

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER,

1888,

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, &C.,

IN THE

Province of British Columbia



REPORT
OF THE
MINISTER OF MINES,
1888

To His Honour HUGH NELSON,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Mining Industries of the Province for the year 1888,
is herewith respectfully submitted.

JNO. ROBSON,

Provincial Secretary and Minister of Mines.

Provincial Secretary's Office,

12th March, 1889.

REPORT.

GOLD.

The value of the Gold exported by the banks at Victoria during the year 1888, is as follows:—

Bank of British Columbia.....	\$286,923
Bank of British North America.....	57,186
Garesche, Green & Co.....	169,834
	\$513,943

CARIBOO.

MR. BOWRON'S REPORT.

“RICHFIELD, November 20th, 1888.

“SIR,—I have the honour to submit, for the information of His Honour the Lieutenant-Governor in Council, my fourteenth annual report upon the mines and mining industry of the Cariboo District.

“As regards alluvial mining, there is but little of importance to note. A few of the old claims have paid fairly well, but many have not paid fair wages.

“There are, however, several of these claims that have been many years ‘opening their ground,’ which are now becoming profitable to their owners.

“It will be observed from the statistics that while the population has decreased, both as regards whites and Chinese, the total yield of gold has slightly increased; so that the product averages, per man employed, considerably in excess of that of last year.

“On Williams Creek and immediate tributaries there have been twelve claims operated as hydraulics (besides those worked by other methods) with more or less success; among the more fortunate of which may be mentioned the Jenny Lind, the Forest Rose, the Bradley-Nicholson, and the Black Jack Companies.

“The Conklin Gulch Company, who have spent some years in taking in a cut and laying flume, have this year met with such encouraging prospects that we may fairly hope that this claim will in future be among those classed as ‘profitable to their owners.’

“On Antler and Cunningham Creeks there have been five or six hydraulic, besides other, claims in operation during the season.

“The Back Shing, a Chinese Company on Cunningham, find gold in paying quantities away three hundred feet up on the hill-side; diggings that with proper water facilities, it is believed, will pay twenty-five dollars per day to the hand.

“Whether this will lead to new ground of any extent is not known, but it is evidently cut off from the old bed, and no apparent source has been found so far.

“Mr. Alex. Sharp is bringing in a ditch some five hundred feet above the level of the stream to work this place.

“The Nason Company, Antler, which has for so many years battled with the hitherto unconquerable water, have this year been able to extend their researches underground, and though not yet on rich ground have got most encouraging prospects; round, heavy gold has been obtained at the rate of one and a half dollars to the bucket. Notwithstanding many obstacles they are still pushing on across the creek to find the main lead.

"The hydraulic claims on Mosquito Creek have turned out better than usual, with the prospects good for next season's work.

"On Lightning Creek Division there is but little to report.

"The output has been greater than that of last year, produced, principally, by desultory mining by Chinese. Harry Jones & Company, who have a lease on Peter's Creek (a tributary of Lightning), have not yet succeeded in finding clay on which to sink, although they have run a tunnel some 400 or 500 feet in search of it.

"In the Keithley and Harvey Creek Division, upon which Mr. Stephenson will report at length, I may mention Anderson and Smith's success in developing the old 'Live Yank' claim, the permanence of which as a paying claim is now assured.

"The Horsefly country has attracted considerable attention, but of the work there I am unable to give details. Mr. Harper has not met with the success anticipated, but Dan. McCullum & Company have opened a claim five miles below with fair prospects.

"I estimate the product of gold from this district (exclusive of Omineca) as follows:—

Barkerville	Division from 1st January to 20th November	\$ 75,294
Lightning Creek	"	"	36,536
Quesnelle	"	"	56,547
Keithley & Harvey, approximately,	"	"	66,000
Desultory, of which accounts are not obtainable			7,000
Whole district, 20th November to 31st December			9,000
			\$250,377

" Quartz.

"The quartz interest, from which we hope so much, has been stimulated by the fact that works are now being erected by the Government under the charge of Mr. E. A. Martin, whose report is herewith enclosed, and which will be read with satisfaction; many claims having been taken up with a view to getting them tested when the mill is ready, but not so much outside capital has been invested as this important enterprise seemed to justify, capitalists, presumably, reserving themselves until actual facts and results are before them and there is a feasible means of examining the mines for themselves.

"Several claims have quartz ready for the works, and this winter or early spring will probably tell us what some of our veins are worth.

"In this connection, if I may be allowed, I would suggest that a very moderate charge be made for the testing of ores, so that a fear of great expense will not deter prospectors from bringing quartz to the works. Quartz for test can be brought to the mill with advantage in winter, and, in fact, while the snow is on the ground it is the most feasible means of getting quartz from many localities to which there are no roads.

"The various mills will, doubtless, have their concentrations brought to undergo the process to ascertain the amount of gold the sulphurets contain, and how much free gold may be got by the agency of water alone; but while the re-agents employed for their reduction continue to be carried by freight teams over 300 miles of road the cost will be high, and possibly preclude the profitable working of low-grade ores, such as it is probable many of these reefs contain.

" Railway.

"The attention of miners and others has been considerably attracted to the prospects of the quartz reefs consequent upon the erection of the reduction works (and upon which a number of men have been and are still employed), as upon the success of this, and the development of the country by railway, the future of Cariboo in a great measure depends.

"I am pleased to observe that candidates at the elections now pending for the Commons and local House see the imperative necessity of a railway to Cariboo for the development of the country, especially the mines of this district, which, given cheaper supplies, machinery, etc., would undoubtedly furnish lucrative employment for thousands where at present but hundreds are employed, and who now make scarcely more than a fair living.

"A railway from the coast, or from some point on the C. P. R., running through the agricultural and mining portion of the district, and through the Yellow Head Pass of the Rocky Mountains, connecting with the railways of the North-west at Edmonton, offers exceptional advantages for the investment of capital.

"It may not be generally known that a practically level pass through the Cariboo Range north-east of Barkerville has been discovered, and a trail made through it to the waters of the upper Fraser last season. The discovery of this Pass, with the superior advantages possessed by the Yellow Head Pass through the Rocky Mountains over all others, would render the building and maintaining of a railway less expensive than that of any of the present transcontinental lines. Such a line of road would also open up some of the finest agricultural land of the North-west, viz.: that between Tête Jaune Cache and Edmonton, to say nothing of the immense coal beds which are to be met with on the McLeod and Pembina Rivers. The writer speaks on this from personal observation, and from a long and intimate knowledge of the capabilities of this district as a mineral country. It is to him inexplicable that while colonization railways are building or projected in almost every direction from the C. P. R. in the North-west, that such an unequalled opportunity for the investment of capital should be allowed to pass.

"It is earnestly to be hoped that some initiatory steps will be taken by the Legislature this year, and that both local and Dominion Houses will work together for this much to be desired end.

"I have, &c.,
(Signed)

"JNO. BOWRON,
"Gold Commissioner.

"To the Hon. Jno. Robson,
"Minister of Mines."

MR. MARTIN'S REPORT.

"BARKERVILLE, B. C., November 20th, 1888.

"SIR,—I have the honour to submit, in response to your request for a report upon the progress, present condition and description of the Reduction Works, as follows:—

"Although some delay occurred in getting started, I regard the progress made under many adverse circumstances as exceedingly satisfactory. Our distance from railway communication I have found a great drawback to pushing the work, and in many ways taxes a person's inventive genius to the utmost to improvise and find a substitute for ever-recurring necessities not here obtainable, but this is invariably the experience of all pioneer establishments of the kind in other places.

"After my return from San Francisco, where I had been selecting machinery, a site was chosen for the Reduction Works on the waggon road, about two miles below Barkerville, where a force of men were at once put to clearing the ground and grading for a foundation.

"Some little difficulty was met with in finding suitable clay for making bricks, but this was finally obtained, of a good quality, about a mile from the mill-site, and at once a large force of men was put on clearing a place for a yard, and finally making and burning a kiln of about 80,000 bricks, which have proved to be of very good quality.

"A contract was let, by tender, to Mr. John Knott for the necessary buildings, which consist of a furnace building 75 feet long by 27 feet wide; a mill building 40 feet long by 22 feet wide; a pan room 30 feet long by 22 feet wide, and an engine room 40 feet long by 23 feet wide, all boarded, studded, and lined, which will make them good, strong, substantial buildings; the contract price being \$4,700. The buildings are now nearly complete, the work being done satisfactorily.

"The machinery purchased in San Francisco consists of one Kendall stamp-mill, capacity five tons in twenty-four hours; one twenty-horse power engine and boiler; one five-foot improved pan; one six-foot settler; the necessary shafts and pulleys for the above, and door frames, bolts and buckstays for a fifty-foot reverberatory roaster, which has a capacity of three tons of concentrated sulphurets in twenty-four hours.

"The reverberatory roasting furnace is now well on to completion, and also the brick stack for the above. The boiler and engine have been set up, but the necessary connections are yet to be made. The pan and settler are in place, but the stamp has yet to be put up, all of which will be completed about the end of the present year.

"Good limestone was found here, and a sufficient quantity for our purpose was burned.

"I might say that in selecting the machinery and appliances for the works I was guided entirely by what I conceived to be the best of the known methods for the treatment of such

character of ore as is here found, and I have endeavoured to adopt the least expensive but nevertheless effective method, so that mine owners of limited means would not be deterred by a heavy outlay from opening out their mines.

"In conclusion, I must express my unbounded confidence in the future of this district as a mineral country; and although, from its remoteness, its development may be slow for a time, yet, with the production of bullion, confidence will be inspired, and development encouraged.

"John Bouron, Esq.,

"Gold Commissioner, &c., Cariboo."

"I have, &c.,

(Signed)

"E. A. MARTIN.

Keithley Division.

REPORT OF MR. W. STEPHENSON.

"FORKS OF QUESNELLE, B. C., November 19th, 1888.

"SIR,—I have the honour to forward herewith the estimated yield of gold for the Keithley and Williams Lake Polling Divisions, District of Cariboo.

"The total yield is nearly the same as last year, although there appears to be a slight falling off; but it is very hard to get any reliable information from the Chinese as to the amount of gold they are taking out. Still, I think my estimate is nearly correct.

"We have had an exceptionally good season for mining, especially on the small creeks and gulches, as there was an abundant supply of water nearly up to the end of the mining season, which enabled those mining on small streams to work much longer than usual. Although on some of the large streams, such as Keithley and Snowshoe Creeks, work was somewhat retarded during the first part of the season, still, upon the whole, the season just ended must be called a good one, as the weather has been good nearly up to the present time, which is not often the case in this section.

"On Keithley Creek the white miners have not done quite as well as last year, but as they still have the winter ahead of them, which is the best time for working deep ground, they have yet the chance of pulling up for any falling off during the summer. On Snowshoe Creek the outlook is quite favourable. Messrs. Anderson & Smith have got their claim well opened up, and it has paid them well for the season's work, with the prospects of still better pay in the future, and plenty of ground to keep them going for the next ten years, while there is also the probability of several more good hydraulic claims being opened on Snowshoe Creek, as well as the quartz ledge owned by Messrs. Vieth & Borland, upon which they have been working during the summer, with results, I believe, satisfactory to themselves; and although there are plenty of quartz veins or ledges about the head of Snowshoe Creek, there has been no prospecting on any of them except on Messrs. Vieth & Borland's claim; but it is to be hoped that with the Government Test Works once in running order, other ledges in that vicinity will be prospected. On the North and South Forks of Quesnelle River there is very little change from last year, as the miners are all Chinese, and, except for a few claims, the mining is of a desultory character. On the South Fork there are two or three good claims, but, owing to the scarcity of water for hydraulic purposes, the yield of gold is not very large. With plenty of water, and properly worked, some of these claims would pay big dividends. As it is, the Celestials owning them seem to be perfectly satisfied, as they only work from two to three months in the year and keep ahead even at that, while down along the Main Quesnelle the Chinamen still work away during the summer season, going from place to place according to the stage of water. On Kangaroo Creek, which empties into the North Fork of Quesnelle River two miles above the Forks, a company has been at work for the last two years trying to sink a shaft. This last year another company located ground joining them and assisted, but they have not yet been able to get to the bottom. They are down over sixty feet. The ground is very difficult to sink in, being slum and quicksand, but when they suspended operations for the season the ground had improved in the last work they had done, and they think now they have got through the worst of it, and are in hopes that when they resume work in the spring they will soon reach the bottom. This creek has been a good creek on the surface, but has never been bottomed yet, and should the present companies succeed in getting down and finding a prospect it will create quite a stir in this place, as there is considerable ground of the same kind as that now being prospected.

"On the Horsefly River there is considerable prospecting going on, and will be, for the winter at least. So far, none of the companies have got into the channel, except the Discovery Company, whose claim, as they get it opened up, is always improving. The last work they did before the cold closed them out for the season promises well for next year. During this last season they ran a cut through the rim rock and are opening it up for an hydraulic claim, having a good water privilege from a lake that gives them plenty of water for the season.

"The other companies, just below the Discovery Company, are driving tunnels in to strike the same channel. These claims are five miles down the river from where the old diggings were, and where Mr. Harper is now, or rather was, working last summer, and although he has suspended operations for the present it is probable he will resume work again, as it is not likely that he will quit now after the enormous expense he has already been at, and it cannot be said that he has at all tested his ground, as he had only just commenced to wash when he had, unfortunately, to shut down. As things are in his works at present the expense of resuming operations would be light, and it is altogether probable that the work will pay if properly managed.

"I have, &c.,

(Signed)

"W. STEPHENSON,

"Government Agent.

"The Honourable

"The Minister of Mines."

CASSIAR.

MR. CRIMP'S REPORT.

"LAKETON, CASSIAR,

"16th October, 1888.

"SIR,—I have the honour herewith to transmit the mining statistics of the Cassiar District for the current year, and for your further information to submit the following report:—

"The accompanying statistics will be found to shew a decrease from last year, the reasons for which are, that the mines are gradually being worked out, and no new discoveries have been made during the past summer.

"On Dease Creek there were only seven white miners and twenty-seven Chinese working. Many of the Chinese did not record any claims, but worked from point to point in a desultory manner wherever they could make a few dollars. Most of them did not make enough to buy their winter provisions. The few white miners did not do much better. I know of only one company that paid over wages. One hill claim, I think, did very well, but the outlook of this creek for the future is not encouraging.

"On Thibert Creek there were ten white miners and eleven Chinamen working, and I think the white miners averaged about wages; two companies did very well; but as will be seen by the statistics the total amount shews a falling off from last year, and consequently does not offer much encouragement; in fact, the creek is about worked out.

"On McDame Creek there were only six white miners the past summer and forty-seven Chinese mining, and it appears from the information that I received, only one claim paid wages, that was on Quartz Creek, a tributary of McDame. This is a tunnel company, and returns from this company shew that they did very well and the outlook for the future of this claim is promising.

"The Chinese on this creek, from the returns which could be gathered from them, appear to have done little good, and I think from observation that they did very poorly; the majority of them were continually moving from place to place trying to scratch out a few dollars. Of course this creek has been worked for the past fourteen years, and it is a wonder that it has held out so well.

"There has not been any prospecting to speak of during the past summer. Nearly all the miners have been trying to make a few dollars to enable them to winter on. Six whites will winter on Dease Creek and about twenty-five Chinese; and on Thibert Creek, five whites and six Chinese; and on McDame Creek, seven whites and thirty five Chinese. Vegetables on this creek are abundant; the Chinese grew 12,000 lbs. of potatoes, with turnips and cabbage in abundance.

"Total amount of gold taken out of the district for the past mining season, as will be seen from the statistics, is as follows:—

Dease Creek	\$13,600
Thibert Creek	6,725
McDame Creek and its tributaries	19,000
Desultory	4,000
Total	\$43,325

"The above amount, I think, is a very accurate, and I think is rather under than over. On account of so many of the Chinese not working in companies, it was hard to find out exactly what they did take out.

