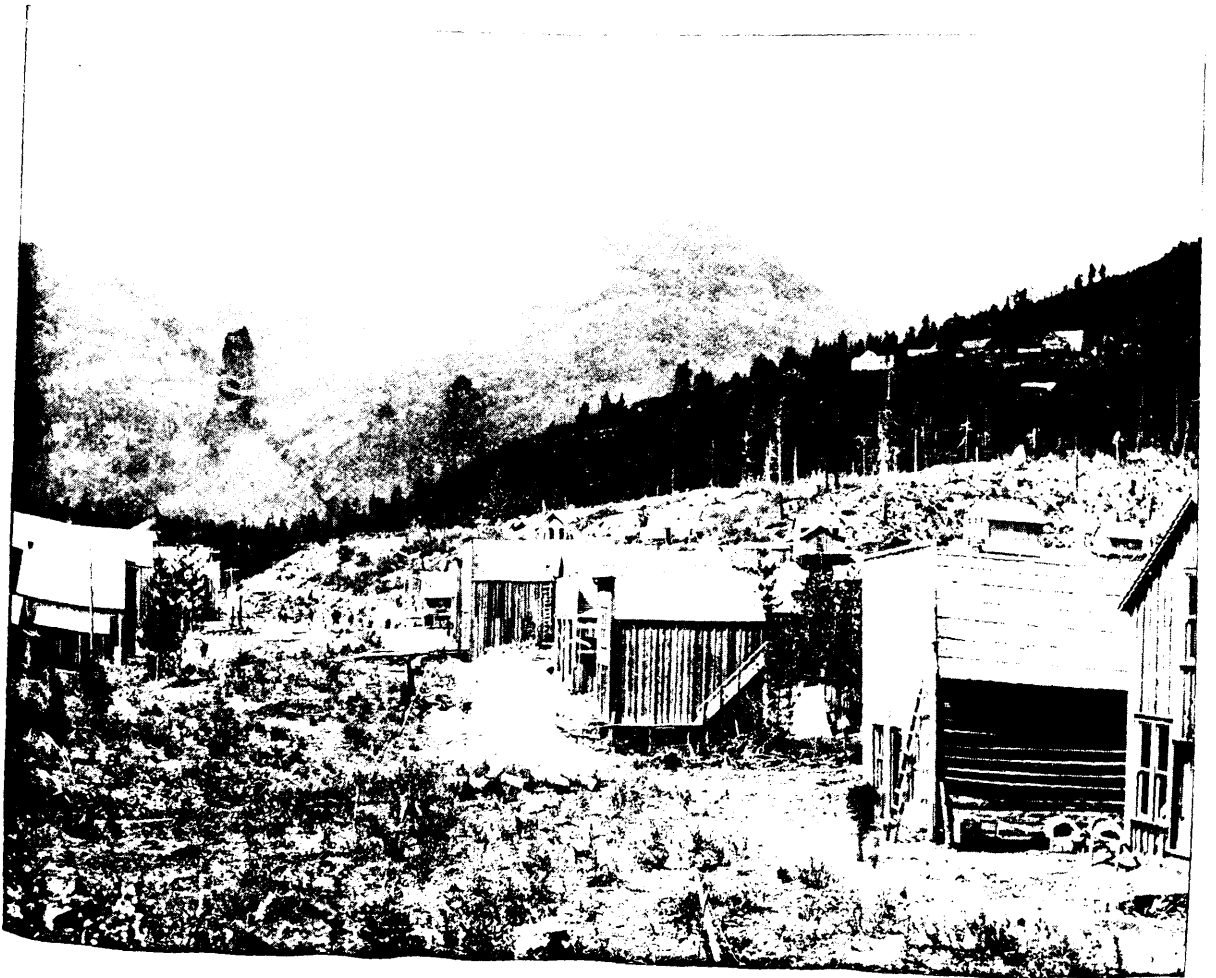
The rich placer washings of Rock Creek had long inspired the belief among miners that there must be quartz ledges carrying free gold near its headwaters, and the first locations were made in 1884, four miles east of the present camp, and half a mile from the falls. F. Georicke, of Concully, located the Victoria on a ledge of free milling quartz in a talcose schist formation, and sank an incline shaft 110 feet, and made a sample shipment to the smelter of 1,000 pounds, which returned \$167 gold and silver, another of 1,200 pounds, which returned \$187, and a third of telluride of gold which gave \$480 gold and fifty ounces silver. A crown grant was obtained, but work was stopped on account of lack of transportation. Adjoining the Victoria on the north George Reynolds located the Washington, but abandoned it soon after, and it was re-located as the Old England by other parties. Between walls of porphyritic slate, with talcose schist against the ore, there is a ledge twenty-two feet wide, through which runs a chute of pay ore, which will require smelting, and on which an inclined shaft has been sunk eighty feet. Next on the north is the Homestake, on which only one year's assessment work has been done. Adjoining the Victoria on the south east, and close to the falls, which are 120 feet high, is the Snowdon, which has two veins. One of these, four or five feet wide, has been crosscut at a depth of 120 feet, and a beginning has been made to crosscut the other, but work was stopped when a crown grant was obtained. Assays average about \$22 gold. There are other claims in the same vicinity, on which a small amount of assessment work has been done.

In May, 1887, Al. McKinney and others prospected the ground. They found a ledge of white quartz, from which they could pick free gold on the surface, and located the Cariboo and Amelia claims. They, however, mistook the direction of the ledge, and under the old law allowing 600 feet across and 1,500 along the ledge, they made their locations and got them crosswise. The ledge was about two feet wide on the surface on a dike of porphyritic slate, which cuts the granite country rock.

Soon afterward the Okanagan and Kamloops were located. Next the Teazer, and adjoining this the Fontenoy; the Vernon was located by Hugh Cameron, who stuck to the camp when everybody else had deserted it; the Vancouver group of two claims, north of the Vernon, owned by Captain John Irving, of Victoria, and others. West of the Cariboo and among the earliest locations is the Alice and Emma, and adjoining these are the Maple Leaf and the Eureka. Southwest from the Cart



WILSON, ED. ROSSLAND, B.C.



MAIN STREET, ROSSLAND, B.C., MARCH, 1895.
Now a handsomely built street, July, 1896.

boo is the Sailor Boy, and three miles northeast is the Highland Chief, while two miles west is the Anarchist.

For several years nothing but assessment work was done to hold the claims, on account of the remoteness from means of transportation, though in 1889 a beginning was made to interest capital. In the fall of 1893 Mr. McKinney sold his interest and steps were taken to develop the property, men being at work all winter, showing up a fine body of ore. A ten-stamp mill was then brought in from the abandoned Rainbow mine at Golden, Wash., and in February, 1894, it was hauled thirty-five miles over the snow to the mountain top and began running on April 26. The first run was 150 tons from a drift 65 feet below the surface, and the mine and drill have since run without cessation. A company is now incorporated as the Cariboo Mining and Smelting Company with a capital stock of \$800,000 in \$1 shares.

In the Cariboo mine the ledge varies in width from two to eight feet. It was first tapped by a tunnel at a depth of 100 feet and the ore above was stoped out. A shaft is now down 200 feet, with a drift at the bottom 300 feet each way, east and west, the ore being raised by a steam hoist. The ten-stamp mill treats twenty tons of ore daily and makes three-fourths of a ton of concentrates worth \$90 a ton, while the free gold saved on the plates is \$15 to \$25 a ton. The monthly product is about \$10,000 in bullion and \$1,800 in concentrates and the total product to date is about \$200,000. The company paid thirteen per cent. dividends in 1895 and another of two cents a share is to be paid on June 16. Of the stock 100,000 shares were reserved as treasury stock for development, but this will not be needed, as there is enough cash in the treasury for the purpose. It is therefore being sold and is bringing thirty cents a share.

While several sales have been made and a good amount of work has been done on other claims none of them have yet become shipping mines, the one cry being the need of transportation. The Alice and Emma had a blow out of sulphuret ore of the same character as that which prevails in the camp and sank a shaft on it. This proved the ledge proper to be seven feet wide and is 63 feet deep, other opening also being made. The ore averages \$10 to \$12 in gold. On the Maple Leaf a shaft forty feet or forty-five feet deep has been sunk on a vein five or six feet wide of the same grade of ore as the Alice and Emma. The Eureka is owned by a New York syndicate, composed of employes of the Standard Oil Company, which has spent from \$25,000 to \$30,000 on development, but suspended work four years ago for the usual reason. Buildings have been erected and a shaft 153 feet sunk with a tunnel seventy-five feet from the 100 foot level. The Fontenoy has a shaft eighty-three feet deep, showing a body of smelting galena ore at the bottom six feet wide and assaying \$24 in gold and silver. The Anarchist is on a different ledge from the Cariboo and has a shaft sixty feet deep, showing the ledge to widen from three feet on the surface to six feet. The ore assays \$9 in gold, five ounces silver. This claim has been crown granted and is well situated for development, having water power on the ground. The Sailor Boy has a ledge five or six feet wide, which has been opened for half the length of the claim, and has a shaft forty feet

deep. The ore carries gold, silver and some copper, some assays running as high as \$60 for all values and is mostly smelting, although carrying some free gold. The Highland Chief has a four-foot ledge of sulphurets on the surface and a tunnel has been run ninety feet to crosscut it. On the Vancouver is a shaft sunk in 1888, since when no work has been done. The Last Chance has a shaft down forty feet on a stringer of galena and gold sulphurets running \$7 in gold, which comes from the Fontenoy lead and is six to twenty-four inches wide. A crosscut is now being run for the main lead.

Camp McKinney is not without the iron caps which characterize this whole mineral belt, for west of the Eureka Wm. Edwards and Gold Commissioner C. A. R. Lambly have located the Dolphin on an iron cap four or five feet wide, covering a ledge of pyritic ore, carrying some free gold and assaying on the surface \$30 to \$40. A tunnel is being driven to tap the ledge and is in sixty feet. Another big iron cap was struck about the end of May three miles south of camp on the ridge between the forks of Rock Creek.

Camp McKinney was relieved somewhat from its isolation in the summer of 1894, when the British Columbia government built a road from Penticton to Grand Forks, 110 miles, taking in this and the other principal mining towns and connecting with a cross road to Fairview, which is six miles off the main road. Still the camp is fifty miles from Penticton, where connection is secured with the Canadian Pacific steamers on Okanagan Lake. Tri-weekly mail service is to be established by this route on July 1.

About eight miles south of this place, running along the boundary, is Anarchist Mountain, where some good surface showings of free milling quartz and pyrites have been located. Richard Sidley, the first settler, took up a ranch on the summit about fifteen years ago, and he says that it has always been known that there was a mineral mountain, but it was considered too low grade to work.

Though the Rock Creek placers are not the scenes of as much activity as in earlier days, a good deal of work is still being done on them. Gold is found in the benches all along the creek from a point one and a half miles above the mouth to the head, a distance of seventy-two miles, but the bed of the creek is virgin soil to the miner. Many attempts have been made to reach bed rock, but the miners were poor men with only such primitive appliances as wooden pumps and wheels, and water and quicksand have always foiled them, though with modern appliances they would have reached bottom long ago.

The largest enterprise on the creek is on the hydraulic claims extending one and one-half miles from the mouth and 500 feet on each side. This ground was leased by Messrs. Nicholson and Tallard in 1886 and sold by them in 1888 to ex-Mayor John Grant and Morris Moss, of Victoria, who organized the Laura Hydraulic Company. The operations of this company were not profitable, and two years ago the property passed into the hands of Messrs. Monaghan, King and McAulav, who are putting in larger pipes and giants and have employed an experienced superintendent, and are now ready to start operations.

Seven miles from the mouth James Copeland

and William Younkin, who have a claim 2,000 feet wide and 1,000 feet along the stream, are running a bed rock drain tunnel under the bed of the south fork to tap the bed rock. The great trouble hitherto has been the quicksand and water, and they are seeking to overcome this by tunneling at water grade. Their observation is that the surface dirt on the benches is secondary wash and carries fine quartz gold, the best pay being heavy coarse gold in the old wash, patches of which were left behind in crevices when the secondary wash came down, most of it being swept into the bed of the stream. They have made 100 feet of open drain and 200 feet of tunnel and are now thirty feet below the bed, having passed through eleven feet of quicksand and three feet more to penetrate. They expect to reach bed rock in another 100 or 150 feet, working on the tunnel in the winter with money taken out of the surface benches in summer.

On the north fork, about eight miles from the mouth, is Dietz's bar, from the surface of which from \$75,000 to \$100,000 has been taken. Donohue & Co. are at work at this point, endeavouring to reach bed rock at the bottom of the bar with a ground sluice head of water. Two or three other companies are working the surface benches, but not attempting to reach the bottom of the stream. A number of Chinamen are also working on the stream, having taken up claims which had been abandoned by white men as too poor.

Kootenay Gold and Silver Ores.