"There is an abundance of provisions in the market, and consequently no lack of anything in the way of living for the coming winter. The past summer has been an exceptionally fine one; no summer frosts; the crops in the farming district have been very good, and all hardy vegetables have come to great perfection.

"I have, &c.,

(Signed)

"J. L. CRIMP, G. C.

"The Honourable John Robson,
"Minister of Mines, Victoria."

KOOTENAY.

Western Division.

MR. SPROAT'S REPORT.

"WEST KOOTENAY,

"FARWELL, B. C., 18th August, 1888.

"SIR,—I beg leave respectfully to offer to you some information about the mining camps in the southern sub-division of this district. The region not being well known, I will send a topographical description and map by and by.

"Toad Mountain Mines (Silver).

"The common rock of the mountains in the neighbourhood is a grayish granite, graduating into, or alternating with, gneiss that often is strongly schistose. Here and there are greenstone dykes of considerable length, and varying from half a foot to seventy-five feet in width. Through these granite rocks there runs, with the formation, a band or belt of what the miners call 'limeshale,' which is, perhaps, properly a compact magnesian limestone (See Specimen No. 1), judging from its appearance below the surface. This belt has been prospected imperfectly for five or six miles in length. It is about a mile wide, but the exposures on stream beds and other indications show that it extends, irregularly, to a greater width. The direction of the belt is nearly due east and west. It lies, say 3,800 feet above Kootenay Lake, or 5,500 feet above sea level, high upon the steep northern slope of the southern mountain wall of the Kootenay Valley, which valley begins about Toad Mountain, in the angle formed by the Kootenay River as it emerges from the lake, and by Cottonwood Creek. The eastern end of the 'camp' (American term for any separate mining district) is about six miles up the steep mountain slopes, from the head of the west arm of Kootenay Lake. Coming down the west arm from the lake, Toad Mountain towers almost in front of you as you approach. The above belt, in its course westward, crosses several high ridges that jut from the slope northerly towards the Kootenay River. Small streams descend from the summit of the range between these ridges, of course crossing the belt. The country is rough, but without any features of savage grandeur such as are visible all around in looking from the summits. A couple of easily ascended peaks show rocky scalps, but, with that exception, the surface is densely wooded, — chiefly with balsams and some spruce, — and there are several feet of soil, up to and upon the highest claims in the camp. About one thousand feet lower down the northern slope

tamarac, cedar, white pine, &c., prevail. The trees along the lake and river have been destroyed by fire. There is a heavy snowfall in winter, and broken weather, of course, in spring and fall. The snow had all gone this year, even from the peaks mentioned, by the middle of June. The seasons vary much, but, probably, from July to October, inclusive, may be considered 'prospecting' months in that high region; in the lower country, three months longer. Good mill-sites abound. Apart from the distance, the contour of the surface between the camp and the lake is not unfavourable for air tramways. A railway up Cottonwood Creek, with stiffish grades in part, might come within two and a half miles of the camp.

"It is in the above belt of country rock that the silver-bearing lodes occur, but they are not limited to it, as good ore has been found several miles away in different directions. The structure of the two first discovered claims in the camp (Messrs. Hall's) has not yet been determined. Outside of these—which may be ore masses, or may turn to lodes—I should say that the lodes vary from about six feet up to, and in a few cases, fifteen feet in width—large sizes for high grade ores. The ore chutes, in general, seem to be at right angles to the course of the lead, which, I fancy, is not very common.

"The gangue, or lode-material enclosing the ore, seems to consist of the country rock in part; also calcspar, a whitish quartz and limonite. In the two first discovered claims above mentioned, the gangue is, for the most part, the country rock more or less mineralized, and harder than the rock outside (See Specimen No. 2). Quartz gangue seems to be commoner towards the west end of the camp.

"The grey copper and lead ores—the tetrahedrite and galenite—are the principal silver bearing ores of the camp (See Specimen No. 3 and No. 2 above). The grey copper—steel-grey to blackish—is well distributed in varying quantities. There is not much galena in the camp as a whole, but nearly all the claims carry a little, and some a good deal, say twenty-five per cent. The galena is the coarse, cubic, eminently silver-bearing ore of this country. A somewhat large quantity of copper pyrites, with a less quantity of iron pyrites, is common in the claims; indeed, it may be said that there is copper everywhere. The only smelting return that I possess shows seventeen per cent. The variegation produced by the coating here and there of blue and green carbonate of copper and cobalt bloom suggests the fancy that the ores blush on being torn from their secret bed. Gold is present in some of these silver claims, and, in two or three, in not inconsiderable quantities. It is too early to know what the silver is combined with. Antimony has been observed, and indications of bismuth. Zinc, so far, is not known to be present. The limonite of the gangue is highly manganiferous. In a specimen or two, stated to be from this camp, I noticed small globules of native silver, and was told, on not very competent authority, that something very like ruby silver had been seen in another specimen. Some carbonate stuff was found in a galena claim just as I was leaving, the nature of which had not been determined. The size of my district subjects me to the illfortune of having to leave mining scenes often at interesting times. The presence of carbonates is important in a camp, as, usually, they are rich, and their earthy or sandy character makes it easy to mine them, and to ship and treat them. The ore that has acquired, distinctively, the name of carbonate is, I understand, a mixture of silver chloride with more or less of lead carbonate, often with iron oxide (from the decomposition of iron or copper sulphides), and with limestone and other material from the decomposed rocks. The bearing of this remark is that one of the camps in this district, to be hereafter described, promises to be a good carbonate camp, and carbonates are found in all of them.

"I annex a diagram of the located claims, which, of course, is only approximately correct; but it will show you that nearly all the ground is taken up along the belt for four or five miles. The records, in and near the Toad Mountain Camp (including ten claims on the gold belt to be hereafter mentioned), numbered 228 on the first of this month. There were about 75 men in the camp at that date. Most of these men represented absentees as well as themselves. On Hall's discovery of the camp, last year, being bruited abroad, many claims were speculatively located, some on deep snow—a proceeding of doubtful legality. This has driven many good prospectors from the camp, who did not care to work on staked ground. It tends to confirm my dislike of the extension to six months of the former period of three months, allowed for the \$100 expenditure. I am aware of what may be said in favour of the period of six months, but the effect of the extension is not always what was hoped it would be. A fair number of monied men, seeking investment, have visited the camp already, notwithstanding the imperfect communications, but there have been no sales. The glamour of the good first discoveries affects every man who holds a five-foot prospect hole. In some cases the local man was willing to sell, and the outside partner unwilling—the former better realizing, probably, that a 'pro-

pect' is not a mine, and never may be a mine. The real nature of a 'prospect' can only be known, in most cases, by a comparatively large expenditure following the purchase of the claim; and this is the risk of the buyer, who may, and often does, lose both the purchase money and the expenditure. However, I suppose, so long as mines are mines, some men will frighten away capitalists, and, in their cabins, repeat the formula, 'What we want, sir, is capital.'

"As the camp now is, it is difficult for anyone to estimate its probable value. The first requirement for such an estimate does not exist, namely, a geological examination, showing the true character of the lodes and their ores, the metamorphism, the connection, if any, with eruptive rocks, and the various regional, or local, conditions which assimilate the camp to, or differentiate it from, other silver camps that have succeeded. The opinion of experienced mining men—practical and scientific—decidedly is, that the camp is one of great promise, as far as this can be said of a surface showing. Very little work has been done as yet, but the ores improve, as a rule, with depth, both in quantity and quality.

"The assays from different claims show that the ore of which the grey copper forms a large proportion yields from 50 oz. to several hundred ounces per ton—in some cases very much higher—and the galena ores from 40 oz. up to 100 oz. per ton. Some of the claims will be much helped by the gold that is in them. It is a high grade camp, though several claims, unless they improve when sunk into, must be classed as low grade, owing to too much gangue, needing concentration of the ores before shipment.

"But the assays of specimens and small lots are chiefly useful to the prospector; the milling test of a large quantity of ore is the true test. So far I can mention but one—a return of 220 oz. of silver, gross, to the ton, and 17 per cent. copper, from a two-ton lot of sorted ores sent from a claim in which the gangue is, as I have said, chiefly mineralized country rock, with little quartz and galena. But other milling returns will be available by and by, as shipments of four to five tons a week from the same claim are being made. I here give a month's account by the local assayer of this claim, of his assays of ores now being shipped, or awaiting shipment:—

"1888	oz.	oz.	oz.	oz.	oz.	oz.	oz.
"June 3rd—5 assays—	354;	345;	933;	364;	1890	Total,	3895
"July 5th—4 "	704;	622;	182;	182		"	1690
" " 27th—6 "	38;	573;	161.57;	1740;	126;	373	3011.60
" " 27th—4 "	155;	218;	38;	68		"	479
" Aug. 1st—3 "	349;	48;	124			"	511
" " 5th—5 "	97;	97;	1869;	38;	583	"	2484
							12070.60

"27 assays, average 447.06 oz.

"As regards the quantity of ores—here, again, caution is necessary, in speaking of a camp with only, at present, a surface showing. The deepest shaft is not over 75 feet, and most of the shafts, inclines and tunnels are much under that depth or length. But there is no change in the country rock so far, and there is, as already said, a general improvement, both in quantity and quality of the ores, with depth. It is considered that, were the camp developed,—which will require minerlike management, great energy, and large capital, there will be ample supplies of high grade ore for a permanent camp. The fact of the existence of continuous lodes has not been fully proved to my mind, but very nearly so. The present season is just opening. Much of the ground is shut to prospecting, for the reason already stated. The prevailing belief, which there is much to confirm, is that the first discovered two claims at the east end of the camp, supposed to be extensive and rich, are there, so to speak, like the knobby handle of a pair of tongs; and that two lodes, like the legs of the tongs, about 1,000 feet apart, run westerly for four or five miles. East from the knob, so far, small indications only have been found; but towards the west end of the camp very good 'prospects' exist, for several of which considerable sums have been offered, lately. In much of the intermediate space ore bodies between walls (possibly parts of lodes) have been discovered, and also finds and indications all over that space, which most men in the camp consider show continuity of the two main lodes above mentioned.

"Toad Mountain Mines (Gold).

"The discovery, lately, of gold ore near the silver camp, is notable, and may be important. I cannot say much on this matter, as the discoveries were only attracting attention about the time I left.

"The so-called gold belt runs generally parallel with the silver belt easterly and westerly, but is about a mile and a half lower down the northern slope of the range, that is to say, between the silver belt and the Kootenay. The two belts tend to converge as they go westward. The country rock of the gold belt is said to be composed of a subcrystalline, slaty rock, perhaps chloritic, except at the west end, where the veins lie between greenstone on the one side, and grey, compact, fine grained granite on the other. The course of the belt at the west end, is northerly and southerly, and the dip of the veins is with it, whereas, elsewhere, the course and the dip of the gold belt are as in the silver belt. The gold rock in general lies almost in contact with the lime rocks in which the silver is found. The gangue in the gold veins is composed chiefly of clean quartz, white to chocolate in colour. The west to south wall, generally, is impregnated with copper pyrites; in some cases these are in the vein.

"There are several very promising claims, banded veins, for the most part, at the west end of the belt, from 3 feet in width down to very small, but all rich in free milling ore. One is uncovered for 700 feet, with an average width of 18 inches, and a range of assays from \$40 to \$1,400 a ton. The holders, probably, will have a mill running there before winter.

"Towards the eastern end of the belt, about a mile back from Cottonwood Creek, between that creek and Messrs. Hall's claims (on the silver belt), is a kind of golden conundrum, a mass of fragile ore matter, about 300 feet across and 5 to 12 feet in depth, in colour yellowish, lying on the wooded hillside, without definite shape or boundaries. Some think that the hanging wall has been displaced; others regard the mass as a kind of 'spew-out,' which may have a vein or chimney beneath it. The ore is free milling, and prospects nicely, \$7 to \$25 per ton of ore taken from a narrow cross cut made by the holders. The ore looks similar throughout the mass. If this prove to be so the claim may become important; there is a good site for a gold mill beside it and also water power. In an adjoining claim, one wall of a 5 or 6 feet vein has been found with ore that looks well.

"Several locations have been made both east and west of the above, but no work has been done on them yet. There is a string of rather promising claims about three miles to the westward, probably having more gold bearing sulphurets, with some very rich ore; but it is too early to express any definite opinions about these or other locations on the gold belt until more work is done. The claims are in good hands, and it is quite possible that the gold belt will be a valuable addition to the wealth of the Toad Mountain camp. It is traceable for the whole distance with breaks, by the presence, on the surface, of peculiar reddish and yellowish rock matter of a shaly structure.

"The long winter, with heavy snowfall, and the disagreeable spring in the Toad Mountain silver camp, together with the dense covering of trees and soil on the surface, will tend to discourage prospecting—(many prospectors this year, after consuming their supplies, and exhausting their stock of uncomplimentary epithets, made rapid tracks rearward)—but the camp and its contents are there, and will be there, and adverse climate or topographical conditions are not much regarded in underground workings that pay. The country is rough and steep, and probably a large expenditure will be necessary to put mines there in good shape for permanent working on a large scale, including the transport of ores to the water. The ore that is now being shipped is sent by a six mile trail on pack horses to the steamboat landing on Kootenay Lake, near the mouth of Cottonwood Creek.

"Hot Springs Camp (Silver).

"Leaving the Toad Mountain camp with the conviction that there is a splendid 'jewel' in the 'ugly head' of it, and not unuseful purposes, perhaps, in the adverse natural conditions that may affect its rapid development, a six miles tramp down the forest trail which, for the most part, follows a rushing tributary of Cottonwood Creek, brought me to the mouth of the latter, whence I started in a boat for Hot Springs camp on the west side of the main Kootenay Lake—a camp which, to the people of the Province has been, hitherto, at the 'back of beyond,' for anything they have known of it. The trip is twenty miles up the west arm, and then eight miles northward on the main lake. The granite of the mountains graduated as we left the west arm into mica schist along the west shore, backed by, and in some places, intermixed with yellowish limestone on the rough slopes, which proved to be a softer limestone than that at Toad Mountain.

"The Hot Springs camp embraces an area of about five miles by three, lying between Coffee and Woodberry Creeks, on the west side of Kootenay Lake, opposite the old galena deposit discovered in 1825 by the botanist Douglas, and known as the scene of the Sproule-

Hammil tragedy, which latter camp will be mentioned in its turn. Two creeks run through the camp, in addition to Coffee and Woodberry Creeks, and there is plenty of wood at the camp for mining purposes. The country is very rough; the hills rise abruptly, and I cannot say much in favour of the landings, either at Hot Springs or Woodberry Creek. The latter is the better of the two, but the ascent from it, for 600 feet, is very steep. The scenery is charming and the climate, of course, much better than in the elevated region of Toad Mountain.

"The country rock extends northerly, but with a slight westerly trend beyond Woodberry Creek, to a distance not determined.

"There seem to be, within the above area of five miles by three, with breaks and deviations, three tiers of claims with a general northerly direction parallel to the lake. The lower tier, say 800 feet above the lake, is, for the most part, in the schistose rock. The second tier, 500 to 700 feet higher up, is, in part, in the schistose rock, and in part in the limestone—the line of contact of these formations here being somewhat irregular and thrown out by a dyke of perphoritic rock that runs northward. The upper or westerly tier of claims, some of which are nearly 2,000 feet above the lake, is mostly in a contact of lime and schist.

"In mentioning 'tiers' of claims, a word of explanation is necessary, not, of course, for mining men, because they know what the nature of the country rock indicates. There are not here tiers of true lodes throughout. We do not look for these in the softer kinds of limestone. This rock is easily eroded by acid solutions and vapours. These solvents, filling cracks and fissures, eat out passage-ways, pockets, cavities, chambers—call them what you will—more or less according to the strength of the acid and the texture of the rock. The ore, as in the lead regions of Wisconsin, Illinois, the north of England, and, I think, in one part of the Hot Springs camp, occupies these caves and openings, instead of lying in true lodes—possibly, in some cases, having been held in solution by the same waters that made the caves, though certain minerals in the deposit may be of later origin. 'Pockety,' I fear, says the adverse critic; 'True,' replies Nature, 'what did you expect?' The real question, in such mining ground, is, as to the sizes of the cavities, and whether they are filled through all their ramifications, or only partly filled with ores. This question can only be answered by the proof of workings, but it is considered by many experienced men that the character of the rock, the nature of the associated minerals, their extensive distribution, together with experience as far as it goes, all point to the existence of a fair proportion of large, well-filled chambers in the limestone section of this camp.

"For the above reason, it may be said that the contact and lime formation claims here probably contain considerable ore deposits in cavities, untraceable one into the other, but, nevertheless, in their kind, occupying the portion of the 'tiers,' which would have carried true lodes had the country rock been harder.

"Those claims in the tiers that are in the schistose formation, appear to many eyes as lodes proper, so far as can be judged from a surface showing, on rugged slopes, with displacements.

"This camp presents obvious differences from the camp at Toad Mountain. The Toad Mountain camp is a high grade tetrahedrite silver-bearing camp, with comparatively little galena and some gold. The Hot Springs Camp is a galenite camp with an abundance of carbonate ores and very little copper, but more iron. The surface at the latter is less covered with vegetation and soil, so that the traveller sees the croppings more easily. What strikes one is the small amount of actual work done, the large amount of ore in sight, and the comparatively large piles of ore for the little amount of work performed in each individual working. The camp hitherto has been classed, absolutely, as a low grade camp, and much of it unquestionably is so, for instance, the lower and some of the second tier of claims, but the tendency of the ores to improve in value with depth (though little depth has been reached) and to turn into carbonates on the upper claims, especially near the contact, which two notable facts appear this summer, point to a possible average value that would remove the camp, as a whole, from the low grade class. Such a description is inapplicable to a camp which, in so many parts, if not continuously, shows large bodies of fair grade ores with sixty to seventy per cent. of lead and thirty up to even one hundred ounces of silver per ton—the ores having a strong tendency to turn into carbonates of varying value, but some very good. Carbonate ore has been found in over a dozen claims, and in some of them in not inconsiderable quantities. Red carbonates extending several feet in every direction, and requiring only a pick and shovel, have appeared in a claim towards the north end of the camp since I left. These assay from sixty ounces to 190 ounces of silver to the ton—of course an exceptional yield. From thirty to forty-five ounces may be about the average for carbonates in the camp with some of lower grade.

Eventually this promises to be a carbonate camp—possibly one of the best on the continent. From all that I can learn the ores are richer than those of Cœur d'Alene; some carry three or four times more silver. I have a little sample of the clusters of wire silver that appear in one of the chambers of a contact claim of high grade carbonate and galena, with an abundance of rich sulphides and sulphides. This is in a 'chimney' eight feet wide, not far from a larger 'chimney,' yielding moderate grade galena and carbonate. A few hundredweights of selected ore from this claim, taken with great labour to the shore, averaged 289 ounces silver to the ton. The quantity of galena and carbonate ores in this camp probably is very large. Conversation with men from Cœur d'Alene inclines me to record their impression, almost their opinion, that the production of this camp alone might equal that of Cœur d'Alene, towards which now the Northern Pacific Railroad Company and the Oregon Navigation Company are making opposition railways side by side. What then has kept this camp back? Well I suppose the answer must be—the prevalent belief in its low grade character, the deadening effect of American hostile tariffs, its isolation, the absence of proper Government officers, the embarrassment or, at least, uncertainty produced practically by some past legislation. I have said that little work has been done in the camp, considering its age, yet nobody who knows its history will feel anything but gratitude to those who, hanging on by their eyelids, have occupied the ground in the general interest of the Province and, I sincerely hope, ultimately in their own.

"The Hendryx Camp (Silver)."

"The lake at the Hot Springs is two miles wide. Crossing obliquely, three miles take one to a small peninsular limestone remnant of submerged land with a quartzite band on its low, bold front that again appears at a point (Cape Horn) ten miles south, and an iron lode dipping into the lake—the whole backed by granitic mountains. If the Hot Springs camp, sometimes, is called the 'old camp,' this camp should be called the 'ancient camp,' for, as already said, it dates from 1825. Its chequered modern history, mixed with tragic incident, need not be related. Known, always, as a very large showing of silver-bearing galena ore, easy of access, and convenient to work, claims here have been located and re-located, examined by different experts, condemned for the most part, or damned with faint praise, as yielding ores of too low grade for handling at a profit. The contrary is not yet proved, but an American company, managed by a gentleman whose energy and courtesy brighten these solitudes, have backed their belief in the mine by an expenditure of \$100,000 in one way or another in connection with its development. I found sixteen men at work there, a tramway finished and wharf in progress, and a strong tram-horse, unconscious of approaching labour, cooled his heels on the shore of the cove near which stands the cottage of the unhappy Sproule—the only stone house in Kootenay. The company's burly steamboat appeared every week, shrieking for cargo, and keeping up needed communication between Bonner's Ferry and the several camps. Several tunnels last year were run into bodies of carbonate ore, and an incline of eighty feet sunk entirely in galena, on the Blue Bell claim, the croppings of which extend for about 400 feet, thus proving the existence of a great body of ore. For further proof, a tunnel was run in—I forget how much lower down—for 195 feet, and the lode was struck just before my visit, wherein appeared a body of galena and carbonate ore of an extent not often seen anywhere. With this enlarged showing came a marked improvement in the quality of the ores—an improvement of such a character that the company have made arrangements to ship eastward 400 to 500 tons this season. They estimate that they have not far short of half a million tons of ore of various grades in sight.

"The three 'camps' above described are the only prospected camps in this southern subdivision of the district, but they probably form a small proportion of its mineral wealth. Good 'float' has been found towards the head of Kootenay Lake, and it is known that there are extensive galena deposits back from its northwest shore, and on the summit of the divide between Kootenay and Slocan Lakes,—locations too remote for present working. The valleys of the Lardo, northwesterly from the head of Kootenay Lake, and of Duncan River, which heads up towards the mountains south of Rogers' Pass, probably contain mineral-bearing formations, which are prolonged to and far north beyond Illecillewaet.

"The number of claims recorded on Kootenay Lake to the 1st of August was fifty-two.

"I will not burden this description of the camps with matters that may, more fitly, be mentioned separately or later in the season, but there are two vital points that demand notice.

"I have to repeat the statement, made in my exploratory report to you in 1883, namely, that without a railway from Kootenay Lake to Kootenay Mouth or from Kootenay Lake

to the C. P. R., the whole of this vast and minerally rich subdivision of the district is, and will remain, useless to the Province. Trails are useful to the prospector or visitor, but a complete system of trails, and even waggon roads, would not bring the ores westward, or enable us to get more than a fraction of the general trade.

"While these camps remain undeveloped, or use a southern outlet, the Canadian Pacific Railway Company, which has done so much to develop our mines by giving reasonable ore freights, will be without the freight of several hundred tons of ore a day which otherwise would swell their traffic in the near future.

"Again, we must recognize that the tendency of American opinion, if not legislation, is to put prohibitory duties on our lead ores. The owners of American smelters need our ores in their business, but the lead mine owners, who have much influence in Congress, wish to exclude them. It is the competitive production of this undeveloped district which I have been describing that they fear, knowing the extent and value of it, apparently, better than we do. The remedy is for us to find markets independently; to improve and cheapen communications; to foster the growth of works and appliances to treat ores, and to seek strenuously emancipation from the effects of the custom-house legislation on the part of our neighbours.

"It would be foolish to overlook the many difficulties in the way of developing these camps, but equally foolish to forget that even greater difficulties have been successfully surmounted elsewhere, as, doubtless, they will be here. I estimate that there are about 250 miners in the subdivision—chiefly Americans. They form a sensible, well-behaved community. Messrs. Hall, Topping, Cobaugh and Henderson, at Toad Mountain; Messrs. Hendryx, Wheeler and Duncan, at the lake, gave me much information. Were I to acknowledge courteous attentions I must mention everybody.

"I have, &c,
(Signed)

"G. M. SPROAT,
"Gold Commissioner.

"To the Hon. Provincial Secretary,
"Victoria."

"WEST KOOTENAY DISTRICT,

"FARWELL, B. C., 21st December, 1888.

"SIR,—My previous reports, and the one made this year about the Kootenay Lake subdivision, having described the general nature of this mining district, which is now pretty well understood, it is only necessary for me to state leading particulars respecting the different established camps.

"But before doing so it may be as well to repeat that this is a gold as well as a silver mining district, and distinctively a quartz rather than a placer district, though containing good placer grounds. It is noteworthy, also, that West Kootenay is ahead of all other districts for quantity of silver ore successfully marketed, and far ahead when quality, as well as quantity, is considered. So far as I can learn of mining results generally elsewhere in the Province, the district, probably, will keep this lead, and go comparatively still farther ahead.

"We already, when nothing beyond 'prospecting' work on mineral claims has been undertaken, have marketed about 600 tons of silver ore—most of it in galenite, of which total about 60 tons have returned over 300 ounces; 100 tons, from 110 to 150 ounces; and 440 tons, 60 to 70 ounces, silver, per ton. The close of the season, and want of means of transport, alone prevented more of the higher grades from being marketed.

"The time is not far distant when I shall have to report to you a product of 500 tons a day of silver ores from this district, with a fair proportion of ores of high grade.

"In all probability, also, the gold yield will much increase soon. Gold quartz prospects have been found during the past summer in different parts. Work continues on our placer grounds. Gold occurs in fair proportion in some of our silver claims. There will be two gold-testing mills at work in the district in spring. Promising indications exist of the presence of iron in large quantities.

"Such being the facts, in an almost unprospected district, it is singular that the public appear to know so little about them. I have lately read articles in some of our newspapers, written evidently without any knowledge that this district alone has successfully marketed 600 tons of silver ores. If our own mining business is not known to ourselves, how can we expect it to be known beyond the Province?

"Quartz miners, as a rule, are not so migratory as placer miners; still, they are migratory. Nothing strikes me more in the history of mining camps than the need of 'keeping things going' when once a start has been made. Hundreds of mining fields and 'camps' across the southern boundary advertise their attractions persistently, and with these a promising part of this district has to compete, both for men and capital. There is unquestionably, for whatever reason, a prejudice against mining in British Columbia on the part of American and other foreign capitalists. The most trustworthy descriptions of 'prospects' and the highest assays are regarded in many quarters, if not with doubt, at least with indifference. It is for this reason that I regard with satisfaction the actual large 'shipments' above mentioned. They arrest attention at once, and the questions immediately follow, 'Where is this from? Is there more of this stuff?' This is the stage reached now in this district, and it is vital to do all that may be properly done to 'keep things going' to disarm unfounded prejudice, to foster means of transport, revise our mining laws and regulations, if revision is needed, and smooth administrative action in every possible way.

"Our mining population in this division is about 500, and capital invested in mining about half a million dollars.

"The product this year is about \$10,000 gold, and \$75,000 silver, but these figures promise to be largely increased soon.

"I know, certainly, that companies and men, with at least ten times the above amount of capital, are seeking mining investments, and regard this district very favourably, so far as their information and inspections extend. There is every probability of my being able to report, next year, a great advance, particularly in the southern or Kootenay Lake sub-division, provided there is no hostile American legislation to retard progress. Of this, as mentioned in my last report, there is some danger, which makes it the more necessary to look ahead and provide means of reaching other markets with certain classes of our ores.

"American mine owners are moving Congress to impose a duty of two cents a pound to check the depreciation of lead, caused, as they allege, by Mexican and British Columbian importations, though our Province has not, as yet, exported much. This was the old rate of duty on lead ores imported into the United States. But by a new late ruling or interpretation of the law, lead, when silver-bearing, must be admitted free, unless the lead value exceeds the value of the silver and other combined metals. The ore, otherwise, is to be regarded as silver ore, which is free—for instance, a carload of Mexican ore producing, say, at Denver, \$29 in lead, and \$30 in silver, per ton, goes in free as silver ore. It is alleged that shippers manipulate the ores to bring the average up to a duty-saving point. The tariff policy of the United States, with respect to lead, will no doubt affect importantly certain classes of our ores until we perfect our communications and establish suitable works for treating such ores. I can only repeat here that it is essential that a railway be made immediately to connect Kootenay Lake and the Columbia River. A wagon road will not suffice. Twenty dollars a ton would probably be the minimum wagon road freight, without steamer freight up the Columbia. A railway would enable ore to be brought from Nelson to the C. P. R. here for \$5 a ton, and perhaps less.

"Big Bend, or Northern Subdivision of the District.

"The placer camps in this Subdivision, on French Creek, McCulloch and Smith Creeks, continue to attract attention. The Glover Company on French Creek did well, and propose to bring water, in spring, from a considerable distance. The Lukes Company have done little on their leased ground, but I have not heard that they mean to abandon it. On McCulloch Creek, the Ophir Bed-Rock Flume Co. worked actively and with good results until their hose burst, too late in the season for repair. They will renew work early in spring. Near Smith Creek Messrs. Wallace, Norleans and others are wintering, and preparing a long flume to bring water upon some good ground there, where one of the party took out \$500 in six weeks last summer.

"A party of five, Messrs Green, Dick and others, left Farwell 24th December, 1888, to work leased ground on McCulloch Creek. About \$1,000 have been got this season on bars in the Columbia, which the low water enabled men to work. Half a dozen men are prospecting on Carnes Creek, and will winter there. Being, debateably, on the edge of the railway belt, individual miners choose other ground for prospecting work.

"Hardly any prospecting for mineral claims has been done in the Northern Subdivision during the past season, as a good many of the miners were drawn off to the southward, but confidence remains that some of the numerous quartz veins, known to exist there, are auriferous, and these will probably be examined next summer. I am still of opinion that our richest gold field may be in that quarter.

"I have reported to the Land Office that the land applied for by Messrs. Chase and others covers the Smith Creek Placer Camp, and that the land, or most of it, at Carnes Creek, which Messrs. Gray and McCallum propose to apply to the Legislature for, is within the railway belt, and is not unworked and abandoned.

"Owing to the proved physical obstacles in the way of individual miners in many parts of this Northern Subdivision, I am in favour of giving reasonable leases of moderate areas of mining ground, in order to encourage the introduction of capital, and accordingly have promised leases to the Wallace Company, near Smith Creek, and to the Glover Company at French Creek, on suitable conditions.

"Illecillewaet, or Middle Subdivision of the District.

"This established camp maintains its position, though the differences between the Dominion and the Province, as to the ownership of the minerals, restrict prospecting and investment.

"The operations, this season, of the Selkirk Mining and Smelting Co. (Limited), so far as regards development, have been confined entirely to the 'Lanark' claim. An incline shaft, 100 feet deep, has been sunk on the vein. About 500 feet of tunnels have been run in to tap the vein on the 100 and 400-foot levels, and some 300 feet of drifts have been driven on the vein.

"At present work is being pushed on the tunnel on the 400-foot level, which it is expected will cut the ore body during the winter.

"The 100-foot level is thoroughly developed by drifts, and shows about 10,000 or 11,000 tons of fine galena and carbonate ores in sight. About 1,000 tons are on the dump.

"The total quantity of ore shipped in 1887 and 1888 to the San Francisco Smelter is 422 tons. This was taken out of the exploring drifts, leaving the ore body intact. On the surface the black galena averages about 60 ounces of silver to the ton, while on the 100-foot level it runs about 120 ounces. The ore gets better, appreciably, with depth.