ONE of the most striking physical features of the interior of British Columbia is caused by the great system of lakes and rivers which almost surrounds the Selkirks within their Canadian limits, writes J. C. Gwillim.

These waterways form long north and south depressions and are connected by low transverse passes, which drain to the east and west.

This region is, therefore, fairly accessible to the explorer or prospector. The geology has not yet been wholly worked out, but enough has been learned to show it to be a region of intrusive and of uplifted rock of undetermined age.

The western portion of this watershed is largely of granitic nature, but there are several large areas of metamorphic rocks, such as quartzites, schists and calcareous slates. The eastern portion is mainly composed of slates and schists.

Up to the present time the most richly mineralized belt appears to lie along the summits of this watershed. Yet the whole region is well stocked with economic minerals and offers to the mineralogist a rich and varied field for study.

The existence of the chief galena silver districts appear to be determined to a great extent by the large areas of impure limestone and calcareous slates. Such districts are the Slocan and Lardeau. Of this mineral, so abundant and valuable, there are three principal varieties, and these have come to be recognized as bearing certain relations to one another in their silver bearing capacity. Cubical, well crystallized galena, is by far the most common; it forms the backbone of the silver mining industry and assays, in the Slocan district, from fifty ounces to 200 in silver. Here it occurs in fairly massive impure limestones and slates. Galena differing in no way in appearance, coming

from Lower Kootenay Lake or the Lardeau country, carries far less silver. The same is true of the great galena bodies of East Kootenay.

This variety forms the largest ore bodies; it seems to be the mother mineral of the chief fissure veins. Calcite crystals and chalcopryrite are sometimes intimately mixed with it, as in the great Slocan Star mine.

Steel galena is of a granular texture, with some resemblance to broken iron. It occurs in patches through the cubical variety, but is seldom found in large bodies. Assays made upon this usually show it to carry a higher percentage of silver than the preceding.

Wavy galena is of much the same texture as steel galena, but is more lustrous and foliated, giving it a somewhat laminated appearance. The value of this variety often exceeds that of the others mentioned. The relative values of these varieties, together with the fact that locality bears such a strong relation to their silver value, may go to show that the silver itself exists outside of a chemical combination with this mineral. Silver is found throughout the whole range, pervading all formations and associated with so many different minerals that the question of the form in which it is present becomes interesting.

Tetrahedrite, or gray copper, is widely represented and much sought after. It is usually of a dark gray colour with a faint iridescence and a texture like steel galena. Specimens of this carry from 200 to 800 ounces of silver. It occurs associated with galena, zinc blende and calcite, giving upon decomposition very beautiful ores or azurite malachite. Silver has entered into many curious relations where the absence of galena has caused its association with some other mineral. One case occurs near Slocan Lake, where the little bunches of native arsenic have been found containing 1,000 ounces to the ton.

In one of the principal producing mines, the Alamo, upon Silver Mountain, it is found with antimony, giving a very rich ore. This is known as antimonial silver. The mineral is very dark gray, sometimes faintly streaked, and occurs as small patches included in a matrix of cubical galena.

Silver is found in combination, as sylvanite in one mine near Slocan Lake, as ruby silver in several places and as native silver filaments and silver sulphides all about the limits of the Slocan area of limestones, in granite.

These latter constitute the dry ores of the district, and are rarely found in the main galena limestone belt.

Argentite is usually associated with iron pyrites in a coarsely crystallized gangue of quartz. Often this mineral is well crystallized, but in most cases it occurs chiefly as a fine black dust or stain. The veins, having a comb-like structure, easily open to decomposing agencies.

Usually a paying quantity of gold is associated with the argentite ores. Some of the veins are banded. A notable example occurs at the Exchange Mine, near Slocan City. Here there is first a band of opaque milky quartz, some inches in thickness. Next to this comes an inch band of iron pyrites (always well crystallized) mixed with silver sulphide dust. An inch from this in a clearer quartz, there occurs a distinct broken lamina of native silver. This arrangement is repeated four times. The pyritous band assays 270 ounces

in silver. There are no pyrites with the native silver band. It would be interesting to find what relation exists between the pyrites and silver sulphide, and if silver exists as a sulphide below the line of decomposition.

As regards gold, there is little evidence of its occurrence in a free state. It does occur in some few places along the east side of Slocan Lake, in a quartz gangue, but even here the ore body carries so much pyrites that it would cause it to become unfit for free milling. Usually the gold is intimately associated with pyritous matter, such as arsenical iron, chalcopyrite and pyrrhotite, as in the Trail Creek country. One of the deposits carrying gold in a free state also carries it in combination as sylvanite, but this is rare.

Very little gold is found in the galena mines. What is produced seems to be derived from the pyritous matter contained therein.

The Trail Creek gold ores are a mixture of chalcopyrite and pyrrhotite, greatly resembling the Sudbury nickel ores. They carry from half an ounce to five ounces of gold. Assayers of this ore have come to the conclusion that there is a direct proportion between the amount of chalcopyrite present and the gold contained, some such relation as exists between the copper and nickel in certain nickel ores.

As this region becomes more developed, there will doubtless be found many rare and interesting mineral combinations. It is but four years since it was but a wilderness, in which some stray prospectors found the first galena lode.

An Okanagan Funeral.

A MINING CAMP INCIDENT.

FOUR great coulees, joining a veritable mountain cross road, on a fair, shiny October day in 1892, is the scene rarely witnessed in an Okanagan mining camp. The little village on a bench a hundred rods or so from the rippling creek which flowed through a bushy, grassy valley, was in all respects like the average mining town, where actors gather for all purposes and follow the average mining "boom." Good, average and bad are the characteristics of the inhabitants, and the bad are not in the ascendancy, nor is the wickedness of the bad class so much the natural bent of criminality, as it is the irresponsibility born of a vagabondish freedom and a shirking of following the rules of conventionalism.

A prominent citizen had died. He had been carefully nursed by attending physicians, who, aside from the solicitous care usually bestowed on patients, had the incentive of strong personal friendship to urge them to do their utmost to save the life of one who was loved and respected by the community. But he succumbed, and a wave of sorrow swept over the camp.

People had died before in the camp and had been laid to rest with commendable respect, but the absence of the Gospel servant, the plaintive hymn, and the last prayer, had been the rule, and even the most hardened sinner usually felt a regret, and turned from the lonely grave with a feeling that something was lacking, even if, in their cheeriest moods they were arrant scoffers and mockers at all religious display and sentiment.

A willing cowboy volunteered to go for the nearest preacher, who lived away down on the lower Okanagan nearly fifty miles away. He started on his mission at noon, and the next day at two o'clock, he rode into town, accompanied by the minister, who, from the distance his charges lived apart, was well trained for and accustomed to riding as the average "Buckaroo."

At three o'clock the coffin of the deceased was carried out and the remains of him, whom they were now endeavouring to honour, placed on the little level plat of ground from which rose the flag pole, straight and tall. The flag was at half mast and hung idly, fold draping fold, the mountain breezes seemingly being subdued and pensive, and partaking of the suppressed sorrow and regret visible in the attitudes and demeanour of the gathered throng.

Hundreds had attended. Neighbouring mining towns had sent their delegates, the miners had come from off the hills, the ranchers from down the valleys, cowboys had ridden into town from as far as the news had been carried.

The minister, with his little testament in his hand, stepped forward. In solemn voice he read words of comfort and mourning for the living, in beseeching supplication he implored divine forgiveness for the dead one. And then a song. A quartette stepped to the side of the coffin and sang "Nearer my God to Thee." Solemn and sweet the voices rose, the lonely soprano, the plaintive alto, the sonorous tenor, the melodious bass all blended in perfect unison and harmony. "Nearer my God to Thee, e'en though it be a cross, that raiseth me." As the sweet harmony rose and rolled up the mountain side, the awesomeness of the occasion impressed all the gathered ones as perhaps nothing else could have done, and in the hush between the stanzas it became evident that the impressiveness of the occasion would be carried away by the listeners and be cherished as something that should not be forgotten.

The services were over, the grave had been filled, the busy occupations had been resumed, the various features of the ceremony had been discussed. "Oh," said one friend of the deceased man, "I wish he could have seen how nice it all was done."

And the singers. Oh, could they ever forget the lovely harmony of the blended voices? The soprano accompanied her husband to her eastern home, the sweet alto now sings at the great white throne, the tenor is still in the same old town, the bass is a lonesome prospector in Cariboo. The voices will never be heard together again on earth, but who can say that faith in the Great One and zeal for good works was not engendered while listening to the matchless words sung to the angelic strains of "Bethany"? O. K. N.

An Automatic Gold Saving Device.

THERE is now a possibility that gold may in a short time be saved in considerable quantities without any of the great expense and labour generally attached to the saving of the precious metal, and from a source which is inexhaustible. John R. Brown, of Harrison Hot Springs, has secured letters patent on a machine which he claims will, assisted by certain natural forces, save much of the gold now being lost in the constantly

moving sand and gravel and in suspense in auriferous streams. The possibilities of such a machine, if once demonstrated to be a success, are incalculable and we shall watch with interest the development of what may turn out to be a very important factor in the wealth of a country traversed by so many auriferous streams as is British Columbia. A full description of the machine, which is necessarily complete, would take up too much space; it is, however, self-cleaning, creates an artificial eddy, has an artificial bedrock attachment with means of effecting the gravel and sand, allowing the gold to remain, has means of arresting the float and finer gold moving in suspense in the stream itself, and while its operations embrace quite an extent of the river bed it is very portable and strong, and not likely to get out of order, while the irregularity of the river bed is of no consequence in its operations. In any river traversing a country intersected by gold-bearing formations or auriferous deposits of some earlier age, its waters gradually accumulate from the wearing banks, rock fragments, gravel and other debris in which much gold is often distributed. The force exerted by these moving waters impels this constantly augmented mass onward down the bed of the stream, grinding the fragments and gradually disintegrating it as it proceeds. The gold contained in this mass is separated from its surroundings, working by its greater gravity to the solid formation in the bed of the stream, still moving, however, down with the debris until occasionally finding favourably disposed bedrock in the crevices of which it may remain for a time until even these resting places are gradually worn away by the attrition of the moving mass above, forcing the gold again downward to some other favourable but temporary resting place. This gold, much of it coarse and heavy when first torn from its matrix, gradually diminishes in size as it proceeds on its interrupted journey down stream. By the constant grinding the particles wearing off in this way in time become the flour and float gold, which, no longer able to respond to its greater gravity in this fine state, when under the influence of a rushing body of turbid water, now moves with it in suspense, mixed with the silt and fine sand, or with the lighter gravel and sand into which these masses of rock and debris are gradually being worn, which moves above the coarser and less worn fragments in the bed of the river. Bars occasionally to be found in these rivers are caused either by uprising bedrock or bends in the river banks; the lodging from this or other causes of a mass of the larger and harder fragments now converted into boulders, often a combination of these circumstances, causing eddies or sluggish currents. The flow of the stream being somewhat retarded at these points, gives opportunity for the precipitation of some of the fine gold which may be in suspense in the stream and for the arrest of a portion of the gold in the upper stratum of sand and gravel before mentioned. On these bars the miners may find good pay, generally near the surface, and will often return to the same place year after year to find new accumulations of the precious metal on the very spot previously worked, much of it very fine and light and, strange as it appears, demonstrating the fact that this fine gold has floated to these bars, that which is slightly coarser being

left by the sands and gravel moving down with the stream. Periods of very high water, however, often enhance or diminish the quantity of gold found on these bars, sometimes forming new bars which may be temporarily very rich. The same general conditions will exist, however, be the water very high or very low. The occasional changes in the position of these river beds by the wearing away of one or the other of its banks, exposes that portion of the original bed of the river which is abandoned. The mass of gravel, sand, boulders, clay, etc., which has come there with the waters becomes in time much higher than the stream and is often proved to be rich in gold and makes our rich placer and hydraulic grounds. If such rich deposits of gold as they often find in these benches represent the gold in the original river bed at the time it was changing its channel, what must represent the value of the gold which has for ages been moving downwards under the irresistible force of a strong current in a great river often increased by periodical stages of high water. In all countries where these auriferous rivers exist the same conditions are created and the amount of gold lost annually by being carried away by being in suspense in the stream or in the constantly moving sands and gravel, depends upon the magnitude of the streams, their velocity and the extent of the auriferous country traversed by these streams and their tributaries. But this loss from the float and flour gold alone must be many times over the entire gold output of such countries. It is the aim of the inventor of the "automatic" gold saving machine to provide a means, by which much of the lighter gold in auriferous streams—now passing away in suspense in the waters or in the lighter sand and gravel in the bed of the stream—can be saved by the aid of the natural forces which originally tore it from its resting place in the veins. And while one machine can save but a small percentage of this gold there can be no limit to the number which may be used for this purpose, while it is quite possible for two men with a properly equipped scow to handle and keep in order a great many of these machines, the first cost of which is very small and the principles upon which they are constructed make them very desirable and not likely to get out of order. The time may not be distant when every settler living on the banks of one of these auriferous streams will have his gold saving machine and get no small part of his income from this source, increasing his own and his country's wealth, and enhancing the value of the land bordering on such streams.