"It is expected that by the opening of next season developments made by the tunnel on the 400-foot level will be so satisfactory that a concentrating plant and aerial tramway will be erected. The mine will then be equipped in a manner that will enable it to take rank as a large ore producer.

"Messrs. Corbin & Co. have done a good deal of useful work, at a cost of probably \$5,000, during the past summer. The lode which they are testing runs from 3 up to 8 feet in width. On this three tunnels, respectively 100, 72 and 40 feet long, have been driven, and all show the rock to be well mineralized. About 600 tons of ore are on the dump. The results, I believe, are considered to justify the erection of machinery and active development of the claim. The company, probably, will proceed vigorously as soon as the North Fork road is finished.

"The Edmunds Co. have run a tunnel for several hundred feet to test one of their claims, which has a good surface showing, but at the time of writing I have not heard whether they have struck the ore body.

"An interesting fact in connection with this Illecillewaet or Middle Subdivision of the district is the discovery of a very good silver-bearing galena prospect on Fish Creek, which rises a little south of the C. P. R. track, near the Glacier Station, and flows into the N. E. arm of Upper Arrow Lake, and upon that arm similar prospects of an encouraging character have been located. This shows that the mineral section in the Middle Subdivision extends beyond what may be called Illecillewaet proper, that is the camp near the C. P. R. Station.

"The Lardo country has not been actively prospected during the past season, but I have seen some \$4 free milling gold quartz, brought by trustworthy miners, from the surface of a prospect discovered there. They will renew prospecting there in spring, and the Arrow Lakes, I hope, also will be more closely examined.

"I have, &c.,

(Signed)

"G. M. SPROAT,

"Gold Commissioner.

"The Honourable

"The Minister of Mines

SOUTHERN SUBDIVISION.

"WEST KOOTENAY DISTRICT,

"FARWELL, B. C., 11th January, 1889.

"Toad Mountain, Hot Springs and Hendryx Camps.

"I described these camps in my special report thereon last summer, and now beg to annex extracts from letters lately received, giving some interesting facts:—

"HOT SPRINGS CAMP, 30th December, 1888.

"Things are looking very well here.

"Little Donald extracting ore all the time and developing a fine vein running north towards the Black Diamond. Some of the ore is rich, 100 to 300 ounces, and one assay went up to 1,700.

"No. 1 is being developed by a tunnel started three weeks ago on the 100-foot level, and expected to be 300 feet long before it reaches the lead—working three eight-hour shifts in the tunnel, and next week begin one or two shifts in the upper incline, following up a very good body of carbonate ore assaying 80 to 400 ounces silver—will spend \$7,000 during winter.

"Gallagher is working five men, and are down sixty feet, finding 150 ounces ore.

"Krao working two men; No. 1, twelve men; Little Donald, six men; Spokane, one man; Now Then, two men; Blue Bell, eight men, and several others prospecting different veins.

"Toad Mountain:—Hall, eight men, and fifty tons selected ore on dump, etc. A good deal of ore will be ready as soon as navigation opens.

"Here, the Little Donald, say 200 tons; Gallagher, probably nearly as much; No. 1, I hope more.

"Hendryx is now drifting across a lode of fifty feet of solid galena, and no hanging wall yet.

"A Portland steamboat-man intends to begin a 150-ton steamer, capable of making the round trip, Bonner's Ferry to Nelson and Hot Springs, in one day.

"A man has been in to look for a site for a saw-mill, and writes me that his machinery will come down the Kootenay on the first boat in the spring."

"NELSON, 15th January, 1889.

"It will be matter of regret if Hall's great mine is affected by a law-suit, but the camp does not depend on one company's claims, however valuable.

"Dr. LeBean's prospect is a fine one. He received to-day an assay showing 5,018 ozs. to the ton, silver, and he does not yet know the mine's width. This is an exceptionally high assay, but his average is high enough to assure shipping ore.

"Tom Morrow brought down a sack of rich ore yesterday from the "Tough Nut," and says he has it four feet wide; if so, the mine is little inferior to Hall's. All those working this winter underground give good accounts."

"I have, &c.,
(Signed)"G. M. SPROAT,
"Gold Commissioner."To the Hon. Provincial Secretary,
"Victoria."*Eastern Division.*

MR. VOWELL'S REPORT.

"DONALD, B. C., December 31st, 1888.

"SIR,—I have the honour to forward herewith, for your information, the mining statistics for the year 1888, supplemented by a report upon mines, minerals, and localities, &c., in the Eastern Division of the District of Kootenay.

"Mining development and industries have absorbed a good deal of interest in this district during the past season, the following being some of the results:—

“ Porcupine Creek,

Upon which placer mines have been discovered and worked during the past season, is a tributary of Quartz Creek, which heads in the Selkirk range about 8 miles east of Rogers' Pass, and empties into the Columbia River at Beaver Station, on the C. P. R., 11 miles west of Donald.

“Some three years ago gold was found in Quartz Creek, but not in paying quantities.

“During the past summer, Henry Lovewell, a miner, who knew of the existence of gold in that locality, induced three other miners to accompany him on a prospecting tour, when, after being in the mountains for some time, they discovered upon Porcupine Creek what promised to be paying placer mines. They immediately staked off and recorded discovery claims, which were located a short distance above the confluence of Porcupine and Quartz Creeks, being about 16 miles above the mouth of the latter:

“The Discovery Company have worked upon the ground since about the middle of August, when they commenced establishing a camp, building houses, getting out saw-logs, making sluice boxes, turning the waters of the creek, and setting their sluices, &c. They commenced shovelling into the boxes on the 20th of September, and were able to work till the 14th October, when, frost setting in, they had to close out for the season, the result of the 23 days' sluicing being an output of 14 ounces and 16 pennyweights of gold to each man—about \$11 per day to the hand. The gold taken out shews much that is apparently fresh from the matrix, fine particles of quartz in many instances still adhering to it. It is very bright, and presents no appearance of having been washed any great distance. The largest piece taken out was worth \$11.60. In washing up, much fine quartz, galena ore, pyrites of copper, and some native silver, has been found. The depth of ground above bed-rock runs from three to six feet; the formation is slate bed-rock intersected by auriferous quartz ledges of various thicknesses, latter showing granite in places.

“Good prospects are obtained pretty generally throughout the hill at the north side of the creek, which shows a very heavy gravel wash, except where covered over by *débris*, the result of slides, which occur occasionally in that locality.

“Some 30 claims are now held upon Porcupine and Quartz Creeks, which have been staked off above and below the confluence of the former with the latter. The claim owners, other than the Discovery Company, having commenced operations late in the season, and having deeper ground to work, had not been able to get upon pay before the season closed. It has been ascertained, however, that gold is generally diffused throughout the alluvium upon which these claims are located.

“On or about the 1st day of June next, the miners expect to open up their claims. The water in Porcupine Creek, at any time, does not exceed 500 inches, so that there is no ‘high water’ to contend against, and a hope is entertained that more extensive discoveries will be made before the close of 1889.

“It is to be regretted that few of those at present interested in these mines are practical miners, and it would be of advantage to the district if the attention of some of the old placer miners of Cariboo and elsewhere in British Columbia, were attracted thither during the coming season.

“The above mines are about eighteen miles from Donald, the present trail running a good deal at right-angles, first going west and then turning southwards. In a direct line the camp is not more than ten miles south of Donald.

“ Weaver Creek.

“Mr. Leonard, a miner of great perseverance, who has stuck all alone to this creek for years, has taken out during the past season about \$5,000 in coarse gold. Weaver Creek is but a short distance from St. Joseph's Prairie and Cranbrook.

“ Palmer's Bar

Yielded to a company of four Chinamen \$1,023.

“ Bull River

Disappointed the miners, there interested, very much. Some heavy work was done in wing-damming that river, but it was discovered, when prospecting the ground freed from water, that the pay must have shifted to the other side, at the point where they left off last year, as the pay-lead could not be found. They took out about \$750, and intend reversing wing-dam next season.

"Moyea River.

"Output to three Chinese, who had this locality all to themselves, was in the neighbourhood of \$700.

"Wild Horse Creek.

"The claims on this creek, chiefly hydraulic, are supposed to have done better than last year. Owing, however, to the respective claim owners having deferred cleaning up their flumes and sluices for the season to a late date, a severe frost overtook them and prevented them from bringing that work to completion; consequently, the exact amount in excess of the total output for 1887 is not known. The amount realized from the partial wash-up was \$24,400, to which may be added about \$4,000, the result of desultory mining by Chinese having no regular locations. David Griffith, who is now one of the oldest Kootenay miners resident in the district, is the owner of an extensive hydraulic mine; he commands an excellent head of water, and used a 'giant' on his ground to great advantage, but having, with others, delayed in washing up, he cannot now do so till next season. He has not cleaned up for three years, and it is estimated that there must be from \$12,000 to \$15,000 in gold dust in his boxes.

"Deep Diggings.

"The Perry Creek Gold Mining Company, owing to there being no waggon road to their mines and to the different pieces of metal being too heavy for pack animals, were unable to have the machinery for their large pump transported to its destination, and, consequently, the shaft, which, with much expense, skill, and labour, had been sunk to bed-rock last year, had to be temporarily abandoned, it being impossible to contend against the water without the aid of machinery. They have, however, during this year concentrated all their energies upon their mining ground known as the 'Mount Ceniz Tunnel,' lower down the creek. This ground is supposed to be rich, but requires a large capital to thoroughly test it. Substantial buildings have been erected, comprising dwelling and boarding-house for employes, storehouse, and an office. A dump-house has been fitted up, wherein everything, under the able management of their efficient foreman, Mr. Dow, an old Cariboo miner, has been placed in perfect order for the winter's work,—stove, dump-box, water heads and gates, and hydraulic air-pipes for the tunnel, being in place and order. The length of the tunnel, which gives evidence of first-class work all through, is now about 580 feet. This tunnel is run at a higher level than the old one, and for the most part goes immediately over it. Pay was not expected till bed-rock was reached and the cañon, through which the old channel originally ran, was passed. By latest accounts bed-rock had been struck, and although quite smooth, being not yet past the cañon, a condition which generally prevents it from retaining the gold upon its surface, a very fair return from the last week's work (only one shift employed) was produced, about \$515 being taken out of the dump box. The company are now sanguine as to the success of their enterprise, to which, in the opinion of all, they are fairly entitled, considering the amount of capital they have invested and the courageous perseverance they have evinced under many difficulties. The work will be vigorously carried on with two shifts, *i. e.*, a day shift and a night shift, during the winter.

"Findlay Creek Mining Company (Hydraulics).

"This Company has a first-class ditch and flume about $5\frac{1}{4}$ miles long, and of a capacity of about 700 inches of water. The head at lower end is about 200 feet. The hydraulic plant consists of a 15-inch water pipe, No. 2 giant, and about 400 feet of 30-inch sluice, and has a capacity of about 1,000 cubic yards per day, of 24 hours, in ordinary gravel.

"The dead work, through clay and cement, is about finished, and a gravel bank of about 100 feet deep, which prospects well, has been all but reached.

"It is thought that the bed-rock of one of the old channels coming in from the north will be struck in June or July next, and that good pay will be the result.

"The company has erected good houses, a blacksmith's shop, storehouses, &c., and has all the necessary tools and appliances to carry on the work; also a circular saw-mill of average capacity.

"A prosperous season is expected next summer.

"Below the Findlay Creek Mining Co.'s ground the 'Adela' Mining Co. has completed a ditch and flume, nearly 3 miles long—capacity, 300 inches—and has put up hydraulic works. The hydraulic was only run for a few days this past fall, but the prospects were satisfactory.

"Some good free gold quartz ledges have been discovered in the vicinity.

"Location and Development of Mineral Claims.

"Commencing south at Wild Horse Creek, that noted field for placer mines in early days, I may state that there are located and recorded in that locality five quartz claims.

"The rock shows a fine grained galena which assays from \$20 to \$80 to the ton in silver. One claim, owned by Faust & Co., has considerable work done upon it, the rock assaying very well, whilst the others have merely the law-requiring representation done.

"In the mountains east of Windermere copper ore has been discovered, with very favourable indications, and claims staked off and recorded. The assays give over 30 per cent. of copper.

"Toby Creek.

"A great ledge is reported to have been struck on this creek.

"From Messrs. McKinnon, Rosemond and Kirkpatrick the following particulars have been gathered:—

"The above is a stream of considerable volume, adding its waters to those of the Columbia River, at a point some four miles northwest from Windermere, and one mile below the salmon beds, near the mouth of the Lower Columbia Lake.

"About four years ago there was a local rush to Toby Creek, a report being then current that it abounded in rich alluvial deposits, at which time considerable gold was taken out in crevicing by the then comparatively uninitiated miners.

"For the first five miles up stream from the mouth, the formation appears to belong to the superficial accumulations; then is reached a conglomerate belt about four miles wide, apparently an ancient river bed.

"To the westward of this belt a formation of slate and gray granite commences, interspersed with reefs of porphyritic lime, continuing so until the vicinity of the glacier belt is arrived at.

"The point where the Discovery claims are located is some twenty miles from the mouth of the creek, the ledge cutting the creek at an angle of about forty-five degrees, in a N. W. by S. E. direction.

"The ledge or ore bearing rock is about 24 feet in width from wall to wall, the hanging wall being gray granite, the foot wall slate. The developments are opened at an elevation of one hundred feet above the level of the creek bed, and consist of an open cut fifteen feet deep and twenty-five feet back from outer edge to face of cut. This cut exhibited a pay streak of galena five feet wide, which assays sixty-five ounces in silver, seventy per cent. lead, with a good trace of gold.

"The altitude of the 'Jumbo' mine, whereon the above developments were made, is about 3,500 feet above sea level, and is in the midst of a thickly wooded country, but the lead can be traced beyond the timber line.

"At present there are only five claims located on the lead, which by all accounts is a true fissure, holding an invariable course in a N. W. by S. E. direction.

"The creek bed is nearly as level as a road bed, so that the chief obstacles in the way of road construction would be the expense of cutting and swamping the timber and underbrush. It is also beneficially surrounded with a luxurious pasturage of bunch grass; in fact, the bottom opens up into a small valley a short distance above the claim.

"Several assays have been taken very recently, which go much higher than that above quoted.

"Jubilee and Spillemcheen Mountain.

"This mountain, apparently three distinct buttes, for all practical purposes may be described as a ridge some seven or eight miles in length by from half a mile to three miles wide, the summit being about 2,000 feet above the Columbia River, the latter from the mouth of Spillemcheen Creek, flowing in a north by west direction; the base of the mountain being on an average about a mile distant.

"The general formation is of lime quartzite or porphyritic lime; there is also to be seen a black line of a shaly nature.

"All ores in these buttes predominate in silver and copper; other metals have shown up in testing, but in small quantities.

"Up to the present assays have varied very materially, giving returns of from twelve to two hundred dollars per ton in silver.

"On the western side of Jones' Butte, upon which is located the great 'Spillemcheen' mine, owned by Jones and Wells, there is one contact vein which might be partially described. It is a galena ledge of vast extensions, taken up in 1884, by Thomas Jones, one of the earliest prospectors in the field since commencement of C. P. R. construction. The croppings equal in bulk those of the Treadwell mine on Douglas Island in Alaska, and upon the numerous claims since located along the line of croppings it has been developed to some considerable extent. The mines, 'Spillemcheen' and 'Rothschild' are opened by tunnels from fifty to one hundred feet in length; the ore is low grade, carrying, among other bases, copper, zinc, antimony and a light trace of tin. Making an average of the different assays taken, it will not exceed \$12 per ton, so far as is at present known, but by concentrating it will yield fifty per cent. in lead, and \$20 in silver. There is also a strata or pay shoot of Red Quartz running through it, which gives a return of \$5 in silver and \$3 in gold.