Rich Discoveries on the Coast.

THAT British Columbia's mineral wealth is not confined to Kootenay, Cariboo, or any of the well known mining districts, is a fact that has, hitherto, been but vaguely appreciated. It is true that for years explorers and prospectors have reported the existence of ore deposits on the islands along the coast, and in the mountains on the Mainland; but they have failed to arouse excitement, or enlist the aid of capital to prove the truth of their statements by a systematic and thorough search. It may be stated flatly, that no prospecting worth the name has been done along the coast until this spring.



Barkerville Cariboo B.C.

BARKERVILLE, B.C.

Now, however, it seems like that before the close of the present season all doubts of the existence of paying ore will be set at rest, and an era of active exploration commenced, which may result in proving that valuable mines exist along the coast, at our very doors, perhaps rivalling in richness and extent those of the renowned Kootenays.

The Channe Mining Company and the Phillips Arm Mining Company, both of Vancouver, have started, in a business-like way to make a commencement, by opening up properties which they have acquired, 140 miles northwesterly from Vancouver, on Upper Valdez, Thurlow and other islands, and on the adjacent Mainland, in the Shoal Bay division of the Nanaimo mining district.

The country is mountainous, or, rather, composed of mountains, tremendously steep and, in places, perpendicular. At the shore line, and in the channels, the water is very bold, sometimes thirty to forty fathoms deep at a distance of twenty feet from the shore. The height of the mountains ranges from 2,000 to 5,500 feet.

The main body of the country rock is granite, ranging from a very fine grained and compact to a coarse-grained, flaky rock. Some syenite occurs near Jackson Point, on Thurlow Island, and there are slate belts various as to quality and extent, some being composed of what is locally called black slate, and others heavily iron-stained, and showing the action of heat and general disturbance. It is not, however, intended to attempt a minutely detailed description of the formation of this portion of the coast, but, rather, to give a rough sketch of what is being done by the companies just named, with the view of attracting attention to the coast districts, and pointing out the advantage of local capitalists taking hold now, while the opportunity is before them, instead of waiting for the Americans to come along, with the courage of their convictions, and get entire possession of what will, in all probability, prove to be a valuable mining district in the near future.

The property being now investigated by the Channe Mining Company comprises the following claims: Bobby Burns, Hetty Green, and Daniel Webster. Work was only started on the 16th of May last, and so far has resulted in an open cut of thirty-three feet, and a 6x7 foot tunnel, running back forty-two feet, thoroughly timbered, and substantial. The start was made at a point five feet above extreme high tide, and the head of the tunnel is now in formation rapidly becoming more solid in character. Several quartz veins show on the beach, making the best showing at low tide. Two of these are strong veins, and, above tide mark, show well defined walls and not frozen. One of these, which will be the first reached by the tunnel, measures fully four feet of quartz, with a sixteen inch pay streak. The second vein to be cut at a distance of 140 to 160 feet, shows a strong six feet of quartz. Another vein, on the northeast side of Channe Creek, shows four feet at outcrop; it also shows in the creek, on a line between the Bobby Burns and Daniel Webster claims, measuring six feet of quartz, with slate, hanging wall. Near the end lines of the Bobby Burns and Hetty Green claims, the granite outcrops, about sixty feet high, with a forty-five inch vein of fine looking quartz, "in place," with three-quarters to one inch of alc on the walls. This quartz looks different

from any showing on the water front, and is a very promising prospect.

The above mentioned claims give every indication of developing into a very strong property, with a comparatively small amount of development work. The tunnel now being driven will unquestionably cut two strong veins of quartz within the next 150 feet, and cut them in solid formation. These alone would be ample to give the property substantial value, even if they should prove to be of much lower grade than the surface indicates—a contingency the reverse to probable.

The owners of this group, the Channes Mining Company, are, with the exception of the Phillips Arm Company, the only ones in the district who have gone to work in a common sense, business-like way, to determine the value of their properties. The superintendent of the Channe Company (Mr. Willis) is from Chicago, "a live American." He is being confidently backed by the company, and the work he is doing will not only benefit those immediately interested, but the province at large, by proving the value of the whole region as a mining district.

The property of the Phillips Arm Company consists of four claims, on a lode extending from the shore of Phillips Arm into the Pembroke Mountains. Their property is in litigation, and work cannot be pushed until the question of title is settled, which, it is expected, will be very soon. They have, so far, driven a tunnel along the lode a distance of forty feet, and shipments of ore from the pay streak netted something over fifty dollars per ton.

The above mentioned include only a very few of the claims located in the vicinity; but constitutes the chief work done to develop the numerous fine prospects exposed by nature in the neighbourhood.

Water and timber are plentiful, both on the islands and mainland, and the natural facilities for transportation excellent. At present it costs \$1.25 per ton to freight ore to Everett, which rate can, no doubt, be reduced, as the district develops and shipments increase. The development of the district, however, would lead to the establishment of concentrators, at the mines, and do more than years of talk to establish the coveted smelter in Vancouver.

Viewing the proposition as a whole, and speaking generally, it may be said that, if the people of British Columbia in particular and of Canada in general, ever wish to be more than "hewers of wood and drawers of water," they will have to wake up and spend some money in mining development. The Kootenay country was developed and is owned largely by Americans; and the immense wealth of its resources will go across the line by carloads, less a few dollars for wages, and what the Provincial Government can collect in taxes. It will be the same with all our quartz mines, unless we awaken from our slumbers and sit up. We do not seem to "appreciate the magnitude of the occasion," and a prospector can tramp our streets all day with his coat tails full of splendid rock, without raising a dollar. A broker, also, exhausts both his eloquence and arithmetic with the same result. We think it "glory sufficient" if we can bond a mine for a few dollars, and sell it to "outside capitalists." It does not occur to us to work the mines ourselves.

Hewitt Bostock, M.P., Yale-Cariboo.

If our people would only seriously ponder the fact that the chief assets of this country lie in the rocks, and that it is necessary to mine them ourselves if we are to have the benefit of them, instead of handing them over to "outside capitalists," and accepting days' wages and a few dollars of taxes, in lieu of the bullion itself, then they would be more eager to put up money for development work.

The cost of developing a quartz ledge is not great; and, if each of our merchants would contribute a moderate sum to the capital of any young local company, of respectable make-up, it would gradually have the effect of swelling up a big list of British Columbia mines owned and operated by British Columbians.

It is questionable if there is a State in the neighbouring republic in which the prospect already referred to would be allowed to remain undeveloped for three months, far less for years—the liberal, speculative instinct of the American would not permit it. Why should we not, with the object lesson of Kootenay before us, make a determined, practical effort to develop and keep possession of the remainder of our mineral assets? The risk of loss by mining operations, if conducted on common sense, business principles, and without spasms of excitement, are no greater—if so great—as speculations in tea, sugar, or grain. Yet men who regard mining with holy horror will, placidly, start grocery stores, soap factories, or other enterprises, when the chances are ten to one against them, and come out "busted," with monotonous regularity. It has been intimated that in New York City, ninety-nine business men ultimately fail out of every 100 who start, and the same figures would, approximately, fit our Canadian towns. Yet despite these appalling figures there is no holy horror of tea and sugar, nor suspicious dread of boots and shoes. Why, then, does the average business man regard mining as such an extremely hazardous business? Because in the past it has not been conducted in the common sense, business-like spirit that characterizes the methods of the day. Also, because the methods of a few years ago were crude and expensive, and mines were abandoned as unprofitable (in California and elsewhere) which are, to-day, handsome dividend payers worth millions of dollars.

It is to be hoped that the coast and island prospects will be quietly and thoroughly developed, by local men, and local capital, without a big excitement, big prospectuses, big safes, and imposing offices full of clerks. A handful of shrewd business men can do the business, and do it safely and economically. Let us at least, try to develop and get possession of this portion of our valuable estate, without depending solely on "outside capital."

A Good Opportunity.

MR. W. JENSEN, the proprietor of the Dallas Hotel, Victoria, B.C., received a letter the other day from a syndicate of powerful capitalists in England who are desirous of investing in British Columbia mines. Any parties who have really good propositions to offer would do well to communicate with Mr. Jensen, giving full particulars. Mr. Jensen himself is a practical man and one of the pioneer miners in the province.

THE view which confronts me as I wend my way towards "Schuhum," the Victoria residence of Mr. Hewitt Bostock, bent upon interviewing the member-elect for Yale-Cariboo is one not easily to be surpassed for beauty even in British Columbia where the only complaint that can be urged against the scenery is that there is too much of it. Across the straits that grand Olympian range lies bathed in the soft hues of the setting sun, each snow-clad peak crowned with a coronet of gold, while away over San Juan Mount Baker proudly rears his hoary head above the mist which shrouds his purple foot hills, veriest majesty amongst mountains. Victoria, in addition to her magnificent surroundings, can boast a goodly show of "desirable family residences," and not the least attractive amongst them is that of Mr. Hewitt Bostock. No one would think the house was only two years old to look at it. But vegetation is of rapid growth in these latitudes, and the shrubs and flowers, to say nothing of the tennis ground, adjoining it, have a sturdy veteran air about them which quite belies their youth. I shall be fortunate if I secure an interview as Mr. Bostock leaves to-night for Ottawa, but it is my only chance, and knowing that this issue of the MINING RECORD would be incomplete without a sketch of the "man of the hour" up country, I summon up that courage which is currently supposed to characterize wielders of the pen no less than of the sword, and stifling all misgivings I press the electric button. Fortune favours the brave, for Mr. Bostock does the rest. A man with "straight as a line" written upon every feature of his face, of medium height, with strong, thoughtful brow and penetrating eye greets me with infinite courtesy. He can give me ten minutes though others are waiting to see him, so I at once get down to business by stating my errand. The difference between the interviewer and the interviewed at once becomes apparent—one has far greater modesty than the other.

Soon, however, we are chatting pleasantly enough, and in the course of conversation I learn that Mr. Bostock is an Englishman by birth, the son of "rich but honest" parents. His father made a fortune as a broker on the London Stock Exchange, which the son in due course inherited. He was born on the 31st May, 1864, at The Hermitage, Waltham Heath, Epsom, which he still owns, near the worldfamed Derby race track, and he was educated by private tutors at home. In 1882, he matriculated at Trinity College, Cambridge, taking the full three years' course at the university, and graduating with mathematical honours in 1885, taking his M.A. degree the same year. He then read for the Bar, and was called at Lincoln's Inn in 1888.

"And when did you first visit B.C., Mr. Bostock?" I ask.

"That same year," is the reply. "I took a tour round the world, and came this way *en route* for Australia, China and Japan."

"Was that when you bought your ranche at Ducks?" "Yes; I liked the country immensely, and thought it had enormous possibilities before it. I bought the Ducks ranche with a view of spending a portion of the year on it, but not with the idea of settling definitely in the province—that, like everything else, was a matter of evolution, and came about gradually. On my return to England, I got married to Miss Cowie, daughter of Mr. Hugh Cowie, Q.C., Chancellor of Durham, and brought my wife out to Ducks, this time *en route* for Alaska, for our wedding trip. We both liked

the country, and I found it improve on acquaintance."

"And what caused you definitely to decide upon leaving England and settling in British Columbia. You must, with your position and means, have found much to interest and attract you in the Old Country?"

"No doubt," Mr. Bostock replied with a smile, "there are few places for a man of leisure and independence more enjoyable than England, but a younger country offered special attractions to me. I think my decision to reside definitely in B.C. and cast in my lot with the province may have been largely influenced by the experience I gained during my association with Mr. Geoffrey Drage (now M.P. for Derby) who was then secretary of the Labour Commission, and in whose work I took a very keen interest. I visited B.C. in each of the years 1890-91-92 and made various investments in different parts, but it was not until 1893 that I finally made up my mind to live over here altogether."

"You started *The Province* newspaper, did you not Mr. Bostock?"

"Yes. I had already formed the idea that there was room for a journal of that description in the West, and as I was fortunate enough to meet with kindred spirits, whose views and principles coincided with my own, I was quite willing to back the project financially and have not much fear of the paper's success. I think people have already recognized its value."

"And what led you to adopt politics as a career?"

"Oh! that seemed to come in the natural order of things, and when a candidate was wanted to contest Yale-Cariboo, in the Liberal interest, I gladly accepted the invitation to stand, for I felt that the number of men who could spare the time and money to canvass so large a constituency must of necessity be limited and I was therefore ready to do what I could for the cause."

"Which you have very much at heart."

"Which I have very much at heart, as you say. It was very hard work and the amount of ground I had to cover was enormous. The constituency is not far short of 200,000 miles in extent—about as large as the whole of France, and the facilities for getting about in some parts of it are none too great—but I think I managed to see as many of the electors as could be seen and to hold as many meetings as possible. The people were exceedingly kind and I very greatly appreciated the way they received me, seeing that I came amongst them as a total stranger."

"Your victory over Mr. Mara seems to have been very popular up country."

"I think it was—though this, I fancy, was largely due to my opponent's unpopularity. To a great extent my strength was due to his weakness and I do not ascribe the result to any personal merit on my part."

"The Victorians, judging by the reception they gave you on Saturday, seemed highly delighted too."

"Yes indeed. I had no idea that they had anything of the sort in store for me and felt quite overwhelmed by the ovation and all the kind things that were said to me."

"I suppose the future of Kootenay as a mining country is assured."

"I don't think there is any doubt about it. Everything points in that direction and I fancy before very long the attention of mining men from all parts of the world will be centered upon B.C."

"You represent an important constituency, Mr. Bostock."

"I do. I am quite aware of the responsibility it

involves, but I am determined to do my best to do justice to the trust confided in me by the electorate though I do not flatter myself that I shall lie upon a bed of roses."

But time is up and I have to take my leave. This I did with the firm conviction that Yale-Cariboo is to be congratulated upon its choice in having selected a high principled, disinterested, absolutely reliable representative, who, come what may, means to do his duty. The Liberal party will be strong indeed if it has many men of the stamp of Hewitt Bostock.

BULLETIN No. 1.

Report of the Alberni Mining District,

BY WILLIAM A. CARLYLE, PROVINCIAL MINERALOGIST.
ISSUED BY THE PROVINCIAL BUREAU OF MINES.

THE Minister of Mines has arranged for a series of bulletins on the mineral deposits of the province to be issued at intervals. Each mining district will be represented and the reports thus furnished by the Provincial Mineralogist will be invaluable inasmuch as they will be thoroughly reliable. These bulletins will appear regularly in the *British Columbia Mining Record*, and in this issue we give the first of the series of which, through the kindness of the Minister of Mines we were furnished with advance sheets. The next bulletin, we understand, will be on the Kootenay district.

To the Hon. Col. James Baker,

Minister of Mines, British Columbia.

Sir.—Herewith I have the honour to transmit Official Bulletin No. 1, a report of the mineral deposits and the progress of mining operations in Alberni and on Barclay Sound, Island of Vancouver, B.C., compiled from notes recently taken by me, May 28th to June 10th, on a short visit to the various points in this district where mining and prospecting are being done. I was accompanied by Mr. Herbert Carmichael, Provincial Assayer, who rendered me signal service by his knowledge of the country and assistance in many ways.

On this short tour of inspection no attempt was made to study the general geology of the country as time forbade, and I confined my investigations to those places where ore was reported as found, or where work had been or was being carried on; and as my office calls for no expression of opinion as to the probable value of any property, I will limit my report to a description of what I saw and learned. Since Mr. Wm. J. Sutton made his much more lengthy examination last year very little work has been done except on two properties, and but little that is new can now be said; however, I was able to inspect most of the leading points of interest and to acquaint myself with many of the conditions that obtain in this district, although I was unable to reach some claims lying further back, on which, as I learned, but little work save prospecting has been done, and at which no men were then at work.

All mining or prospecting except on the placers on China Creek, as seen by me, was in igneous rock, in most cases I believe in diorite or rock closely allied, rock nearly everywhere carrying more or less iron pyrites, that led some prospectors to report exposures of such rock as ledges of great width and in many cases to call this fine grained or aphanitic rock, quartz, when in fact but little quartz was seen apart from the regular quartz veins to be described, although the feld-

spar that mostly constitutes this rock is very acidic or high in the percentage of silica. Prospectors find this country very difficult to explore on account of its being densely covered with heavy timber and thick underbrush, especially near the coast, so that it is only by pushing up along the streams that they have picked up the clues that have led to many of the locations now made. Where so little development work has been done and so little of the ore really tested it is next to impossible for anyone to reach a safe conclusion as to the value and extent of the ore now exposed and all interested in Alberni are awaiting the results to be determined by more underground work, the milling test soon to be possible on the erection by Mr. James Dunsmuir of the prospecting stamp mill at the foot of Mineral Creek and the first clean-up on the placers where hydraulicing is being inaugurated.

In reference to fire assays of nearly all kinds of free gold ores I would like to express my belief that such—as it is almost impossible to get average samples—are practically of but little value except in indicating whether gold is present or not, and of none at all in determining the probable *yield* value of an ore unless very careful average samples be taken from a large amount of ore, which is seldom done except by thoroughly experienced men. It is also utter folly by picking out a piece of rock, probably one looking very promising, to attempt to arrive at the value of an ore by the assay value of this particular bit, or further still by the common but pernicious and erroneous method of *averaging* up a number of such assays.

One must not forget that there is often a big gap between the *assay* value and the *yield* value of a gold ore, and that every caution must be taken to determine the milling qualities of such an ore, hence in nearly all the camps of note where free gold occurs in the ore fire assays are seldom made and mill runs are imperative, and here again the lots of ore chosen must not be picked but systematically sampled out so as to give an average, representative as far as possible of the general run of the mine, keeping in mind that ore near or at the surface, enriched by decomposition of the vein matter, is often of high value and easier to treat than ore from a lower horizon in the lode or below the natural drainage level.

The drift of these few remarks is to the effect that in this untried mining district there is needed much more work to ascertain the size and character of the ore bodies, and also many careful mill tests, prosecuted with intelligence and experience, to decide not only the value of the ore but its treatment qualities, and much can be done along these lines without an extensive outlay of capital, thorough experience indeed being almost more requisite than money.

It is to be hoped that the tests soon to be begun will be carried out with experience and understanding, and that the results will be so encouraging as to lead to vigorous mining operations. I believe that with careful, systematic prospecting and exploratory work, work honestly intended to prove and develop the true value of a claim but *not* intended for purely speculative purposes, the work of an intelligent miner, not of a prospector of mining schemes, this district may become the centre of mining activity; but what is to be most deprecated is the issuing of extravagant reports

that, on the face of them, are absurd, for such invariably redound to the hurt, discredit and retarding of what may be a most promising region. A few may make some small gains by such practices, but everybody interested in the opening up and advancement of a new locality should strive to suppress such ultra-highly coloured statements as most injurious to their own real interests, and endeavour by actual development work to prove up their property, as one really promising claim thus developed will be of more substantial value to a district than a vast deal of puffing that cannot bear out investigation. I will give a short description of properties and localities in the order I visited them. All altitudes were measured from sea level by a pocket aneroid and bearings are magnetic.

Barclay Sound.

SARITA RIVER.

About a mile up this river on the left bank is a steep bluff of diorite, heavily covered with timber and under-brush, showing a considerable amount of rock more or less permeated with magnetite, iron and copper pyrites and pyrrhotite, which in places where a few shots had been put in showed in solid masses of basic sulphides. As to the extent of this deposit no definite idea can yet be formed until some work is done, and the men engaged building a house were to begin driving a tunnel above high water mark to exploit this large surface exposure.

This claim, called the Sarita, is said to be located in the Indian Reserve, the foreman being John Gray.

Through inability to find the trails I had to abandon a visit to a deposit of magnetite near here, and the marble reported as near Poett Nook.

SANTA MARIA ISLAND.

Near the south end, just at high water mark, is a shaft filled with water, whence many years ago iron ore was extracted, the shaft having been sunk on a small exposure of magnetite containing sulphides, running across this end of the island.

COPPER ISLAND.

Rainbow claim. On a small neck of land on the east side of this island, near a good sheltered anchorage, a shaft has been sunk fifty or sixty feet on a ledge of magnetite that carries more or less sulphides. This ledge out-crops irregularly along the shore, some parts very red or reddish brown, proving on fracture to be solid pyrites. There is a good house near the shaft, but all the men have been removed to the Sarita River property.

Along the north end of the island and along the shores of the adjacent mainland and islands, is seen much limestone of a dark colour and hard fine grain, traversed by many dykes of eruptive rock, by which all bedding planes have been nearly obliterated. No fossils were found.

SECHART.

On this peninsula much prospecting has been done by Mr. Anderson, who has built good trails to different points, and has disclosed by stripping several large exposures of iron ore. The first claim visited was the Lord of the Isles, altitude about 950 feet, where three men were engaged on

covering a small exposure of magnetite that lies in what appears to be diorite and next to a very extensive area of limestone, that at the point of contact with the eruptive rock is completely crystallized into large, coarse crystals. On the Crown Prince, 800 to 900 feet altitude, two miles from the wharf, or about three-quarters of a mile from the nearest salt water, a large, steep face on the mountain side has been stripped, disclosing much magnetite iron ore, in places in large masses separated by country rock, but no new faces exposed by blasting were seen. Mr. Anderson allowed me to copy the following analysis made on samples of ore:—

(a.) By E. H. Cook, Cleveland Iron Works, Middleborough, England: Iron, 66.0 per cent.; manganese, 44 per cent.; lime, 4.00 per cent.; sulphur, .92 per cent.; phosphorus, .01 per cent.; silica, 2.00 per cent.

(b.) By Dr. O. Wurth, Pittsburg, Pa., U.S., October 19th, 1893: Iron, 64.01 to 66.32 per cent.; sulphur, traces to .09 per cent.; phosphorus, .007 to .009 per cent.

These analyses show a very small percentage of phosphorus, that would rank this ore as a fine Bessimer iron ore.

Other deposits of iron ore have been stripped, but I had not time to inspect them. These iron deposits can be easily mined and the ore brought down to a well sheltered deep-water harbour, but as yet no work has been done underground to test the continuity or extent of these ore masses. Along the trails exposures of syenite and felsite were seen and limestone was abundant.

The Sechart quicksilver claim, one-half of a mile up Pot-Hole Creek, which enters into the sea about one-quarter of a mile from the wharf, has three tunnels and two shafts close to the creek in which it is reported native mercury was first found by hunters. The rock on the dump appears to be a diorite or a diabase, and some good specimens of the ore were found which, on being broken, disclosed the cinnabar disposed along the extremely narrow invisible cracks, while decomposed rock was found carrying the metallic "quick."

The dense underbrush, but little cleared away, precluded further examination to learn in what relations the ore was to be found, but at one place where ore could be got a fault wall was seen to be next to this material. No work is being now done on this property, which is held under a crown grant.

The "Hundred Islands" consist mostly of syenite, but in one place a bluff about 100 feet high, close to the water edge, was a hornblende granite, from which had fallen many large blocks.

EFFINGHAM INLET.

About five miles up this inlet is a high bluff of reddish brown eruptive rock of close, fine grained texture, but showing no series of regular cleavage planes or indicating whether it would break out in large blocks. Associated with it were intrusions of greenish eruptive rock with more or less amygdaloidal structure, and fresh blocks of agglomerate were to be seen. There is deep water right up to the bluff, on which the cribbing for a wharf has been laid. Along the west side of the inlet at this point is exposed much limestone cut by dykes, but no rock of the true character of marble was seen along the shore, although good marble is claimed to be found inland.

Alberni Canal.

COLEMAN CREEK.

About a quarter of a mile up this stream on a claim located by Mr. McAllister for some Victoria gentlemen, on the surface of a bluff on the left bank is evidence of a shear zone in the diorite or where along a fault plane, six to seven feet of dark, rusty-coloured crushed rock matter is seen, into which a tunnel was started and run sixty feet where it branched into two short drifts, one fifteen feet and the other twenty-two feet long. In the workings I could see no indications of a vein or of ore, although several smooth fault walls are there, with gouge or taley matter along them. No work is being done on this property.

GRANITE CREEK.

About three and one-quarter miles by a good trail from the mouth of Hiwatches Creek, on a tributary, or Granite Creek, I visited the Star of the West claim, located 1894, by Messrs. McCoy, Poole *et al.* Altitude, 740 feet. A tunnel then about fifty feet long was being run north forty-five degrees east, following as a hanging wall a well defined fault wall, dip south forty-five degrees, east sixty degrees, with another such or the foot wall, with four to five feet of greenish coloured rock between carrying much calcite but little quartz and some pyrites. Some of the rock called "blue quartz," tested with hydrochloric acid, proved to be lime. No assays or tests have been made of late, but from the material first taken out and on the dump, I was told assays of \$10 to \$12 had been several times obtained.

Several other claims have been located adjacent to this one, and also seven or eight miles up further along the creek, but as no one was at work further up, I did not visit them.

CHINA CREEK.

A road now runs from Alberni to the upper end of the Duke of York placer claim, whence two and a half miles more are being constructed to Mineral Creek, near its junction with China Creek where near De Beaux' cabin—altitude about 1,200 feet—the prospecting stamp mill will be erected for treating the test samples of ore from the property of the Alberni Consolidated Mining Company and other claims up Mineral Creek, up and along which is a good trail, that I took and inspected the Mountain Rose, Last Chance, Missing Link, Alberni, and the Chicago claims.