"The lode is so extensive that, taking into consideration the great advantages the resources of the surrounding country afford for reduction works, if taken hold of by the right men with capital, and mined on an economic and practical basis, this property alone would prove of inestimable value, even if only clearing \$2 per ton.

"Messrs. Jones and Wells have this fall made a rough waggon road from their mines to the Columbia River, and are busy in getting out ore, which it is their intention to ship next spring, so soon as navigation commences on the Columbia River. They have at present about 200 tons on the dump.

"Jubilee Camp.

"About four miles up the trail from Jubilee Landing, Columbia River, are numerous locations, upon most of which considerable work has been done, and from which rich assays have been had; some of the rock gives a good percentage of copper, and yields from \$40 to \$160 in silver to the ton. The Law and McIntyre locations 'Constance' and 'Atlanta' were the first made upon the Jubilee end of the mountain, having been recorded a little over eighteen months ago. The development work on the 'Constance' consists of a 50-foot shaft, and of 3 open cuts. The shaft passed through several pockets, and is now at its greatest depth in ore. It was put down last winter when no difficulty in carrying on mining was experienced, the greatest depth of snow not exceeding 30 inches snow disappearing altogether in April.

"That work, however, has been temporarily abandoned, and a tunnel commenced to tap the shaft at a distance of 400 feet, N. W.

"Mr. Law has recently returned from the east, where he has succeeded in advantageously bonding the mines 'Constance' and 'Atlanta,' to a company or firm in Toronto, possessing ample means and enterprise to develop them.

"From the mines last mentioned to the northwest end of the mountain, a distance of two miles, the croppings of a continuous ledge have been located, but no work of any significance has been done, except on Campbell's 'Mayflower' and Kellie's 'Scotch Giant.' At a point on the 'Mayflower,' where apparently three fifteen-inch veins meet, Campbell has stripped the main vein for fifty feet, exposing ore the entire distance; at this point an open cut will be made to prove the size and character of the ledge.

"Mr. Kellie has done similar work on the 'Scotch Giant,' with a like favourable result.

"The ore from these claims is of the same character as that found at the McCrea and McIntyre groups, showing distinctively that the deposit or ledge is a continuous one for a distance of over four miles.

"The McMurdo Section,

"Situated about thirty miles southeast from Donald, and promising to be the richest quartz centre in East Kootenay. The following brief description, touching upon its formation and resources, may not be amiss:—

"Starting for that locality from Hayes' Landing, on the Columbia River, about 24 miles above Golden, the trail follows a tortuous route for about five miles over and around the benches flanking the western shore of the Columbia.

"This portion of the country may be said to belong to the secondary formation, although it has a thin covering of superficial accumulations. It is almost entirely barren of timber of any market value, but it abounds with a growth of bunch grass which will be a great aid to those engaged in freighting, &c., in time to come.

"On reaching the summit of what is locally known as the 'first divide,' an altitude of some four thousand feet above sea level is attained. The vegetation here is in a comparative healthy condition, nature not having had to contend so much against 'forest fires,' which periodically commit such ravages throughout the country. Upon passing the 'divide' a descent is made into the valley of the north fork of the Spillemcheen, when a country is traversed rich in timber, groves of spruce, fir and jack-pine, suitable for either mining or commercial purposes. It is also well stocked with meadows of wild timothy, and dotted here and there with tiny rivulets and excellent springs.

"While ascending the second divide, about 17 miles from Columbia River, traces of the sandy slates and silurian limestone of the transition period are noticeable, but the country is not tilted up enough to admit of an emphatic statement.

"This ridge reaches an elevation of nearly 5,000 feet, the trail crossing it at a lower level, about 4,500 feet, and is densely covered with a fine growth of timber peculiarly adapted for mining purposes. When the summit is reached, for the first time do the bleak and rugged peaks of the main range of the Selkirks come in view; the trail then descends into the valley of the middle fork of the Spillemcheen, which is followed crossing and recrossing the creek about 16 times, till the Glacier Belt is arrived at. Timber along the stream is scarce, having in places been destroyed by fire, and again by the mechanical forces of snow slides. At this point quartz reefs are observable on either hand, becoming more numerous as the stream is ascended; they are mostly of a gold-bearing nature.

"The general formations are chiefly slate and granite, the country rocks consisting of clay-slates, crystalline limestones, mica, schists, and rocks of the primary strata.

"The mountain peaks, especially in the Glacier Belt, are both massive and columnar, affording, I should imagine, a most extensive and interesting field for geological research.

"The metalliferous resources of this section seem to be unlimited. The mineral belt by general estimation is at least ten miles wide, but being as yet unexplored, it may be more or less; however, it is safe to conjecture that it extends from Illecillewaet to the Kootenay Lakes, with a variable width of from five to ten miles.

"The McMurdo camp proper takes in a stretch of country some nine miles long and about four wide. The greatest and richest of the deposits as yet known are near the heads of the Middle Fork, Carbonate and Copper Creeks, where mineral seems to abound in every direction.

"The veins are nearly all true fissures, running an invariable course for miles in a N. W. and S. E. direction, with a general dip towards the east.

"Copper Creek is a tributary of the Middle Fork, emptying into that stream at a point about one mile below where the present trail reaches it. The South Fork basin offers many attractions to the prospector for an examination next summer, as it is reported by McMurdo, who is the only white man known to have visited that locality, to contain numerous and extensive out-croppings of quartz leads.

"This section is between twenty and twenty-five miles distant from the banks of the Columbia River and could be tapped by a trunk road following up the Spillemcheen; thence trails could be cut up the South Fork and Copper Creeks, and also to the Big Buttes and Jubilee, as somewhere along the banks of the Spillemcheen will be the site of the reduction works necessary to utilize the vast and latent mineral resources of this section.

"McMurdo, the original discoverer of mineral in that country, has bonded two mines upon which enough work has been done to prove that the claims are rich, high assays being obtained, and ledges of satisfactory dimensions uncovered.

"The 'Monitor' mine, the property of Low and Dainard, has had a tunnel run in to the ledge eighty-two feet; two open cuts have also been made, proving that there is four feet of solid ore which assays \$100 in silver and \$8 in gold to the ton, besides carrying a good percentage of lead with a showing of gray copper. This mine has been bonded, and extensive development will be done upon it next season. Close to the Monitor is the Crescent ledge, upon which are seven locations. The assessment work on the 'Crescent' mine exposed a pay streak from four to six feet wide, and similar in character to that in the 'Monitor.'

"An assay made by McVicker, of Salt Lake, from ore taken from the Crescent, gives a return of \$226.03 in silver and \$8.44 in gold to the ton, besides 39 per cent. in lead, and 11 per cent. in copper. That mine, and another in the same locality, has also been bonded.

"Further assays have been made from ore taken from same locality, by Bredemeyer, of Vancouver, with following results: Sample No. 1 carried \$164.41 in silver and \$48.23 in gold

to the ton, and 46 per cent. copper. No. 2 gave \$146.99 in silver and \$48.25 in gold to the ton, and 41 per cent. copper. The above was from picked samples of gray copper.

"Carbonite mountain, a short distance from the above, possesses very fine indications. On its western slope are croppings of a ledge nearly two miles in length; eight locations have there been made and recorded. An assay made at St. Paul, for George Stark, one of the claim owners, gives over \$100 in silver, and one ounce of gold to the ton; the latter of a quality realizing \$20 to the ounce. Development so far has proved that the belt is beyond a doubt rich, and lies close to the surface, the pay shoots lying under the loose earth and vegetation.

"The formation being slate and granite gives no indication of the minerals pinching out, but proves the belt of true fissures; each prospect-hole shows a dump of from one to ten tons of good ore, the shoots growing larger the deeper they are followed. The veins are easily traced for miles; on two of them sixteen locations have been made, eight on each, and they still keep on their course into an extensive range of mountains as yet unexplored.

"From the numerous deposits and high grade ores already discovered, combined with the natural facilities and unlimited resources of timber and water suitable for milling purposes, the McMurdo country cannot but be, at some not far distant date, a rich and prosperous mining centre, such as hitherto the Province has not known. It is easily accessible from any point on the Columbia River ten miles south of Golden; there are no serious obstacles in the way of waggon road construction, neither are there any insurmountable difficulties in the way should it be contemplated at some future day to bring in a branch from the main line of the C. P. R.

"The Monarch mine, at Field, lately purchased from the Coffman Brothers by the British Columbia Smelting Company, is being rapidly developed, large shipments of ore being forwarded daily to the smelting works at Vancouver.

"Dwelling and boarding-houses, an office and blacksmith's shop, &c., have been erected near the mines.

"A car track has been blasted out of the solid rock, along an almost perpendicular face, for a distance of about 1,000 feet; in one place, for a short distance, a tunnel having to be run through the mountain. About 850 feet of this track is covered over by substantial shedding, to protect the men while working. The elevation of the track above the C. P. R. line is about 800 feet.

"The cars are filled at the chute at the mine and then started down grade to upper bin (dimensions 30x30x30), into which the ore is dumped upon their arrival at that point. The empty cars are then, two or three at a time, hauled up by horse-power to the place of commencement, viz., the chute at mine. At upper bin the ore is again loaded in cars and run down to lower bin (dimensions 30x30x20), a distance of 1,100 feet, where the loads are dumped.

"It is so arranged that when the loaded car is started from the upper bin it hauls up the one just emptied at the lower bin, by which means much labour in hauling up grade is saved.

"Up to the present date over 600 tons of ore have been shipped to the smelting works at Vancouver, and it is the intention of the company to keep shipping steadily, the supply being apparently inexhaustible.

"The work done upon the mine consists of drifts, cross-cuts, upraises, and tunnel work. Total number of feet underground work is 370, of which about 270 feet is in ore, the average thickness between walls being about 4½ feet.

"The best ore only is shipped to Vancouver, the residue being retained upon the ground for concentrating purposes, under which process it can be profitably disposed of.

"The company have thirty men steadily employed upon and in connection with their mines, and have expended a great deal of money on account of labour, tramway machinery, cars, track-rails, tools, lumber, &c., &c.

"From the spirit and enterprise demonstrated by the very thorough manner in which the mine is being worked, and ore shipped, &c., the company is deserving of the most entire success—a result which will be looked upon, by all who are interested in the development of the country, with much satisfaction.

"Otter Tail.

"Although excellent prospects have been obtained and much money expended in the vicinity of Otter Tail Creek, situated about six miles west of Field, yet, since the destruction by fire, in 1887, of the stamp-mill, saw-mill, store, and dwelling-houses, &c., erected by the Otter Tail Company, nothing towards development has been done.

"In addition to those reported upon, there are many other promising mineral claims in this district needless to particularize, especially as but little work has been done upon them.

"Mineral claims located and recorded this year amount to 109; placer mines about 40.

"Coal.

"The extraordinary rich deposits of the above mineral at Crow's Nest Pass, in the Rocky Mountains, have been fully reported upon by me last year, since which time there is little of interest to mention.

"This year, about six miles south-west from Golden, J. M. Kellie and Harry Estelle have discovered what they report to be a 21-foot seam of coal, which, from surface indications, is thought to be anthracite, and which, if true, cannot but give a great impetus to all branches of industry, &c., in that vicinity.

"Slate.

"A ledge nine feet in width, of an excellent quality of slate, has been discovered by Walter Hogg, a prospector, $6\frac{1}{2}$ miles east of Golden, and only a few hundred yards distant from the C. P. R. track. Specimens of the slate were brought to Donald, which were of a blue-black colour, of smooth surface, hard to break, and of good grain. The discoverer states that slabs of any desired size, such as beds for billiard tables, mantels, flagging, &c., can be taken out, and that it is especially adapted for roofing purposes.

"During the past summer I have visited nearly all the localities named. As, however, my stay at any of these places was necessarily short, other business requiring my presence elsewhere, I have been indebted for much of my information to miners and others interested in and visiting the different camps reported upon.

"In conclusion, I would state that I consider no country could have a brighter promise ahead than has the Kootenay District; and if one-hundredth part of the prosperity foreshadowed by the inestimable riches, consisting of minerals, timber, and water-power, &c.,—ample indications of which have been ascertained beyond a reasonable doubt,—is realized, then will it be proved that British Columbia has resources within herself of a lasting nature, such as have been hitherto unparalleled in the history of Canada.

"I have, &c.,

(Signed)

"A. W. VOWELL,

"G. C. & S. M., &c., Kootenay.

"The Honourable John Robson,

"Minister of Mines, &c., Victoria."

LILLOOET.

MR. SOUES' REPORT.

"GOVERNMENT OFFICE,

"CLINTON, B. C., December 21st, 1888.

"SIR,—I have the honour to enclose herewith mining statistics, and my annual mining report, for the District of Lillooet for the season ending 30th November, 1888: The year has been fairly good; as a rule abundance of water for all mining purposes; floods in June cleared out wing-dams, etc., on Cayoosh Creek, necessitating a renewal of everything on the subsidence of the water. A cold snap early in November stopped work for about ten days, but at the present writing, most of the claims on that creek are still working. The total yield of gold (ascertained from reliable sources only) is \$90,160. Of the amount carried away in private hands, any estimate of mine would be imaginary, the Chinese being the principal miners in the District. The above amount is again under that of the last four or five years. I attribute the shrinkage this year to two causes: 1st, not much above half the usual number of Chinese miners, and, 2nd, to the unsettled state of the mining community generally, consequent on the discovery of free gold bearing ledges in the immediate neighbourhood of Lillooet last fall, which has taken up the time of the white miner this season in prospecting the mineral claims located by them. For comparison I append statement of the mining and mineral claims recorded in the District in 1887 and 1888.

	1887	1888
" Mining (alluvial) claims recorded	230	135
" Mineral (quartz) " "	53	116

"The above shows that over twice the number of mineral claims have been recorded in 1888 that were in 1887, while in the same time the record of mining claims is 95 less, and so far it is the mining claim that gives gold returns in this District. Of the total yield this year, nearly \$60,000 worth has been bought by Mr. A. W. Smith, of Lillooet, and I think I am safe in saying that seven-eighths of this amount is from the Chinese mining claims on Cayoosh Creek. Mr. Phair, Mining Recorder at Lillooet, reports to me 'that during the season there was only 'half the usual number of Chinese miners; they have done very well on Cayoosh Creek; a 'party of them who left for China took \$4,000 with them in gold dust. One company of five 'averaged \$100 a day. Others are paying from \$4 to \$10 to the hand, but not having proper 'machinery, they cannot reach bed-rock in the creek. If capitalists were to take up the 'abandoned ground on this creek, they would undoubtedly have large returns for their outlay. 'Rocky barriers at the mouth of the first cañon could easily be blasted out, which would 'lower the creek above many feet. White miners on the south fork of Bridge River—about 'twenty—have done much better than in past years. A party of six took out in a week \$494 'in coarse gold. Seventeen Chinese miners flumed part of Cayoosh Creek, and they are now 'making \$5 a day to the hand, with every prospect of striking it richer on bed-rock, if they 'can reach it.'

"I personally examined the trails and claims on this creek in October last for a distance of about eight miles. The creek, or more properly speaking mountain torrent, flows through a narrow cañon from which rise precipitous mountains, rugged, torn, and shattered in every form, from violent upheaval, and stretching upwards, in all shapes, to the line of perpetual snow. The trails, often not more than a foot wide, wind along these mountain sides in several places. I noticed the most dangerous, the so-called trail was an imaginary one, as the passing foot-mark of man or horse is immediately filled up with slowly descending shale, and it seems almost incredible that accidents are not the rule instead of the rare exception. A sum of \$2,000 (wholly inadequate) was placed on this year's estimates for a road along the line of the creek, but careful and exhaustive surveys would require to be made on both sides of the creek previous to any attempt at road making. Without taking into consideration the number of quartz ledges that have been located on both sides, and in the immediate neighbourhood, there can be no doubt, I think, that the bed of the creek will give rich returns for many years, provided that it is worked in a proper manner, and the Chinese miner will certainly never accomplish that. One thing certain, the mineral claim first requiring machinery must make a road to get it in. My furthest up point was about eight miles, the barometer reading 1,300 feet above sea level. The Bonanza Co.'s claims, situated on a mountain ridge or back-bone, rise from the creek at this point at an angle of at least 50°, and as they have six claims located along the line of the ridge, I should judge that the extreme upper end of their ground must be close on 6,000 feet above sea level.