Mountain Rose.—Altitude, 1,500 feet. Owner, Wm Campbell, *et al.* Alberni.

Two men were working, stripping a well defined vein very irregular in width, of five to thirty inches of quartz, carrying a small amount of iron and copper pyrites, strike east and west, dip north eighty degrees into the mountain; country rock a greenish schistose rock, laminae at right angles to course of vein, which is exposed for a short distance along the hillside but near the workings is faulted, the direction and amount of throw not having yet been determined.

Last Chance.—Altitude 2,125 feet.

The Quadra Mining Company comprises three claims, the Ophir, Quadra and Last Chance, at the last of which two men were at work sinking a shaft, then about thirty feet deep. On the surface the shaft had been started in an exposure of

very rusty iron-stained rock with a small stringer of white quartz, but the bottom of the shaft was all in country rock, a hard fine grained diorite of a slightly schistose character. Foreman, John Merrifield, Alberni.

Alberni.—Altitude, 2,800 feet.

The Alberni Consolidated Mining Company own four claims in a block, the Alberni, Warspite, Victoria, and Chicago, the dispute as to ownership having been satisfactorily terminated, admitting the commencement of progressive exploratory work, upon the results of which the further development of this locality now greatly depends. At the Alberni claim the last work was begun on the steep hillside of a clearly defined vein of quartz about one and a half feet wide, and an open cut nearly twenty feet deep was made before a shaft was sunk forty feet down on the pitch of the hanging wall, but at the time of my visit this shaft was full to the collar with water which, being too great to handle with a bucket, has necessitated the driving, sixty feet down the hill, of a tunnel to be about 100 feet long, to tap the vein underneath the shaft. At the top of the shaft the quartz vein was two feet wide but following it along the surface a short distance it narrowed materially, while down in the shaft, a miner stated that at its widest part it (*i.e.*, the quartz vein) was three and a half feet. The country rock on either side, eruptive rock evidently dioritic, is heavily impregnated with iron pyrites, and is reported to give good assays in gold, although this must be conclusively determined by the mill tests.

The dump, where most of the material from the shaft has been piled up to be milled, consists mostly as far as could be seen of this pyritic wall rock with little typical quartz rock in evidence, hence increasing the importance that will be attached to the mill runs, proving this rock to be good pay ore or not as there is a large quantity of it; from a smaller quartz vein higher up on the mountain on this claim, two tons of ore were selected and sent last year to an American smelter from which most favourable returns in gold were obtained. A good cabin is near by the shaft. Strike of the vein being north and south, dip eighty degrees east. Foreman, Capt. Ross.

The Chicago is the claim south of the Alberni, and is about on a line with the direction of the strike of the vein at the shaft just described, and about one-eighth of a mile distant. In an open cut about thirty feet long is a quartz vein eight to thirty inches wide, strike north fifteen degrees west and south fifteen degrees east, dip into mountain of seventy-five to eighty degrees easterly.

The Missing Link—Altitude 3,050 feet—immediately north of the Alberni, shows in a small open work on the side of a small creek, a quartz vein one to two feet wide, strike north, thirty degrees west and south thirty degrees east, dip about eighty degrees easterly, with pyritic country rock.

From De Beaux to the Alberni shaft is about one and a half miles along the good pack trail, with a difference of elevation of 1,600 to 1,700 feet, and for testing purposes it will be easy to pack down ore to the stamp mill soon to be erected near De Beaux, and run water taken from Mineral Creek, which will afford an ample supply for this purpose. It is strongly urged that this mill may be in charge of a man thoroughly experienced in gold-milling, capable of making fair sample lots of the

ore at the mine and then of determining by use of the mill the probable average yield-value of the ore and the character of mill that may be best suited for this ore if such proves persistent in quantity and rich enough in gold to promise a good margin of profit, or otherwise these tests, so important in determining to a great extent the advisability of further expenditure, may be very unsatisfactory, or worse than useless.

The Golden Eagle, five or six miles above De Beaux by a trail along China Creek, is a kind of box canyon, in a steep mountain side scoured in places by annual snow-slides, up which, along a ridge a well defined quartz vein in the same kind of country rock or diorite, as described above, has been traced and explored by four short tunnels. The lowest tunnel, No. 1, was covered by the snow which never entirely leaves this basin, but Mr. Sutton reports its length to be forty-four feet with seven feet of solid vein matter at the mouth and three and a half at the face. About 100 feet above is tunnel No. 2—altitude, 2,960 feet—which I was able to enter and find to be about sixty feet long and run in on a true fissure vein of quartz and iron pyrites, mispickel, etc., more or less banded in a direction parallel with the walls two and a half feet wide at the mouth and fifteen inches at the face. Strike west of south, dip nearly vertical.

Tunnel No. 3, altitude, 3,075 feet, direction as No. 2, and nearly immediately above it. Vein the same as below, but three and a half feet wide at entrance, but beginning to narrow at thirty-five feet in until at the face or forty-five feet only four inches wide; however, there is no reason to doubt but that the vein on continuing along its course may widen out again as is characteristic of nearly every vein or ore deposit where such irregularities are to be expected. Tunnel No. 4 was inaccessible and the approach for this examination to this property was attended with some difficulty on account of the snow banks. No data as to the average value of the ore taken are available to me, but as I understand this claim has just been sold for a good price, we may expect that much more work will soon be undertaken and this vein thoroughly exploited.

Placers.

The properties of two companies were visited where the work is being energetically pushed forward and will now be described. On the Comstance claim I was informed that much water was giving trouble in the exploratory shaft being sunk to bed-rock.

The Duke of York claim, superintendent, M. W. Leveridge, Alberni P.O.

The property consists of (a) the Duke of York and the Queen claims, two miles long, and (b) the Prince of Wales claim below the Cataract Company's ground. On the Duke of York claim excellent work is being rapidly accomplished in thoroughly and properly equipping it for work, all the requisite details to be completed before the water is turned on in the early part of July, after which the climatic conditions are such that hydraulic mining may be carried on throughout the whole year, the cold winter spells being in most years very short and not at all severe.

Flume.—Near the upper end of the Duke of York claim is a dam across China Creek, whence water is

led into a flume six feet wide, three feet deep, California pattern, for one and one-quarter miles to the pressure box, whence the pipe, twenty-two inches in diameter of No. 14 steel plates, imported, rolled and punched, but riveted on the claim, will carry it 1,100 feet to the pit, and then divide, with gates, into two fifteen-inch pipes leading to two seven-inch monitors. The grade of the flume is eight one-hundredths per sixteen feet, and in one place is carried along a trestle work sixty feet high and then, passing under an over-hanging bluff, is suspended by chains of five-eighths of an inch iron fastened to the outer end of sill while the inner end is bolted to a short piece resting on two bolts driven into the rock. Capacity of flume 6,000 inches.

Head.—At the lower end of the claim, 240 feet head will be available and for one mile up the stream nearly 200 feet, and with the two monitors it is expected 2,500 to 3,500 cubic yards of dirt will be handled daily with 5,000 inches of water.

Sluice Boxes.—At first in working the lower gravel sluices six feet by forty inches, grade six to eight inches per sixteen feet, will be put in and lined with nine-inch fir blocks, but when working the upper benches and more dirt is available the sluices will be eight feet by forty inches. There will be excellent facilities for an under-current twenty feet wide, grade one inch per foot.

It is proposed that in the season of low water the creek will be deflected through the flume and the bed of the creek hydrauliced through the smaller sluice, but with high water, then the benches will be washed into the larger placed higher up.

Gravel.—Between twenty-five and thirty prospect pits have been sunk to bed-rock, in which the gravel is reported to have always prospected well. On either side of the stream are high benches of gravel, and as the claims are ten chains, or one-eighth of a mile on each side, there is a large amount of ground to wash in which there is not an excessive number of boulders as might well be expected, and so far but few that will be beyond the capacity of the powerful derrick.

Dump.—Work will begin on bed-rock at the lowest limit of the claim where the creek falls into a fast descending gorge that passes through 800 to 1,000 feet of territory not to be located as placer ground, and that should afford a site for a considerable amount of debris.

Derrick.—A very complete derrick, invented by Mr. Leveridge, Sr., will be put in the mine by which stumps and all boulders up to six tons in weight will be easily lifted and dumped on the washed bed-rock, the stumps and heavier boulders to be lifted by chains, while smaller rocks will be rolled on to a six by four foot platform, it being intended to keep as many as possible of such boulders from entering the sluices. The derrick will be operated entirely by water power through a seven-inch pipe, with gate, from the main pipe, and one and one-eighth inch nozzle on a hurdy-gurdy water wheel centered horizontally up on the gudgeon of the mast, below a platform. The mast is eighty-six feet long, sixteen inches square at the butt and fourteen inches at the top. The boom will be an extensor one capable of handling its load at 40.90 feet, this length to be at once changed at will with full load on so that a stump or big boulder can be easily moved 180 feet in

three minutes, the derrick being operated by one man. This property will soon be fully and well equipped for the proper working of its gravel, and before long the returns from clean-ups should be on record. The timber was cut at their own mill, and houses, blacksmith shops, stables, etc., are now erected.

The Cataract, superintendent, J. J. Stuart, Alberni P.O.

The property of this company comprises three claims, (a) the Cataract, one and a half miles long; (2) Balley Hooley, half a mile; (3) the Pat-Patlicant, one and a half miles, on China Creek. About 1,000 feet below the lower end of the Duke of York claim is a dam twenty feet high, forty-eight feet along the crest, cost \$2,000, the first dam higher up the stream having been swept away by a fresher. From the dam 5,000 feet of flume, forty by twenty-four inches, grade not regular, carries the water to the pressure box, whence a twelve-inch, No. 12 steel pipe leads the water to a monitor with four and six inch nozzles with available head of 148 feet. At the time of my visit the monitor was being used to prospect a high gravel bench on the right bank, and a face about thirty feet high was exposed, but so far no holes have been got down to bed-rock. Two hundred feet of sluice boxes, four by three feet, grade one-half inch to the foot, were carrying away the dirt, but as the creek has but a small drop along this part of the claim, the sluice could not be put in with a steeper grade or so as to reach bed-rock until run a considerable distance up stream. No mercury is being yet used in the sluice, but if this prospecting gives favourable results it is proposed to run a new and larger flume, by trestling which forty or fifty feet more head of water can be got, and to install a complete hydraulic plant, derrick, etc.

There is much gravel in the benches on both sides of the creek, carrying gold, it is claimed, in nearly every part and in the pit not many boulders have been encountered. On both properties can be seen the places in which, for several years, the Chinamen worked in their primitive way.

Being under orders to proceed without delay to the Kootenay mining district, I regret that more time was not at my disposal to make a further and more extended examination in this part of the province, but with more development done and more definite results attained, I hope on my next visit to find much progress to report and successful mining properties in full operation.

I have the honour to be, Sir,

Your obedient servant,

WILLIAM A. CARLYLE,

Provincial Mineralogist.

Bureau of Mines,

Victoria, B.C.,

June 17th, 1896.

The Missionary in the Mining Camp.

IT has been the custom for many years for the Presbyterians of Eastern Canada to send the students of their colleges and universities out during the summer season to do mission work in the western provinces. Many and varied were the experiences of some of these young embryo preachers, who were usually fired with zeal and good purpose to do the work of their Master.

The summer of '93 found a Kingston student, J. T. Stewart, at Fairview in the lower Okanagan, in the southeast corner of Yale district. The year before the Fairview camp had experienced one of these spasmodic "booms" incident to the average mining camp, but a desire to "freeze out" some luckless shareholders, or some other reason, had prompted the management of the mines to shut down work on the big quartz veins, the miners had scattered, and the camp soon assumed a degree of quietness that left practically no work for even the zealous young missionary to do.

Just across the southern border of the province, and in the State of Washington, Palmer Mountain was enjoying a brief season of prosperity, and young Stewart, in his zealous purpose, wrote back to the missionary headquarters in the East for permission to extend his field of work to the rushing camps of Golden and Loomiston, and boarding the upper deck of his "cayuse" he started southward to the latter town, leaving an appointment for a meeting at Golden on the following Sabbath. At the appointed time he proceeded to Golden with saddle bags filled with Moody and Sankey's Gospel hymns. Arriving at the town, he found everything proceeding as usual, saloons wide open, stores trading, and to all appearances, the Sabbath was as any other day to the careless inhabitants. No provisions had been made to receive the preacher and he was beginning to feel really lonesome and out of place when he was met by "Billy" Nelson, a good-natured saloon keeper with a four-by-nine smile, and whose worst fault was that he dealt in "40-rod red eye."

"Want to preach, eh?" he quizzed.

"Yes, but I have no place to preach in, and there appears to be no one who cares to listen, anyhow."

"Well," said Nelson, "I guess most of the boys are down to my place, and if you want to preach there, you can."

The idea rather staggered poor Stewart, but what was he out West for? To preach, of course.

"All right," he said, "when shall I come down?"