" Quartz.

"On the various locations made in the eastern portion of the District, viz., Deception Creek, Mahood Lake, and Clearwater, there has not been any work done this season. Mr. Allingham has been at work on his claim on Mad River, and under great difficulties, from its isolated position, high water, and loss of cached stores, etc., stolen by Indians.

" Foster Gold Mining and Milling Co., located on the Big Slide.

"I regret that I have again to report that everything in connection with this company has been at a complete standstill during the past season.

"Nearly the whole of the quartz claims recorded this year are situated west of the Fraser River, and on the eastern slope of the main chain of the Cascade Mountains. The ledges so far discovered carry free gold with traces of silver, gold and silver, silver and galena. Of the last named class a wide ledge was discovered this fall, some eight miles from the west end of Anderson Lake, by Mr. Jensen, an old experienced miner, who informs me that he considers it a true fissure vein of good quality, but, like the claims on Cayoosh Creek, very difficult of access. Of the claims recorded this season, only a small proportion of them have had the necessary work

done on them to enable the locators to hold them for a year under the provisions of the Mineral Act. On the Bonanza ledge work has been carried on without intermission by the company owning claims there—since the recording of the Discovery last fall. A 50-foot shaft was sunk last winter and prospecting generally during the whole of the past season. The company are engaged at present in running a tunnel, which, at about 100 feet, is supposed to intersect the ledge at a distance of 250 feet from the surface. The secretary of the company has handed me forty-two different assay returns (made in Victoria, Cariboo, Vancouver, Ottawa and San Francisco) of the ore from different parts of the ground, from which I find the average is little over \$47 per ton of 2,000 lbs. The returns, in every case, are the same, viz., free gold with traces of silver. On the free gold ledges located on Big Bar Creek, and referred to in my report of last year, there has not been any work done this season. This remark applies also to the leased ground of the Fraser River Cable Co. A lease of abandoned mining ground on St. Mary's Creek, west side of Fraser River, was given last summer; up to the present I have not had any report from the lessee. Of the mineral claims located this year on Cayoosh Creek, Seaton and Anderson Lakes, several are owned by capitalists in Victoria, New Westminster and Vancouver. I trust those gentlemen will, in their own interests, see that energetic developments are commenced at an early date in the spring of next year.

"I have, &c.,

(Signed)

"F. SOUES,

"Gold Commissioner.

"To the Hon. John Robson,

"Minister of Mines, Victoria."

YALE.

Kamloops Division.

MR. HUSSEY'S REPORT.

"KAMLOOPS, B. C., December, 1888.

"SIR,—I have the honour herewith to transmit my mining report of the Kamloops Division of Yale District for the current year.

The Stump Lake Mines.

"A mineral field of great promise, situated among the hills in the vicinity of Stump Lake.

"It has the advantage of being easily accessible by a good waggon road which connects Kamloops and Spence's Bridge, both stations on the Canadian Pacific Railway.

"The mines so far discovered and partially developed are about thirty miles from Kamloops, and in close proximity to Stump Lake, a sheet of water about one mile in breadth and seven miles in length.

"There are three companies in the district, who for the past year or more have shown an unusual amount of energy in developing their property, namely:—The Nicola Milling and Mining Co., the Star Mining Co., and the Mary Reynolds Co.

"The Nicola Milling and Mining Co.'s property consists of over twenty locations, all of which are being more or less developed. The principal ones, however, on which a steady development is being performed, are the 'King William,' 'Tubal Cain' and its extensions, and the 'Joshua.'

"The King William shaft is down 110 feet, and a level is also being run north from the main shaft, shewing in places a body of ore about seven feet in width.

"The shaft at the Joshua is down 240 feet, from which four levels have been run in a northerly and southerly direction, to a distance of 100 feet, which has clearly demonstrated the fact that the ore body is continuous and of good quality.

"The 'Tubal Cain' shaft is down about 130 feet, and, as in the other works, the shaft and levels are being pushed ahead as fast as men and machinery can do it. From this shaft a 50-foot level has been run north a distance of 160 feet, shewing a fine body of rich ore. At

the 110-foot levels are being run both north and south on the vein, and up to date there is no change in the ore, which is of the same quality as that procured at the 50-foot level. Two tunnels are being run in from the side-hill on the ledge to a distance of 600 feet; the lowest one will tap the shaft at a depth of 260 feet

"The company are employing a force of from fifty to sixty men at their mines, and it is to be hoped the developments on their property will be sufficiently advanced by next spring to warrant the company in erecting reduction works. The ore on the dumps amounts to about 3,000 tons, of which more than half is first class milling ore, which will average \$30 to \$40 per ton.

"These mines are considered one of the best developed mineral properties in the Province, employing more men than any other, and working entirely on their own resources; they certainly are worthy of special notice.

"The Star Mining Co. have shown unusual energy in developing their mine, by sinking a shaft 100 feet in depth, at the mouth of which a horse whim and blacksmith shop have been erected. The ledge is four feet in width, with a pay streak of about twenty inches. The assays range from \$20 to \$600 per ton.

"The Planet mine, which is also the property of this company, is being developed in a business-like manner. A shaft 40 feet in depth has been sunk, and at the bottom a level has been driven in a northerly direction, which exposes a magnificent body of ore which has assayed an average of about \$95 to the ton. The owners of these mines have been engaged during the summer in drifting, taking out rock for milling purposes, and shipping concentrates. The rock was hard quartz, shewing galena, iron sulphurets and gray copper. The copper did not run over 4 or 5 per cent. The result of several assays of picked specimens, of which the following are two:—576 oz. silver and 2¼ oz. of gold per ton; 407 oz. silver and 1½ oz. of gold per ton.

"The nearest point of shipment is Kamloops, to which place it costs about \$10 per ton to haul. The plant of the Star Mining Co. is very complete, but not large enough to be profitable. It consists of a rock breaker and a quartz mill and two Triumph concentrators. The last named have done their work well, but the quartz mill is not a success, owing to the hardness of the rock.

"The reduction involved in the concentration is about 1 in 7, or about 12½ per cent. Economically considered, the reduction should still further be continued before shipment. Experts consider it would pay to reduce the ore to bullion by roasting, and possibly by leaching, on the ground.

"The cost by the time the concentrates arrive at San Francisco and are smelted are as follows: \$10 per ton for freight from the mines to the railway, \$4 to Vancouver, \$5 to San Francisco, and from \$10 to \$14 per ton for smelting, which makes a total cost of from \$30 to \$40 per ton.

"The 'Silver King' Mining Company, owned by Asbury and Jensen, of Victoria, are sinking a shaft, and a contract has been let for 60 feet, 36 feet of which is already completed at a cost of \$12 per foot. The shaft is 8 feet by 4 feet. Indications are very favourable.

"A company of Victorians are operating the Jenny Long, Longfellow, and Dentist mineral claims, and a contract at \$14 per foot has been let for sinking a shaft on each claim. The shaft in each instance is to be 100 feet in depth. The Jenny Long claim contains free gold in what is considered paying quantities.

"The Hepburn claims are being developed, and ore will be shipped during the winter.

"Assessment work is being prosecuted on the 'Silver Queen' mine, and the shaft is already several feet in depth.

"The Azela mineral claim, owned by Wm. Palmer, is one of the most promising in the district, and will prove very valuable should further developments expose rock equal in value to what is now in sight.

"Messrs. Wright and Fletcher are the owners of several mineral locations, amongst which the most valuable are the 'Minnie,' 'Idaho,' 'Banner,' and 'Bertha.' A shaft has been sunk on each claim and sufficient work has been done to demonstrate the value of the property, which possess lodes from 3 feet to 4½ feet in thickness. The ore assayed from these mines is estimated to be worth from \$75 to \$250 per ton. The owners expect to begin active operations next spring.

"The 'Mary Reynolds,' owned by Jos. Hepburn & Co., has two shafts, one about 90 feet and the other 40 feet in depth, with sufficient ore in sight, both in quantity and quality, to enable the company to ship direct to the reduction works at San Francisco, without the

necessity of having it concentrated, and this is being done as rapidly as circumstances will permit. The assays range from \$375 to \$1,000 per ton.

"The 'Gold Cup' has a shaft about 15 feet deep, exposing a fine ledge which has assayed about \$90 per ton.

"I have only referred to the leading mineral claims, upon which work has been vigorously prosecuted with most favourable results. During the past twelve months fifty-six new claims have been recorded at the Government Office at Kamloops.

"Placer Mining.

"The mines on Tranquille Creek continue to yield a regular supply of coarse gold of first class quality, but as the claims are exclusively controlled by Chinese, it is impossible to secure reliable information regarding the quantity of gold obtained. Between thirty and forty Chinese are regularly employed in placer mining on this creek, which is situated about seven miles from the town of Kamloops.

"Coal.

"Croppings of coal were discovered this spring by James Guerin, about two miles south of Kamloops. He ran several small drifts in the mountain where it had been cut through by a gulch, and found a number of small seams which had every appearance of being bituminous coal. At the same time Mr. Geo. Loney ran a tunnel twenty-five feet into the hill, on the opposite side of the gulch, and cut across six or eight small seams. He then sunk a shaft and cut through several seams ranging from one to eight inches, at a depth of 23 feet from the surface.

"At 38 feet they struck a new formation of sandstone, and blasted through that for 22 feet, with very little change.

"They are now running a drift on the seams above mentioned 22 feet from the surface.

"The Guerin Company are also running a tunnel, and are in about 200 feet. The coal is bituminous, and is superior to any found in the North-west, being considered quite equal in quality to the celebrated Nanaimo coal.

"It burns freely in an open grate with little draught and leaves a fine white ash. Several tons have already been taken out, and it is expected that the two companies now at work will shortly be able to supply this section, and before another year has expired make arrangements for exporting.

"I have, &c.,
(Signed)

"FREDERICK HUSSEY,
"Government Agent.

"The Honourable John Robson,
"Minister of Mines, Victoria."

Okanagan Division.

MR. DEWDNEY'S REPORT.

"GOVERNMENT OFFICE,
"VERNON, 17th December, 1888.

"SIR,—I have the honour to enclose herewith the mining statistics and my annual report for the Osoyoos Division of Yale District.

"Cherry Creek.

"The prospects on this creek are looking up, both in placer and quartz mining. The Chinese (in all about 40), I am informed, have done much better this summer than for some years past.

"The Cherry Creek Mining Company (Mr. John Merritt, foreman) are still running their tunnel into the hill, trying to find the lost channel.

"The quartz mines on the Monashee Mountain claims, under the superintendence of Mr. Donald McIntyre, have taken out some very rich quartz this past summer, and, during an interview I had with him, he informed me that he intends making arrangements this winter, with the companies he represents, to place machinery on the ground this coming summer.

"The Hidden Treasure Mining Company have also done considerable work on their claims this year, but with what results I am not in a position to state.

"Mission Creek.

"Very little has been done in the way of prospecting this creek during the summer, only a few Chinamen, with one or two whites, making a bare subsistence.

"Rock Creek.

"On the 10th of August of the present year I visited this creek, and was very agreeably surprised to find such a well-constructed little mining town, called after the discoverer, 'McKinney.' I found the mines, as they have been represented to be, very rich; and, in my opinion, it is only a question of a very short time when there will be one of the richest mining camps ever known in this Province.

"Mr. Douglas, manager of the Douglas Mine, representing New York capitalists, has his claim in splendid working order, and is as well equipped for working as any mine could possibly be. He appears to be the moving spirit in that camp, and others are waiting on him for further developments, although vast quantities of very rich ore can be seen on the different dumps, showing that considerable work has been done by the miners towards developing their claims.

"I am gratified to learn that Mr. Douglas has struck a very rich vein, at a depth of about 85 feet, which will, I have no doubt, throw a new impetus into mining operations on this creek.

"The Government, at an expense of \$1,915.51, built a first-class trail from the Indian village, In-ka-neep, about 20 miles from Penticton, to Rock Creek. Freighters and others pronounce this a good trail, and far more convenient, as it shortens the route to the mines about 15 miles.

"Boundary Creek.

"This creek, which is near the boundary line, is pronounced to be rich in minerals, and I have just received a notification, from a gentleman who is prospecting there, that there will be some fine properties developed near the boundary line in British Columbia in a very few years.

"I have, &c.,

(Signed)

"WALTER DEWDNEY,

"Gold Commissioner.

"The Honourable

"Minister of Mines, Victoria."

Similkameen Division.

MR. TUNSTALL'S REPORT.

"NICOLA, December 28th, 1888.

"SIR,—I have the honour to forward the annual mining statistics for the Similkameen Division, in which you will observe that the yield of gold exhibits a decrease from that of the previous year, principally owing to a smaller number of men being engaged in mining, and the exhaustion of some of the mines.

"On Granite Creek some of the bench claims have averaged from \$5 to \$10 per day to the man, whilst others have paid about wages. Operations in the bed of the creek have been carried on in the majority of instances by Chinese, in ground abandoned by the whites, with fluctuating success. Collins Gulch has kept a small number of men employed who have done well. Slate Creek has yielded satisfactory returns to a limited number of miners. Boulder Creek is gradually being worked out by the Chinese, by whom, with a few exceptions, it has been exclusively worked. The pay on this creek has ranged from \$2 to \$4 per day.

"The Tulameen River has not attracted as many men as formerly, although a good deal of work has been accomplished on the bars, over a distance of about five miles from its mouth. At its junction with the Similkameen the Chinese have struck some ground which pays well, back of the present channel, and at a considerable height above its level. It can be worked for only a limited period during the season, as the water is obtained from a small creek, which dries up as the summer advances.

"The Chinese on the Similkameen River have obtained from \$1.00 to \$1.50 per day, and some earn a smaller amount than that mentioned. They, however, manage to lead a comfortable existence with the additional assistance of their gardens, which produce all the vegetables they require. At Princeton, Mr Allison has ten men engaged mining an elevated bench, from which, I am pleased to say, he derives very good returns, although the gravel is encumbered with immense boulders, which necessarily render work laborious and slow. The pay is contained in a stratum of cemented gravel on the surface, averaging from five to six feet deep, lying on a bed of sand. It is a strange fact that the large body of water required to move and disseminate this mass of heavy fluvial drift did not cut into and carry away the soft deposit on which it lies. The same peculiarity is exhibited in the claims at the mouth of Granite Creek.

"I regret to state that the expectations formed of Five-Mile Creek, explored by some Cariboo miners last fall, have not been realized. Two Chinese Companies proceeded there last summer, and reported having made only from 50 to 75 cents per day to the man.

"The yield of platinum is estimated at 1,500 ounces. This is the only portion of British Columbia wherein it is obtained in sufficient quantities to render its production a feature worthy of mention in the mining statistics. It is found associated with alluvial gold, and is composed of two grades, the magnetic and the non-magnetic. Competition has raised its value in the mines to \$3.50 per ounce. An analysis has proved this metal to contain a certain quantity of iron, osmium and indium. The latter is exceedingly valuable, and is principally used for tipping the points of gold pens; also, in a limited degree, for other purposes where great hardness and indestructibility are deemed essential qualities.