"Why now;" said Nelson. "One time is just as good as another."

So down to the saloon they proceeded. The long room was filled with a motley crowd. Miners, cow-boys and ranchers, mingled with each other, drinking, swearing, talking; some "having a time," others looking on, while seven-up, poker and faro games were running full blast. Surely, thought Stewart, here was a chance for missionary work, indeed.

As the two entered the saloon the proprietor roared out: "Here, you fellows, stop those games. We're going to have preaching."

To most of the occupants of the room the announcement seemed only one of Nelson's jokes, but he soon made them understand that he was in earnest, and the cards were reluctantly dropped, the tables set back, and Nelson further ordered a couple of busy bar keepers to stop selling drinks till the services were over.

Where should he stand? "Oh, go right into the bar," said the proprietor; and behind the bar he went, while fifty or sixty men gathered at convenient distances in front. Behind the missionary were the shelves with bottles of various liquors, the mirror, the cut glass; before him was the bar with the attendant cork-puller and other ordinary

paraphernalia. He handed out his hymn books and announced a song. It was sung with a will, as these rough looking chaps were mostly from eastern homes where in childhood they had been under good influences, even if some of them had sadly fallen from grace. After the song, a chapter of the Bible was read, then another song. The men in front of the bar were beginning to enter into the spirit of the thing, and from a jest at first, some of them appeared quite willing to be led, for the time being, at least, by the young missionary, to sing and listen with interest. After the second song he essayed to preach, but after a few moments' talk he was interrupted by the request, "give us another song." This he obligingly did and then commenced again to preach. But the interruptions continued. Finally, one godless chap said: "Give us a jig." Stewart realized that he would have to make some kind of terms with his restless audience or the service would be a failure and his power for good in the camp would be entirely gone. He was not without resources, and quickly resolved to bring some of his "talent" to bear on the audience. At college he had usually been selected by the students to play "darker" parts in the college entertainments and could dance a jig equal to any coloured Sambo. He said to those in front: "If you will agree to let me talk to you for twenty minutes without interruption, I'll dance a jig for you."

"All right." "Fair play to the preacher," etc. Out went Stewart into the middle of the big saloon, and in a ring formed by the lookers-on he commenced to dance. Double shuffle, triple knock-pigeon wings, clog steps, followed each other in succession, till, winding up with a whirlwind break-down, the young man stood breathless, but smiling, amid tremendous applause. "Now for the sermon." Surely a man who could dance like that ought to be able to preach, and preach he did.

After that he never had any trouble to get an audience and good attention at Golden. Later, when the boys organized a baseball club and received a challenge from a neighbouring town it was Stewart who volunteered to fill the position of second baseman and outplayed every man in his own or the opposing club. Poor Stewart, the melancholy news of his death was sent to friends on the Coast last year, but he will long be remembered as one of the best and noblest of young men.

Lieutenant-Governor Dewdney's Visit to Kootenay.

LIEUT.-GOVERNOR DEWDNEY paid a visit the other day to Kootenay district. Thirty-five years ago the governor superintended the building of the trail which bears his name, and which cuts through the forests and over the mountains of Kootenay passes for over 300 miles through what is probably the richest mining region ever discovered. Little did he and others think when cutting this trail that it was destined to be the forerunner of an era of mining development which would startle and astonish the world. In an interview after his return to Victoria Governor Dewdney expressed his surprise and delight at the marvelous activity everywhere to be seen in the Kootenay. I spent two days at Trail, he remarked, and I had an excellent opportunity to observe the working of the great smelting plant erected by Mr. Heinze at that point.



MINING CAMP IN BRITISH COLUMBIA.

While I was there they were running through about 130 tons of ore a day; but they were building additional furnaces, which will bring the capacity of their plant up to 500 tons a day. I had not been at Trail Landing for thirty-one years, and, on this, my second visit, I found a busy hive of industry where on my first I found but solitude and savagery.

I rode from trail to Rossland and spent three days in looking over the now famous camp. The superintendent of the Le Roi took me through that mine and explained its wonderful development, and I had also the pleasure of going through the War Eagle. Both are among the great gold mines of the continent, and I saw and heard sufficient to believe that many War Eagles and Le Rois will be found at Rossland before many years are at an end.

From the slopes of Red Mountain I had a bird's-eye view of Rossland, and I must admit I was almost dazed by the prospect. The extent of the town and the vast number of dwellings and business houses far surpassed anything I had been led to expect. Everything betokened a happy, healthy, prosperous community.

I met a great number of mining men from other parts of the Kootenay, and I found them all speaking with unbounded enthusiasm of the great and wonderful things in store for that country. Mr. Pritchard, the London expert, seemed carried off his feet by the Trail country, and he told me that if London knew the camp as he did, it would go crazy over it.

My chief regret has been that I could not afford time to visit the other districts in Kootenay, but I have seen enough to convince me that British Columbia is about to have a mineral development which will place her among the foremost mining camps of the world.

Railway and Steamboat News.

The Columbia & Western Railway running from Rossland to Trail, is now ready to do business. Its regular train service was commenced last week. A two-train service has been inaugurated. The road will be tapped and side tracks laid by the other large properties of the camp as speedily as possible. The main line of the road passes over the ground of many properties in the south belt, and these will be enabled to ship their ore immediately.

Acting on recently conferred parliamentary powers, Mr. Corbin is instituting an ordinary telegraphic service between Nelson and all United States points as well as to the Coast.

Box cars for the Columbia & Western Railway have arrived at Trail, and now the road has its full equipment for handling general freight.

Merchandise consigned through the railway will be put on the cars direct from the steamer without being lowered to the ground, thus saving danger of breakage or damage of any kind. A freight shed is to be built on the level of Columbia Avenue. A. McQueen, lately western agent of the Kootenay Mills, and well known throughout the province, has been appointed freight solicitor. A "Y" is being put in on the flat above the city. Ore has been going forward at the rate of seventy-five tons a day from Le Roi mine. Two carloads of ore went forward from the Mayflower

the other day, and small shipments have been made since. The road has been kept very busy since regular train service was started.

President Corbin has let the contract for the construction of the Columbia & Red Mountain Railway to Stewart & Welch, of Helena, Mont. Work will start at once, and is to be finished by September.

The latest in connection with the Crow's Nest Pass Railway scheme is to the effect that F. Aug. Heinze, backed by the C.P.R., will go to London to raise the funds for the building.

The Nelson & Fort Sheppard Railway has put in a new siding for the north fork of Salmon river, three miles from Salmon Siding.

The Spokane Falls & Northern has begun a daily train service (Sundays excepted) between Nelson and Spokane. Trains leave Nelson at 8:40 a.m., and arrive in Spokane at 6:15 p.m. They leave Spokane at 7 a.m. and arrive at 5 p.m.

The new time card of the C. & K. Co., which went into effect June 8th is as follows: Steamer Kokanee leaves Nelson at 4:15 p.m. and arrives in Kaslo at 8 p.m.; leaves Kaslo at 5:30 a.m., and arrives in Nelson at 9:30 a.m. On every second Saturday, beginning June 6th, the Kokanee leaves Kaslo at 10 p.m. for Bonner's Ferry.

Rossland Stock Exchange.

Last issue of the *B. C. Gazette* contains the notice of the incorporation of the Rossland Stock Exchange of British Columbia. The incorporators are John M. Burke, R. J. Bealey, S. M. Wharton, A. B. Irwin, Ross Thompson and J. B. McArthur. The capital stock of the company is \$50,000 in \$50 shares. Well done Rossland.

HAPPENINGS AT THE MINES.

ALBERNI.

W. B. Garrard, who returned from Alberni the other day, states that there is now water in the flumes at the Duke of York claim and piping is begun. The tunnel on the Alberni is being run. The Mountain Rose is doing well, and the Alberni Consolidated and Mineral Hill companies are making active preparations for a busy season. The Last Chance is shut down for the present, but will open up again shortly. Work is progressing on the Regina Group claims, a cabin having been erected and a quantity of ore extracted. It is stated that there will be 100 tons on the dump and ready for shipment in August. The rock beneath the crust assays \$14 to the ton and improves with every shot. The ledge is 300 feet wide and can be traced for 3,000 feet.

CARIBOO.

The South Wales Company have again started work in their drift after having had for different causes to lay off over two months.

The Slough Creek Company have been forced to stop their drain drift for a while on account of surface water from their drift, which will undoubtedly help them a good deal when they start up again.

On Oregon Gulch, a tributary of Chisholm Creek, Messrs. Marotte and Tetreau are working eight or nine white men on their hydraulic claim

and are making things hum while the water lasts. The claim is looking well, a good deal of gold being visible in the ground sluice.

FORT STEELE.

Some rich specimens of copper ore have been brought in from the Wasa property.

The owners of the Gold Hill property will run fifty feet of tunnel at an early date.

The Invicta Company commenced work on their placer ground last month. Two giants are at work and as soon as the pipe arrives two more will be set at work.

P. Waterlette, an expert on coal, arrived lately at Fort Steele. He will examine the Crow's Nest coal fields in the interest of a private syndicate.

KASLO.

George W. Hughes, of the Best, received word lately that the contractors who are running a 300-foot tunnel to cut the lead, had come upon a large body of ore. He also received samples of the ore, which look to be high grade.

Slocan mines paid dividends during the first six months of 1896 aggregating \$1,500,000. This does not include the Kootenay Lake or Nelson mines, which, if added, would probably swell the figures to a round \$2,000,000. Is there a silver lead camp on earth which can beat that record?

MIDWAY.

During the past week a large number of locations have been made in the vicinity of Pass Creek. This is a new field for prospectors, and lies between Long Lake camp and Brown's camp on the north fork of Kettle River.

Messrs. J. C. Haas and T. Dales are having a forty-foot shaft sunk on the Golconda claim in Copper camp. This claim was located only this spring, and from the character of the cropping should, on development, prove a valuable property.

NELSON.

The shares of the Hall Mines are quoted in London at £3, being a premium of 200 per cent.

In spite of the lateness of the season, over sixty locations have been made mostly in the vicinity of Deer Park on the Arrow Lakes.

There has been quite a rush of prospectors this spring into a range of mountains running east and west between Tin Cup Rapids on the Columbia and the mouth of the Slocan River. Last fall some locations were made on the Kootenay end of the range on what is locally known as Red Mountain. Some very satisfactory assays were had from these ledges. Two months ago a number of prospectors went in from the Columbia River end of the range and made several locations from four to six miles back from the river. The ledges in most cases carry large bodies of pyritic iron. At least forty claims have been staked on this end of the range, assays running from \$8 to \$10 in gold per ton.

NEW DENVER.

The Willa, situated near the Little Daisy, on Eight Mile, is likely to be a very big mine indeed. A sample of the ore shows native copper in large quantities.

At the Enterprise group there is nearly 300 tons of high grade ore outside the two drifts, while in the workings there is room sufficient for fifty men

to stope ore. For over 300 feet in each tunnel clean ore is shown.

Something like 250 men are prospecting in the Lemon and Springer Creek districts.

In the Nil Desparandum at Bear Lake 124 ounces of dry ore has been struck.

QUESNELLE.

The Young dredger, built just below the bridge where the Underwood Company built theirs, has been launched and presents a fine appearance.

The Mallory Brothers, from November to April took out by rocking on a bar opposite Mud Creek on the Quesnelle, sixteen miles above the village, 100 ounces of gold. The bar is extensive, and much of it lies below water.

The ground of the Quesnelle River Hydraulic Company is very good and very extensive, but water is scarce, although it can be brought on the ground at a moderate expense.

The Underwood ore ledge is working and the owners seem very sanguine of the final outcome. It will take some time yet to get the machinery regulated and running smoothly. It certainly looks as though dredging would be successful in this section, and if so there is a great future for business in this line. A new dredger is now being started, the timbers being gotten out at Reid's sawmill. It is to operate on the Fraser.

QUESNELLE FORKS.

The Cariboo Hydraulic Company's works are in full blast—powder, fuse and water—and it is rumoured that some little extension of ditch is likely to be commenced soon.

The prospecting work by the Quesnelle Forks Canal and Hydraulic Mining Company on Spanish Creek produced a nice little golden return lately, giving renewed encouragement to those engaged in it. Some Chinamen working on the same creek seem more than usually cheerful, and it is presumed that their recent receipts have been considerably more than the proverbial two "bitees" a day.

The California Consolidated Hydraulic Company at Rose Gulch, although only working in a small way, have had a very satisfactory wash-up, and the gold sent off reached well up into the hundreds of dollars for a short period of operations.

REVELSTOKE.

The Albert Canyon trail is now in twelve miles with about seven men employed. The prospectors are in ahead of the road, and say the North Fork camp will soon be heard from.

The Columbia Hydraulic Company at the Big Bend, have got all their pipe in and water turned on. Everything is working satisfactorily. Twenty-three men are employed.

It is reported that the aerial tram at Illecillewaet will be built very soon. It will be over two miles in length and reach from the tunnels on the Lanark and Maple Leaf to the railway track by Muir's tunnels.