"Very little has been done the past season in quartz mining; the owners of mineral claims having satisfied themselves with merely performing the necessary work to hold their locations. The Bonanza Queen, situated above Bear Creek, is claimed by Messrs. Rabbitt, Fell, and Jansen, the two latter of Victoria, and is considered a valuable mining property. The assays average from \$50 to over \$100 per ton in gold, and \$15 in silver. It is the intention of the proprietors to develop this mine next spring, by running a tunnel to tap the lode at a considerable depth from the surface. The 'Nevada,' an extension of the 'Queen,' also exhibits first-class ore. The claims on the O'Donnell ledge, about a mile west of the above-mentioned, remain unworked, although the surface indications are of the most promising character. Want of means, in this instance, as in many others, is the sole excuse for the little labour expended on them.

"On the divide of Wolfe Creek, a tributary of the Similkameen, about twelve miles above Princeton, James Jamieson has discovered an immense body of argentiferous copper ore, over 150 feet in width, assays from which have gone as high as 65 per cent. in copper, and \$20 in silver to the ton. The casings are formed of syenite, gneiss and granite. Three extensions have been recorded, named respectively, the Mountain View, Copper Queen, and Copper King. The silver contained will nearly pay for the transportation of the metal from the point of production to navigation on the Fraser, at Hope, a distance of about 65 miles, principally over the trail at present in use. This, I consider, would prove an excellent opportunity for the investment of capital, as the ore can be mined from the surface without any difficulty, and at a small cost.

"Dr. Dawson, of the Dominion Geological Survey, explored the surrounding country during the past summer, and expressed a very favourable opinion of the evidences of mineral wealth he had everywhere encountered, and strongly recommended prospecting in the direction of the head waters of the Tulameen, which his observations induced him to believe would be found rich in auriferous deposits and veins.

"The Similkameen Division yields to no other portion of the Province in regard to the richness and number of its mineral-bearing lodes; but the lack of capital and means of access, seem at present to oppose an insurmountable barrier to their being worked. Ledges abound on the Similkameen and Tulameen Rivers, and on Granite Creek, where mining operations have brought them to view. They are visible in the rock bluffs on the streams mentioned, and they crop out in localities on the mountain sides without attracting the attention of the placer miner, who knows he cannot afford the time and money required to make them valuable; hence the apathy displayed towards a branch of mining industry destined in the near future to support a large and prosperous population.

"I have, &c.,

(Signed)

G. C. TUNSTALL,

Gold Commissioner.

"The Honourable the Minister of Mines.

REPORT BY W. J. SUTTON, GOVERNMENT ASSAYER.

"VICTORIA, December 31st, 1888.

"SIR,—I beg to submit the following report on the different mines I have visited during the past year, and a statement regarding the mineral resources of the Province:—

"The Nicola Mines.

"The Nicola mines are situated in the Nicola Valley, about thirty miles from Kamloops, and consist of a large number of ledges varying in width from one to six feet. The general direction of the ledges being about north-west to south-east. It is a very open country, with low undulating hills, easy of access, and will be very cheap and convenient to mine and operate.

"The principal work that is being done is by the Nicola Milling and Mining Company, Mr. Wills foreman. This Company is doing thoroughly good work, and has expended a large sum of money in sinking and drifting on their different ledges, so as to prove beyond a doubt the existence of a sufficient body of paying ore, prior to the erection of reduction works, which it is to be hoped they will be justified in building, ere long.

"The Company's property consists of a number of veins on what is known as Mineral Hill. Three of these ledges, which were the most promising on the surface, are being worked at present, *i. e.*, The 'Joshua,' 'King William,' and 'Tubal Cain.'

"The following is a synopsis of the work done on these ledges:—

"Joshua Mine.

Main shaft, 278 feet deep.
Air shaft, 80 feet deep.
100 ft. level, North drift, 90 feet.
100 ft. level, South drift, 55 feet.
200 ft. level, North drift, 48 feet.
200 ft. level, South drift, 72 feet.

"King William Mine.

Main shaft, 137 feet deep.
Air shaft, 50 feet deep.
50 ft. level, South drift, to air shaft, 40 feet.
100 ft. level, North drift, 71 feet.

"Tubal Cain Mine.

Main shaft, 146 feet deep.
Air shaft, 50 feet deep.
50 ft. level, North drift, to air shaft, 162 feet.
100 ft. level, South drift, 40 feet.
100 ft. level, North drift, 55 feet.

"Tubal Cain (hill-side levels).

107 ft. level tunnel, 200 feet.
220 ft. level tunnel, 90 feet.

"There are a number of other shafts and tunnels, making in all a total of about 2,000 running feet of good working shafts and tunnels.

"The Joshua vein averages about 30 inches in width, and has a dip of about 60°. The ore at the surface consisted of galena, chalcopyrite, pyrite and blende, with traces of gray copper in a white translucent quartz matrix. With depth the ore has gradually changed until gray copper is the predominant ingredient. The gray copper is highly argentiferous, containing about 400 ozs. silver, and 1½ ozs. gold per ton, and will concentrate well, so that the change is a marked improvement. It is reasonable to expect that the ore will continue to increase in richness as greater depth is reached.

"The King William.

"This vein is very much of the same nature as the Joshua, the average width being about three feet and pitch about 70°. The ore consists of galena, pyrite, chalcopyrite and blende, in a white translucent quartz. Medium coarse crystalline galena (containing 30 to 40 ozs. silver) at present predominates—very little gray copper yet appearing, but it is probable that this vein will undergo the same change as the Joshua with depth.

"The Tubal Cain.

"This vein is somewhat different in nature to the Joshua and King William on the surface—the country rock being more of a calcareous nature. The vein averages about thirty inches in width, and has a pitch of about 70°. It consists principally of a fine crystalline galena running in bands through a rotten ferruginous quartz. A sample of the galena assayed 120 ozs. silver per ton. There has been more or less copper ore in this ledge from the surface, and gray copper is increasing with depth. The ledge has been traced down the hill, and tunnels are being run in from the face of the hill, next to Stump Lake, to tap the main shaft at 100 ft. and 200 ft. levels.

"By building the plant for reducing the ore from these mines close to Stump Lake, and following up the system of tunnels and shafts now commenced, the mines will be opened up in a systematic manner, and afford scope for continuous workings for many years. They will then be able to drain the mines and mine the ore at a remarkably low rate.

"I am inclined to think that the best method of treating the ore from these mines will be to concentrate and ship concentrates to Vancouver or San Francisco. With a series of rolls for crushing and a good concentrating plant, there ought to be no serious difficulty experienced; especially if the percentage of gray copper increases with further development, thereby making higher concentrates.

"The 'Russell process' of lixiviation with sodium and cuprous hyposulphite solution might be applied to the treatment of these ores to advantage.

"Great care should be exercised in deciding upon the best method of treatment, and I would therefore recommend to continue sinking and opening up the mine until the exact nature of the ore to be treated has been thoroughly ascertained.

"The Star Mine.

"The Star ledge, also on 'Mineral Hill,' is about the same nature as the Joshua and King William; it averages about 30 inches in width, and has a pitch of about 70°.

"The ore consists of the usual mixture of galena, pyrite, chalcopyrite, and blende, with a little gray copper.

"A shaft is down over a hundred feet, with a number of drifts.

"The Star, Joshua, King William, Tubal Cain, Gentle Annie, &c., form a cluster of veins running more or less into one another, and along with cross-veins present a perfect network of mineralized veins. The cross-veins carry very little mineral, as far as I was able to observe.

"All the veins have a casing of one to three feet of a soft calcareous rock heavily studded with pyrite, which, I think, has been formed by calcareous infiltrations from the country rock. It contains no precious metals.

"Messrs. Henderson and Patterson are the owners of the 'Star' mine; also the 'Planet.' They have erected a small concentrating plant, consisting of a 'Blake ore breaker,' a 'Kendall roller pulverizer,' and two 'Triumph concentrators,' with suitable boiler and engine to drive them. About sixteen tons of concentrates have been shipped to San Francisco, realizing about \$75 per ton.

"The works are on rather too small a scale to be remunerative—they will answer a good purpose in the way of experimental work to ascertain the best method of treating the ore. I am of the opinion that a set of two or even three pair of 'Krom rolls,' with suitable screens, would answer best for powdering the ore. The quartz matrix being so very hard, an ordinary pulverizer will hardly answer, as the hard quartz grinds the softer minerals into an impalpable powder, which is lost in concentrating (sliming badly).

"Rolls crush with a minimum amount of grinding, the soft mineralized portion being separated from the quartz by screening after passing through the rolls. Rolls are taking the place of stamps in quite a number of large mills, being found to answer better, and are more economical.

"The Mary Reynolds.

"The Mary Reynolds' is one of a group of claims owned by Messrs. Hepburn and Wilson, and located on what is known as Idaho Mountain, which rises about 1,000 feet above Stump Lake.

"The vein is about three feet in width, running about north-west to south-east, and is well defined, with a pitch of about 70°. Some very fine ore has been taken from this mine, assaying 400 ounces in silver and three-quarters of an ounce in gold. I took a sample from an outcropping on this ledge, just under the 'grass roots,' which assayed 182 ounces silver and four-tenths of an ounce gold.

"There is a shaft down about 100 feet, with drifts at the 50-foot level running about 40 feet north and south on the ledge.

"A large number of claims have been staked off on Idaho Mountain, notably the 'Dunsmuir,' 'Nip and Tuck,' 'Gold Cup,' the 'Fletcher' claims, etc., upon which more or less work has been done, demonstrating that a large number of veins traverse the mountain in all directions.

"The Jennie Long

"The 'Jennie Long' is owned by Messrs. Dr. Jones, Grant, Moss and others, of Victoria, and located about two miles south-east of the Joshua, and running in about the same direction. The vein averages about three feet in width, upon which a shaft has been sunk about 70 feet. A small quantity of very rich ore has been taken from this ledge, assaying over \$3,000 per ton in gold and silver. The vein has about the same characteristics as the other veins of the Nicola Valley, previously described.

"A large number of other claims have been taken up throughout the Nicola country, showing out-croppings of mineralized veins, but not sufficiently developed to be of special notice.

"The country rock of Mineral Hill is a green crystalline rock of a dioritic nature. It varies considerably, graduating into dioritic slate and diabase. In places it is somewhat porphyritic. The country rock of Idaho Mountain approaches a syenite. Outcroppings of rock of a dolomitic nature were found in several places. The rocks of both Mineral Hill and Idaho Mountain carry considerable calcite and pyrite.

"I was pleased to see the business-like method adopted at the Nicola mines, as I may state that much of the distrust that exists in the Province in regard to mining as a legitimate field for investment has arisen very largely from the lack of business principles in its prosecution. A great many of the misfortunes that have attended mining ventures in the Province have been brought about from a too eager desire to turn the newly found treasures into bullion—mills and machinery being purchased and erected before the existence of a sufficient quantity of paying ore has been definitely ascertained. As so much of this haphazard mining has been done in the past, and since mining men are proverbially sanguine, I deem it important to call their attention particularly to this danger, which must be patent to everyone who has followed the mining history of this Province. There is also the possibility (if not probability) of the ore changing its nature, so that milling plant intended to treat the ore on the surface may become useless on account of not being adapted to treat its altered condition. Sinking and drifting are necessary, and must be done sooner or later to open up the mine and put it in working condition. Why run the great danger of having a mill on your hands with no grist to grind?

"LILLOOET DISTRICT.

"The town of Lillooet is situated upon a plateau of the Fraser river, snugly lying under the lee of high, abrupt, mountains, reminding one of the town of Helena, with the mighty Fraser rolling past, instead of a national highway. Mine host, Mr. Allen, M. P. P., was on hand to receive us. He was quite enthusiastic over the merits of their little town under the hills, and shewed us some splendid fruit and vegetables that were raised there under the genial influence of their beautiful climate and irrigation. It is, indeed, a charming location, and all that it requires is commercial life and enterprise, which will, no doubt, come in due time through the development of the mineral wealth of the surrounding country.

"The Bonanza Ledge.

"The Bonanza ledge is about eight miles from Lillooet and is reached by a trail along Cayoosh Creek through a wild, picturesque country, the rugged mountains standing out in bold relief. In contradistinction to the appearance of the Nicola country, it did not look 'too nice' for a mineral region. That noble bachelor element, gold, has the characteristic of wandering off by himself to some lonely, almost inaccessible locality. The ledge lies on the edge of a horseback or ridge, rising up from the creek on an incline of about 50°, the opposite bank being a precipitous bluff fully 2,000 feet high.

"Most of the work that has been done on the ledge is on an outcropping about 1,200 feet above the level of Cayoosh Creek, a shaft having been put down a depth of 50 feet. The vein at this point has been very much contorted—pitching with a heavy curve towards the side of the ridge. The vein is about 30 inches in width of a crystalline quartz, with a slight ferruginous coloring, having a 'kindly' appearance. Towards the edges of the vein schistose slate is intermingled with the quartz. The country rock is a black argillaceous slate, graduating in places into talcose slate. In proximity to the vein the cleavage planes of the slate are very much curved and contorted and more schistose, shewing considerable metamorphism. Outcroppings of the ledge are to be seen along the ridge in many places, and the vein can thus be traced for a long distance up the mountain, running about north-west to south-east.

"A side-hill cutting has been made on a vein down near the creek, exposing a mixture of quartz, slate, earthy gangue, and a schistose slate containing arsenopyrite (mispickel). This vein appears to run magnetic north and south, and it is hardly probable that it can be a continuation of the Bonanza ledge proper. A large dyke, about 100 feet wide, cuts across the ridge between the upper and lower locations, which was most likely instrumental in forming these veins. Extensive igneous eruptions have no doubt taken place in this locality, as a great many large dykes can be plainly seen cutting the mountains in all directions. No doubt igneous eruptions, forming dykes, are instrumental in producing fissures and creating heat, and thereby favourable conditions for vein formation, and metalliferous veins are of more frequent occurrence in the neighbourhood of eruptive rocks.

"It would be interesting to trace the association of the numerous dykes and veins in this region. Every man in that section has one or more quartz ledges staked off, carrying more or less gold.

"The richest portion of the Bonanza ledge is where the schistose slate and quartz are intermingled, next to both the hanging and foot walls. The schistose slate, with arsenopyrite, occurring in the lower location invariably carries considerable gold, and I have detected small traces of arsenopyrite accompanying the gold in the upper location.

"The following is a list of assays made of thirty samples taken from the Bonanza claims. Many of the samples are picked, so that the assays would represent rather too high an average :

No.	DESCRIPTION.	GOLD. (Valued at \$20 per oz.)	SILVER.
1	Quartz	\$ 36.00	25c.
2	Quartz	3.00	Nil.
3	Slate	38.00	25c.
4	Quartz and Slate	108.00	50c.
5	Slate	90.00	50c.
6	Quartz and Slate	76.00	\$2.00
7	Quartz	18.00	Trace.
8	Quartz	Trace.	Nil.
9	Quartz	16.00	Trace.
10	Quartz	14.00	Trace.
11	Quartz	4.00	Nil.
12	Quartz	Trace.	Nil.
13	Quartz and Slate	74.00	50c.
14	Quartz	54.00	Trace.
15	Quartz	22.00	Nil.
16	Quartz and Mispickel and Slate	288.00	\$1.25
17	Quartz and Mispickel	34.00	Trace.
18	Quartz and Mispickel	21.00	Trace.
19	Quartz and Mispickel	17.00	Trace.
20	Quartz	7.00	Nil.

		(Valued at \$20.70.)	
21	Quartz.....	\$ 4.14	Nil.
22	Quartz.....	2.07	Nil.
23	Quartz.....	14.43	Trace.
24	Quartz.....	24.84	Trace.
25	Quartz.....	4.14	Nil.
26	Quartz and Slate.....	22.77	Trace.
27	Slate and Mispickel.....	42.43	18c.
28	Quartz.....	Trace.	Nil.
29	Earthy Gangue.....	Trace.	Nil.
30	Slate and Arsenopyrite.....	34.15	Trace.