ROSSLAND.

Two more diamond drills are at work in the district. They will be available for prospecting to a depth of 200 to 2,500 feet.

Considerable attention has been drawn towards the Champion-Bear Creek section of West Kootenay. It is destined to attract a great deal more

yet. A mineral zone has been located on the eastern shore of the Columbia, which for size and extent, seems to be unequalled by any thing in the district, and whose development bids fair to add to the resources of the country a number of producing mines.

About eighteen miles north of Rossland in an air line is the third new camp which promises to beat all records. It is manifestly a direct extension of the Trail Creek mineral belt, as it is staked solidly from Rossland clear through to the Lower Arrow Lake. This camp is known as Burnt Pass, and has its outlet at the mouth of McCormick Creek on Lower Arrow Lake, about twelve miles above Robson. The hub of this new camp appears from all reports to be the Lakeview mine, about three miles up McCormick Creek. Several enormous veins radiate from this claim in a southerly direction, but are apparently cut off a short distance to the north by the country granite.

The Waterloo camp lies north of the Champion-Bear Creek belt south of the Kootenay River in what is known as the Deer Mountain range. Several groups of claims in this section have already been bonded for large figures. It has been visited during the past week by a host of prospectors, promoters and experts. One of the latter thus summarizes his impressions of the camp: "It contains enormous bodies of iron sulphide, which appear to be wider than any of the veins on Red Mountain. They do not, however, show the same continuity, but this is not surprising as absolutely no work of any kind has been done. The values on the surface are low, but the texture of the ore is very coarse, so that with development a great improvement seems probable. The ore bodies occur in diorite exactly as on Red Mountain and the ore zone appears to be separated from the Champion-Bear Creek district by a wide belt of white, coarse-grained granite which also comes in on the north. The possibilities of the camp are immense.

Last year was Red Mountain year. This year it is plain that Monte Christo hill will be the centre of attraction. In no other part of the camp are there such extensive and continuous surface showings as on this hill, and at last the work of developing these veins on an adequate scale is about to be entered on.

The vein on the Mayflower has recently opened up the full face of the tunnel. The ore is galena, carrying 100 ounces in silver and from \$12 to \$20 in gold. From assays made from the sacked ores, the owners believe that the shipment will pay for the development. Twenty men are employed on this mine.

The eighteen-inch ore chute on the St. Elmo has widened out to four and a half feet and assays well in copper and gold. A force of thirty men has been employed to go on with the work.

Considerable attention has been given lately to Murphy Creek, with the result that the district is coming into prominence.

The shaft on the Commander is down seventy-two feet, a force of eleven men being employed. There are now about forty tons of shipping ore on the dump which will average \$22 to the ton, including gold and copper. The ore averages nearly ten per cent. in copper, and is, on that account, very desirable for the local smelters.

No. 2 shaft on the Iron Mask is now down twenty-five feet below the level of the No. 3 tunnel and shows over three feet of solid ore which averages \$60 in gold and thirteen per cent. in copper. This is practically the highest grade copper ore in the camp. The ledge is constantly widening and already evidences a most marked improvement over he showing in the tunnel or on the surface.

The new vein on the Le Roi is now being opened up by a drift on the ore body. When it was cross-cut it proved to be a little over twenty-two feet wide between the walls. The ore continues to average a little better than \$40 a ton, which is not quite as good as we previously reported, but on investigation we find to be as good as it ever ran, taking the average of the whole vein. Some portions of the vein assay up to \$150 in gold.

Work is progressing famously on the Georgia. The No. 1 tunnel is now in on the main vein a distance of 110 feet and is being driven towards the old shaft, which is sunk on a big showing of ore. The No. 2 crosscut tunnel is now in eighty feet and has sixty feet more to run to reach the vein. It will develop both the main vein and the cross vein discovered in starting the upper tunnel. On the cross vein a fine showing of ore is being opened up by crosscuts and shafts near the north end of the claim and a tunnel will be started shortly to explore it thoroughly. This ore carries a big percentage of nickel, besides running well in gold.

VERNON.

The Morning Glory mine, a few miles from Vernon on the west side of Okanagan Lake, is showing up in very promising manner. The parties owning the claim are now down about twenty feet on a large and well-defined ledge. An assay from rock taken at a depth of six feet, has recently been obtained from the Tacoma smelter, and shows the ore to carry gold to the value of \$32, silver \$42, and zinc \$2 per ton. The smelting company have made an offer to purchase all the ore shipped to them, which will net about \$59 in Tacoma.

Beatty Gold Dredging and Mining Company.

APPLICATION is made for Dominion incorporation of the Beatty Gold Dredging and Mining Company, with the following gentlemen composing the same: McSloy Bros., St. Catharines; H. C. Symmes, Banker R. Payne and Charles F. Morse, of Niagara Falls South; A. B. Denison, of Niagara Falls, N.Y.; Hugh McCullough (of Goldie & McCullough), Galt; Senator Ferguson, Toronto; and Beatty & Sons, of Welland. The capital stock is \$50,000, all promptly subscribed. The claim is three miles in length of bed and bar on the Fraser River, and is located just below North Bend, 129 miles from Vancouver, British Columbia. The location was made after personal investigation of the claims, and lies in the very centre of the gold-bearing section. Gold is being taken out by hand on all sides in paying quantities. It is correctly argued that if thousands find remunerative results from hand work, the dredges will take big money out of the river bed and bars.

Two weeks ago the stockholders met and awarded Messrs. Beatty & Sons the contract for supplying a complete gold-dredging plant, to cost

about \$20,000, which they are now building with all possible speed. Dredge, hull, scows, grizzlies, sluice boxes, etc., will be built on the Fraser River. The plant will be of the most modern style, supplied with Beatty's latest improvements. All will be ready for business about October 1st, when active operations will be begun under the superintendence of L. R. Symmes. Millions of dollars' worth of gold have been taken out of adjacent bars in years gone by, and with machinery that will delve twenty-five feet below the water's surface it is believed that there is "money in it." Be that as it may, the men who are putting their money into the scheme are wide-awake and go into the enterprise with their eyes wide open. They know just what the chances for success are, and seem eager to take the chance. There is no question as to the finding of the precious metal, but success depends on whether or not it can be got out in paying quantities.

One great advantage lies in the fact that the company's claim is within half a mile of the Canadian Pacific Railway, and it will not take a barrel of money to place the machinery at its destination.

H. L. Beatty and L. R. Symmes are now in the West.—*Welland Tribune*.

The *Shareholder*, London, England thus quotes the *Mining Record*:—The May issue of the *Mining Record*, published monthly at Vancouver and Victoria, which contains editorial paragraphs respecting parties of English gentlemen already arrived in British Columbia, and other parties being formed to visit Western Canada this summer via the Canadian Pacific Railway. One of these paragraphs ends thus: "This means that a great deal of money is likely to be invested in our mines during 1896. It is the duty of every man connected with mining in this province, whenever opportunity occurs, to guard these capitalists from bogus investment." The same journal elsewhere recommends that incorporated mining companies should be compelled to publish monthly statements of their condition, for the protection of innocent investors against bogus mining concerns.

W. F. McCulloch shipped recently a 100-pound specimen from the Golden Eagle claim to Montreal. One piece knocked off the specimen assayed over \$96, running over three and a half ounces in gold. The specimen was consigned to A. C. Flumerfelt, of Victoria, who is on a business trip east. An effort will be made to dispose of the property in the city of Montreal.

Notes.

We call attention to the advertisement of Mr. J. A. MacFarlane, F.C.S., in this issue. Mr. MacFarlane has fitted up extensive premises at 623 Hastings Street, Vancouver, thoroughly complete in every respect for assaying purposes, and his long experience places him in the position of being one of the most reliable assayers in the province. Reliable work in assaying is of the utmost importance to owners of mining properties, and in this respect we can safely recommend Mr. MacFarlane.

The Manor House is situated on the corner of Dunsmuir and Howe Streets, Vancouver, one block from Post Office, and only a short distance from all trains and steamers, and commands a beautiful view of the sur-

rounding country. It is the headquarters for commercial travellers, tourists, mill and mining men. Supplied with electric call bells, hot air heating, electric and Auer lighting, hot and cold baths, commercial sample room etc. It has connections with large tourist firms in Europe, also the best hotels. Cuisine excelled by none in city; European chef. Gives employment to twenty white people, and has a capacity for about one hundred guests. Rates, \$2 per day and upwards. The Manor is a particularly desirable hotel for mining men to stop at when visiting Vancouver. It is most pleasantly situated.

Catalogues Received.

Which will be sent free to any subscriber of the *Record* on application to the Editor.

Joshua Hendy Machine Works. Mining Machinery of all kinds.

The Giant Powder Company, Explosives.

Shelton & Co., Vancouver, B.C., Furniture.

Merrall's Hydraulic Quartz Mills.

The Pelton Water Wheel.

Goodyear Rubber Co., Rubber Goods.

Union Iron Works, Machinery.

The McGlew Ore Concentrator Co., Concentrators.

The Babcock & Wilson Co., Water Tube Steam Boilers.

The Goubert Manufacturing Co., Water Heaters, &c.

Gates Iron Works, Rock and Ore Breakers, &c.

Fraser & Chalmers, General Milling Machinery.

The Metallic Roofing Co., Steel Shingles.

H. W. Petrie, Machinist and dealer in Machinery.

James H. Lancaster, Dredging and other Mining Machinery.

Northey Manufacturing Co., Ltd., Pumping Machinery.

Girard Water-wheel Co., Water-wheels.

M. C. Bullock Manufacturing Co., Diamond Drills, &c.

H. W. Caldwell & Son Co., Elevating Machinery, &c.

Edward P. Allis Company, Mining and Milling Machinery.

J. J. Norman Company, Gas and Gasoline Engines.

Sullivan Machinery Co., Diamond Prospecting Drills.

Electrical Engineering Co., Dynamos and Motors, &c.

Canada Paint Co., Paints, &c.

William Hoskins & Co., Hydro-Carbon Blow-pipes, &c.

Gutta Percha and Rubber Manuf'g Co., Rubber Goods.

The Dominion Wire Rope Co., Wire Rope.

Dodge Wood Split Pulley Co., Split Pulleys.

Selby Smelting and Lead Co., Refiners of Bullion, &c.

The Goulds' Man'g Co., Hydraulic Machinery.

Marvin Electric Drill Co., Electric Drills, &c.

Western Plating and Man'g Co., Amalgam Plates, &c.

D'Este & Seeley Co., Engineering specialties.

Robert Atchison Perforated Metal Co., Perforated Metals.

Jos. Dixon Crucible Co., Graphite Lubricators, Crucibles.

The Cannerville Blower Co., Beamers, etc.

Henry R. Worthington, Hydraulic Machinery, &c.

The Jeffrey Manufacturing Co., Chain Belting, Mining Locomotives, &c.

The Philadelphia Engineering Works, Ltd., Engines, Air Pumps, &c.

James Leffel & Co., Water-wheels, &c.

Wm. Jessop & Sons, Special Steel.

James McBeth & Co., Electric Blasting Apparatus.

R. D. Wood & Co., Special Gas Machinery.

The Risdon Iron Works, Mining Machinery, &c.

The National Ore and Reduction Co., Prospectors' Furnaces.

A. Wyckoff & Son, Steam Pipe Casing.

Eimer and Amend, Assayers' Appliances.

The Card Electric Motor and Dynamo Co., Electric Power.

The Norwalk Iron Works Co., Compressors, &c.

The Taylor Iron and Steel Co., Manganese Steel.

Wm. Ainsworth, Assayers' Outfits.

The Roessler & Hasslacher Chemical Co., Chemicals.

The Ludlow-Saylor Wire Co., Screens, Nails, Fencing, &c.

The Stilwell-Bierce & Smith-Vaile Co., Water Heating and Purifying Machinery, Boilers, &c.

The A. Leshen & Sons Rope Co., Special Fattened Strand Power Rope.

The Lafin & Rand Powder Co., Finest Modern Sporting Powders, Loaded Shells, &c.

The Canadian Rand Drill Co., Drills, Compressors, Special Oils, &c.

Wm. Ainsworth, Fine Balances and Assayers' Appliances.

Fried, Krupp Iron and Steel Works, Mining Machinery, &c.

California Wire Works—Wire Ropes, Cables, etc.

Colorado Iron Works, Mining Machinery.

B.C. EXPRESS COMPANY, L'TD.
Stage Lines for Cariboo and the Northern Interior of British Columbia.
S. TINGLEY, GENERAL MANAGER.

GOING NORTH— Read down.	TIME.	PLACES.	Miles from Ashcroft.	TIME.	COMING SOUTH— Read up.
*Mon, Wed and Fri. de	5.30	Ashcroft	0	18.00	ar *Tues., Thurs. and Saturday.
*Mon, Wed and Fri. de	8.00	Hat Creek	13	16.00	Tuesday, Thursd'y and Saturday.
*Mon and Thurs. ar	11.00	Pavilion	41	11.00	Tus. and Fridays.
*Mon, Wed and Fri. de	18.00	Lillooet	62	5.30	de Tus. and Fridays
*Mon and Thurs. ar	12.00	Clinton	32	12.00	Tuesday, Thursd'y and Saturday.
*Tues and Fri, ar	18.00	83-Mile House	68	5.30	de *Tues. and Sat.
*Tues and Sat, de	5.30	83-Mile House	68	18.00	ar *Mon. and Fri.
*Sleigh Rd. fr m 108 Mile House	9.00	108-Mile House	93	13.00	*Mond'ys and Fri.
*Tues and Sat, ar.		Horse Fly	140		Special.
Trail from 150 Mile House	18.00	150-Mile House	135	5.00	*Mond'ys and Fri.
Weekly Stage		150-Mile House	135	18.00	*Sun. and Thurs.
Weekly Stage		Horse Fly	185		Special.
Weekly Stage		Forks Quesnelle	195		Connect 150-Mile House.
Weekly Stage		Keithley Creek	195		Connect 150-Mile House.
*Wed and Sat	9.00	Soda Creek	165	14.00	*Sun. and Thurs.
Weekly Stage		Chilcoteen	135		Connect Soda Crk.
*Wed and Mon.	18.00	Quesnelle	225	5.00	*Sun. and Thurs.
Thursdays	de	Quesnelle	225	18.00	*Saturdays.
Thursdays	15.00	*Stanley	273	7.30	*Saturdays.
Thursdays	ar	*Barkerville	285	5.30	*de. Saturdays.

* Weekly.
 Days in italics are for summer season only.

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Alberni.—Steamboat communication with Victoria and by stage with Nanaimo.

Barclay Sound.—Forty miles from Alberni; communication by steamer with Victoria.

CARIBOO.

Barkerville.—Two hundred and eighty-five miles from Ashcroft; stage from Ashcroft. See stage lines.

Bonaparte.—Six miles from Ashcroft; stage from Ashcroft.

Big Bar.—Stage from Ashcroft.

Clinton.—Thirty-two miles from Ashcroft station; stage from Ashcroft.

Fort George.—Nearest post office, Quesnelle.

Horsefly.—Nearest post office, 150 Mile House; stage from Ashcroft; change at 150-Mile House.

Lac La Hache.—One hundred miles from Ashcroft on stage line from Ashcroft to Barkerville.

Lillooet.—Weekly stage from Ashcroft.

Lightning Creek.—Between Quesnelle and Barkerville, by stage to Stanley.

One Hundred Mile House.—Stage from Ashcroft.

One Hundred and Fifty Mile House.—Stage from Ashcroft.

Quesnelle.—Two hundred and twenty-five miles from Ashcroft; stage from Ashcroft.

Quesnelle Forks.—Stage road from Ashcroft.

Soda Creek.—Stage from Ashcroft.

Stanley.—Stage from Ashcroft.

Slough Creek.—Stage from Ashcroft.

Tailc Lake.—Stage from Ashcroft, changing at Soda Creek.

Willow River.—Stage from Ashcroft.

Williams Creek.—At Barkerville.

CASSIAR.

Dease Creek.—

McDame Creek.—

COAL CENTRES.

Crow's Nest Pass.—

Nanaimo.—From Victoria, all rail, 73 miles. Steamer from Vancouver.

Union.—

Wellington.—From Victoria, all rail, 83 miles. Steamer and rail from Vancouver.

EAST KOOTENAY.

Cranbrook.—Nearest railway station, Golden. Communication by steamer from Golden to Windermere, thence by stage.

Fairmont Springs.—Nearest railway station, Golden. Steamer to Windermere, thence by stage.

Fort Steele.—Steamer and road from Golden. Steamer from Jennings, Montana, G.N.R.R.

Galbraith Ferry.—Steamer from Golden. Stage in winter.

Galena.—Nearest railway station, Golden; thence by steamer. Stage in winter.

Golden.—On the main line C.P.R., 475 miles from Vancouver.

Moyie River.—From Fort Steele, 25 miles.

McMurdo District.—Steamer and trail from Golden, 35 miles.

Perry Creek.—Steamer from Golden to Fort Steele, thence by road.

St. Mary's.—From Fort Steele, 20 miles trail.

Thunder Hill.—One hundred and fifteen miles from Golden. Steamer in summer, stage in winter.

Windermere.—Steamer from Golden. Stage in winter.

Wild Horse Creek.—From Fort Steele, two miles trail to Kootenay River.

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CASSIAR.—W. Stephenson	Quesnelle Forks
J. Bowron	Barkerville
YALE.—W. Dodd	Yale
L. Norris	Vernon
C. A. R. Lambly	Osoyoos
W. McMynn	Midway
H. Hunter	Granite Creek
G. C. Tunstall	Kamloops
LILLOOET.—C. A. Phair	Lillooet
F. Sones	Clinton
CASSIAR.—Ezra Evans	Manson Creek
Jas. Porter	Laketon
ALBERNI.—Thos. Fletcher	Alberni
VICTORIA.—W. S. Gore	Victoria

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 Cariboo.—John Bowen, Richfield.
 Cassiar District.—James Porter, Laketon, Cassiar.
 Lillooet District.—Frederick Soues, Clinton.
 East Kootenay District.—J. F. Armstrong, Donald.
 West Kootenay District.—N. Fitzstubs, Nelson.
 West Kootenay District.—J. D. Graham, Revelstoke.
 Yale District.—Chas. Lambly, Osoyoos; G. C. Tunstall, Kamloops.

WEST KOOTENAY.

Ainsworth.—Twenty-eight miles from Nelson and twelve from Kaslo. Steamer communication.

Albert Canyon.—A station on the C.P.R., 400 miles from Vancouver.

Big Bend District.—Fifty miles from Revelstoke by trail and boat.

Cariboo Creek.—Steamer from Nakusp, ten miles.

Fort Sheppard.—Nearest post office, Trail Creek; communication by rail and steamer from Revelstoke.

Illecillewaet.—On the main line C.P.R., 407 miles from Vancouver.

Kaslo City.—Thirty-five miles from Nelson; communication by steamer.

Lordeau City.—Forty miles from Revelstoke; communication by steamer.

Lardo-Duncan.—Steamer from Kaslo to head of lake, thence river trail 40 miles.

Nakusp.—North-west terminus of Nakusp & Slocan Railway, 50 miles from Revelstoke. Steamer communication from Revelstoke tri-weekly.

Nelson.—Thirty miles from Robson; is the eastern terminus of the Columbia & Kootenay Railway, and also on the Spokane & Northern Railroad. Steamer from Revelstoke.

New Denver.—Steamer from Revelstoke and rail from Nakusp; all rail from Kaslo. Distant from Revelstoke, 78 miles, from Kaslo, 28 miles.

Pilot Bay.—Eighteen miles from Kaslo, thence by steamer.

Revelstoke.—On main line C.P.R., 379 miles from Vancouver.

Rossland.—Seven miles from Trail Creek by road or stage.

Sproat's Landing.—One hundred and sixty miles from Revelstoke, and one and a half miles from Robson.

Springer Creek and South Slocan Camps.—From New Denver by steamer, twenty miles.

Sandon and Cody Creek.—All rail from Kaslo, 29 miles.

Steamer and rail from Revelstoke *via* Nakusp and Three Forks. Distant from Three Forks, four and a half miles.

St. Mary's Country.—Steamer from Kaslo or Nelson to Davie Townsite, thence trail.

Three Forks.—Steamer from Revelstoke to Nakusp, thence rail; from Kaslo, all rail. Distant from Revelstoke, 82 miles; from Kaslo, 24 miles.

Trail.—Rail from Spokane to Northport, thence steamer. All steamer from Revelstoke, or steamer and rail *via* Nelson from Revelstoke, 150 miles; from Nelson, 50 miles.

Trout Lake City.—Steamer and stage from Revelstoke.

LILLOOET.

Bridge River, Cayuse Creek, Fraser River.

YALE.

Boundary Creek.—Nearest railway station on the S. and O. R., Okanagan Landing, thence by steamer to Penticton and on by stage to Midway.

Fairview Camp.—Communication by boat from Okanagan Landing to Penticton, thence by stage.

Kettle River.—Steamer from Okanagan Landing to Penticton, thence by stage.

Midway.—Rail from Sicamous to Okanagan Landing, steamer Penticton and on by stage.

Okanagan Mission.—Rail from Sicamous to Vernon, thence by stage or by steamer from Okanagan Landing to Kelowna, thence by livery.

Osoyoos.—Rail to Okanagan Landing, steamer to Penticton, and thence by stage.

Rock Creek.—Rail to Okanagan Landing, steamer to Penticton, and thence by stage.

Yale.—Nicola Lake Stage from Spence's Bridge and Kamloops, 50 miles.

Any of these points may be reached by rail from Spokane to Marcus, and thence by stage twice a week.

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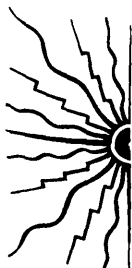
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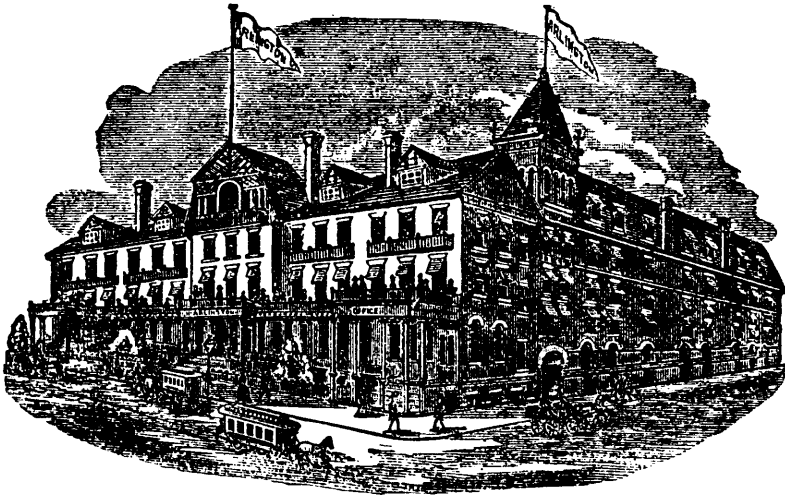
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prepaid to Vancouver. This offer will be withdrawn after September 1st, un-
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THE COLUMBIA & KOOTENAY STEAM NAVIGATION CO. LIMITED.

TIME TABLE NO. 9.

In effect March 15th, 1896.

REVELSTOKE ROUTE, STEAMER "NAKUSP."

Leaves Arrowhead for Nakusp and Robson on Sundays, Tuesdays and
Thursdays at 8 p.m.
Leaves Robson for Nakusp, Arrowhead and C.P.R. points east and west on
Mondays, Wednesdays and Fridays at 4 p.m.

Connection is made at Robson with C. & K. Railway for Nelson and all
points on Kootenay Lake and with steamer Lytton for Trail and Northport.

TRAIL CREEK-ROBSON ROUTE, STEAMER "LYTTON."

Leaves Trail for Robson on Mondays, Wednesdays and Fridays at 8 a.m.
Leaves Robson for Trail on Mondays, Wednesdays and Fridays at 1 p.m.
Close connection at Robson with steamer Nakusp for Nakusp and Reve-
lston and with C. & K. Railway for Nelson and Kootenay Lake points.

NORTHPORT-TRAIL CREEK ROUTE, STEAMER "LYTTON."

Leaves Trail for Northport on Tuesdays, Thursdays and Saturdays at 8 a.m.
Leaves Northport for Trail on Tuesdays, Thursdays and Saturdays at 1 p.m.
Connects at Northport with Spokane Falls & Northern Railway for
Spokane.

NELSON-KASLO ROUTE, STEAMER "NELSON."

Leaves	NELSON FOR KASLO:—	Leaves	KASLO FOR NELSON:—
	Sundays at 4 p.m.		Sundays at 8 a.m.
	Tuesdays at 5:30 p.m.		Mondays at 3 a.m.
	Wednesdays at 5:30 p.m.		Wednesdays at 3 a.m.
	Thursdays at 5:30 p.m.		Thursdays at 8 a.m.
	Fridays at 5:30 p.m.		Fridays at 3 a.m.
	Saturdays at 5:30 p.m.		Saturdays at 8 a.m.

The steamer leaving Nelson connects on Tuesdays, Thursdays and Satur-
days with Nelson & Fort Sheppard train at Five-mile point, and with C. & K.
Railway on Wednesdays and Saturdays for Kaslo and Lake points.

The steamer leaving Kaslo connects on Mondays, Wednesdays and Satur-
days at Five-mile point with Nelson & Fort Sheppard train for Spokane, and at
Nelson with C. & K. Railway for points north and south.

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