"It would be advisable to do some prospecting on the ledge close to where it is likely to come in contact with the dyke previously mentioned. Whatever work is done should be in the way of sinking down on the vein, doing as little tunneling as possible, as the vein has apparently been considerably twisted.

"There appears to be a weakness among miners for tunnels. In many places throughout the country long expensive tunnels have been driven into the mountain side, before the value of the vein had been in any way demonstrated. By all means stick to the vein until you have proven to some extent what you have got.

"A splendid water power can be obtained from Cayoosh Creek by a flume to a fall just above the ledge at a small expense, with sufficient power to drive any amount of machinery. A road would have to be built along Cayoosh Creek for about six miles, which would be somewhat expensive, but I think a fairly good road, suitable for the purpose, ought not to cost more than \$10,000.

"Just below the Bonanza claim, some enthusiastic miner has built an old-fashioned Mexican arastra, but appears to have become discouraged and left without completing it. The arastra is still used in some parts of Mexico, and answers a good purpose for prospecting under favourable conditions. About a hundred Chinamen were busily engaged placer mining over a distance of four or five miles immediately below the Bonanza claims. The Chinamen have shewn considerable enterprise in building wing-dams, sluices, etc., which are swept away every winter. Notwithstanding their crude methods of operation, and also the fact that bed-rock has not been reached, they have been taking out fully \$75,000 per year during the past five years. There is no doubt that if this creek was taken in hand by a few practical miners, with some capital, it would yield big returns. With a comparatively small amount of blasting a bed-rock flume could be run up the bed of the creek, and thus strip the bed-rock of its golden treasures.

"A large number of quartz veins can be seen cropping out along the shores of Seton and Anderson Lakes. A sample taken from a vein on Anderson Lake, for Mr. Pettingell, contained some chalcopryrite, carrying a little silver. A large vein of quartz, containing argentiferous galena, was discovered about ten miles from the north end of Anderson Lake, by Mr. Jensen, last summer. The galena contains about 140 ozs. in silver and an ounce of gold per ton. Some specimens of quartz, with gray copper, rich in silver, have been obtained on Bridge river, also a nugget of native copper. A large vein of native arsenic occurs between Bridge and Fraser rivers.

"From what I can learn, the Bridge river country is a good field for prospectors, as it is well mineralized and comparatively unexplored.

"Illecillewaet Mines.

"A very large number of claims have been taken up in the neighbourhood of Illecillewaet, which indicate numerous outcroppings of mineral veins.

"The Lanark mine is the most prominent one at present, having opened up a large body of galena and decomposed ore (carbonates), rich in silver. Four hundred tons of ore have been shipped from the mine during the years 1887 and 1888, bringing, in San Francisco, about \$65 per ton. The Lanark mine is owned by the Selkirk Mining and Smelting Company, They are also interested in a number of other claims in the neighbourhood. Mr. Thomas Earle is president, and Mr Geo. A. Sargison secretary, of the company. The company are running in a tunnel this winter, on the four hundred-foot level, and expect to reach the ore body by spring, when it is the intention of the company to build a tramway to transport the ore to the railway, thereby reducing the cost to a minimum, the expense of packing the ore down the mountain side on mules' backs being very heavy. The average of a large number of assays of

galena taken from this mine is about 70 oz. in silver. Some samples have gone as high as 120 oz. of silver per ton.

"The ore formation of the veins in the neighbourhood of Illecillewaet consist principally of galena and oxidized ore, containing more or less gray copper, chalcopyrite, pyrite, and blende, in quartz and calcite.

"The veins, as a rule, run parallel to the strike of the country rock of the district, which consists of calcareous slates and limestone. The veins may therefore be regarded as 'segregated veins,' or, as the miners call them, 'blanket lodes.'

"It was at one time thought that segregated veins were not to be trusted, but some of the most productive mines in the world have been segregated veins. The only fault that can be found against them is that they are more liable to pinch out than true fissure veins, when occurring in limestone.

"I am informed that the 'Jumbo,' belonging to Messrs. Corbin, Kennedy & Co., cuts across the stratification of the country. It is well defined, and a very promising ledge, consisting of quartz containing galena and pyrite, and will concentrate about twenty to one. An assay of the concentrates went 316 oz. in silver.

"Some very fine argentiferous gray copper ore (freibergite) was taken out of the Isabella mine last year, samples of this mineral having assayed as high as 2,600 oz. in silver per ton. Argentiferous galena will no doubt be the principal output of the Illecillewaet mines.

"Most of the mines will require a concentrating plant, as the galena, although occurring in large masses, is more or less disseminated through the quartz and calcareous gangue. The average of a large number of assays of galena from this locality is 66½ oz. in silver, the lowest being 32 oz., and the highest 120 oz. silver, per ton.

"I have prepared a tabulated list of the various minerals, which have been found in different parts of the Province, that have authentically come under my notice. I would be pleased to receive a sample of any mineral not included in this list, giving locality, etc., for future additions.

"Every country has its individuality in the way of characteristic minerals, with which a prospector should endeavour to become familiar, as it will be of service in his explorations and estimation of the probable value of any vein he may discover. I trust the following list of minerals, and notes on gold and silver ores, may be useful in that direction, and answer as a commencement towards a systematic arrangement of definite information on the minerals of the Province.

List of economic minerals found in the Province.

"IRON ORES.

"*Magnetite.*

"Very abundant; found in large deposits on Texada Island; also in considerable quantity at Sooke, Kamloops Lake, Nicomin, etc. Occurs, peculiarly intermingled with pyrite, at Burrard Inlet and Skeena River.

"*Hematite.*

"Not yet found in any large quantity; found in association with magnetite at Sooke and Texada Island. A small body of red ochre occurs at Texada Island. Small quantities of micaceous variety found at Nicola, Toad Mountain, and Burrard Inlet. Large nodules of clay iron stone occur with the coal beds of Queen Charlotte and Vancouver Islands.

"*Pyrite (Iron Pyrites).*

"Very abundant. Found everywhere throughout the Province, carrying more or less gold. Auriferous pyrite localities—Rock Creek, Cariboo, Big Slide (near Clinton), Kootenay.

"*Marcasite (White Iron Pyrites).*

"Occasionally met with.

"Pyrrhotite (Magnetic Pyrites).

"Abundant. Localities—Illecillewaet, Big Slide, Salt Spring Island, Westminster District.

"Arsenopyrite (Mispickel).

"Abundant. Frequently found in gold-bearing quartz. Localities—Cayoosh Creek Kootenay, Queen Charlotte Island.

"Menaccanite (Titaniferous Iron Ore).

"Somewhat rare. Localities—Skeena River, Texada Island.

"Siderite

Occurs in magnetic iron ore, Texada Island.

"COPPER ORES.

"Native Copper.

"Rounded pieces have been found at Omineca, Fraser, Bridge, Thompson, Similkameen, and Quesnelle Rivers, and Keithley Creek. Native copper occurs at Sooke, V. I., in small flakes, disseminated through a hornblende rock.

"Chalcopyrite (Yellow Copper).

"Very abundant. Occurs in small quantities in a great many places. Usually carries a little silver. Notable localities—Howe Sound, Texada Island, Queen Charlotte Island, Nicola, Toad Mountain (42 oz. silver), Salt Spring Island, Sooke, Barclay Sound.

"Bornite (Peacock Copper).

"Frequent occurrence. Invariably contains some silver. Localities—Toad Mountain, Howe Sound, Texada Island, Queen Charlotte Island, Jarvis Inlet, Homathco River.

"Chalcocite (Copper Glance).

"Not uncommon. Locality—Jubilee Mountain (in heavy spar), Toad Mountain.

"Tetrahedrite (Gray Copper).

"Abundant. Invariably carries silver. Localities—Illecillewaet, Kootenay, Nicola, Toad Mountain, Bridge River, Hope, Cherry Creek.

"Cuprite.

"Rare. Locality—Cassiar.

"Azurite.

"Common. Localities—Nicola, Jubilee Mountain, Illecillewaet.

"Malachite is occasionally met with in copper veins.

"ANTIMONY ORES.

"Stibnite.

"Somewhat rare. Locality—near Lytton.

"Arsenical Antimony (likely Alledonite).

"Rare. Locality—Queen Charlotte Island.

"ARSENIC ORES.

"Native Arsenic.

"Abundant. Occurs in small seams, generally in calcite. Localities—between Bridge and Fraser Rivers, Kokesailah River, Queen Charlotte Island.

"Cobalt and Nickel.

"Traces found in some of the gray copper or fahl ores. Some nickeliferous sand has been found in alluvial gold from the Fraser River.

“LEAD ORES.

“*Galena.*

“Very abundant. Occurs in both limestone and quartz, but favouring quartz. It is invariably argentiferous, carrying from 2 oz. up to 300 oz. in silver—usually from 50 to 70 oz. Notable localities—Illecillewaet, Kootenay, Nicola, Rock Creek, Similkameen, Omineca, etc.

“MANGANESE ORES.

“*Wad (Bog Manganese).*

“Somewhat rare. Locality—Nicola.

“MERCURY ORES.

“*Native Mercury.*

“Rare. Locality—Fraser River, near Olinton.

“*Cinnabar.*

“Rare. Locality—Kicking Horse, near Golden (in calcite), Fraser River (doubtful), Homathco River.

“*Arquerite.*

“Rare. Locality—Vitale Creek, Cassiar. Small quantities have been found in several other creeks. Contains about 85 % silver.

“ZINC ORES.

“*Sphalerite (Blende).*

“Very common. Found in variable quantities in nearly all silver-bearing veins, but is generally very poor in silver. Localities—Illecillewaet, Nicola, Cherry Creek, Texada Island, Kootenay, Burrard Inlet, etc.

“MISCELLANEOUS MINERALS.

“*Molybdenite.*

“Abundant. Often found in copper veins. Localities—Howe Sound, Anderson Lake, Kittimaht (N. W. Coast), Texada Island, Jarvis Inlet, Cowichan River.

“*Barite (Heavy Spar).*

“Common. Localities—Jubilee Mountain (large body containing lumps of copper glance), Nicola, Queen Charlotte Island.

“*Mica.*

“Common. Found in good-sized sheets in Horsefly country and Clearwater River.

“*Asbestos.*

“Abundant. Found in small seams in a number of places. Localities—Similkameen (good quality), Kootenay, Stuart River.

“*Platinum.*

“Abundant. Found in small particles in the Similkameen, Tranquille and Fraser Rivers; principal locality, Granite Creek, from which about 4,000 oz. of native platinum has been taken since 1885, in working for alluvial gold.

“Osmiridium and chromite are associated with the native platinum, which contains about 70 % platinum, with some rhodium, iridium, copper, and iron, and traces of palladium.

“*Bismuthinite*

Occurs in small veins of quartz on the Little Shuswap Lake.

“Chalcedony.

“Pieces of chalcedony are plentiful on the shore of Kamloops Lake and Queen Charlotte Island (sea shore).

“Celestite.

“A very good sample was found during the past year—locality not yet known.

“Native Alum.

“Small deposits have been found near Harrison and Anderson Lakes.

“GOLD AND SILVER ORES.

“It is well-known that gold is to be found in almost every stream in the Province. The reports of the Gold Commissioners contain a detailed statement of the product of the different streams in their respective districts. Gold-bearing ledges have been discovered in every mining district in the Province, the most important districts being Cariboo, Kootenay, Rock Creek, and Lillooet.

“A number of free gold quartz ledges have been discovered, but the majority contain more or less pyrite or arsenopyrite—the rock of the whole country being very heavily charged with iron sulphurets.

“Many of the so-called free gold ledges are only the ferruginous cappings (gossan) or outcroppings of metalliferous veins which have undergone decomposition or oxidation by the action of moisture and atmospheric forces, the sulphurets of iron being changed into the hydrated oxide of iron. This surface alteration of the vein does not extend below the water or drainage level of the country. In this Province it does not, as a rule, extend very deep, generally not more than ten or twelve feet.

“The Government testing mill, now in course of erection at Cariboo, will, no doubt, furnish interesting results regarding the yield of the gold-bearing ledges of Cariboo, which contain, for the most part, a large percentage of sulphurets.

“It is somewhat premature to lay down any rules or observations regarding the mineral characteristics of this Province, owing to its not being sufficiently developed, but I may state with regard to silver-bearing veins that there is a marked similarity between the ore formation in the different mining sections of the country. There is a general rule of association of the various minerals contained in metalliferous veins which is most likely due to the solubility of the minerals in the same menstruum. The association of minerals or typical ore formation, which represents the characteristic features of almost all the silver-bearing veins in the Province, consists of galena, pyrite, chalcopryrite, and blende, with more or less argentiferous gray copper in a quartz matrix. This class of vein, although not uncommon in other mineral countries, is strikingly characteristic—being found in almost every part of the Province, and which supports the theory that certain processes of formation have been common to every period in its geological record.

“Galena is the principal mineral or matrix for silver, and will no doubt be the source from which the great bulk of the silver yield of the Province will be obtained. It is usually highly argentiferous, running from 2 ozs. to 300 ozs. in silver per ton, the average throughout the Province being about 60 ozs. silver per ton. The galena, as a rule, is comparatively coarse grained, and generally in a quartz matrix. The old idea that fine-grained galena carried the most silver does not hold good respecting the galena of this country. On the contrary, the rule is reversed—the coarse-grained galena generally being the richest. The fine-grained galenas often carry some antimony—the fineness being due to the presence of that metal.

“Argentiferous tetrahedrite, commonly known amongst the miners as ‘gray copper,’ comes next to galena in importance as a silver bearing mineral, being found in nearly all the mining sections of the Province. It is invariably rich in silver, running from 400 ozs. to 3,000 ozs. in silver per ton. In the Nicola District it averages about 400 ozs. in silver. In the Kootenay, including Illecillewaet District, it averages about 1,000 ozs. in silver. It occurs in small specks disseminated throughout the quartz, also in lumps enclosed in galena, and in ribbon veins. Owing to its scattered or spotty nature in the gangue of the vein, and its intermittent occurrence, the miners have not much confidence in it as a good indication, but I am inclined to think they are passing judgment too hastily. In the Joshua mine, at Nicola, it is the principal source of silver at a depth of nearly three hundred feet—the surface ore being principally galena.

"Gray copper ore occasionally graduates into a polybasite, which may, for the sake of distinction, be better termed argentiferous fahl ore in some of the mines, a good sample of which was obtained from the Hall Bros. mine at Toad Mountain, containing copper, antimony, arsenic, iron, zinc, silver, sulphur and traces of cobalt and nickel.

"Peacock copper ore (erubescite) occurs frequently throughout the Province, carrying from 30 ozs. to 50 ozs. in silver per ton. A sample from Toad Mountain assayed nearly 500 ozs. in silver, but I think this high assay was due to fine threads of very rich copper silver glance contained in it.

"Small ribbons of copper silver glance, occurring at Toad Mountain, go as high as 5,000 ozs. in silver. Copper glance occurs in barite (heavy spar) at Jubilee Mountain and Queen Charlotte Island, but it is rather poor in silver, carrying only about 10 ozs. in silver. Yellow copper (chalcopyrite) usually carries a little silver (from 5 to 40 ozs.)

"A sample of specular iron from Illecillewaet District went 90 ozs. in silver. Native wire silver has been reported as occurring at the 'Krao' mine, Kootenay Lake. Small nuggets of native silver have been found in the following creeks:—Similkameen, Forty-Mile, Granite, Wild Horse, Mission, and North Fork Stickeen. Considerable Arquerite has been obtained in Vitalle Creek, Cassiar.

"In conclusion, I take this opportunity to state that the samples sent from different parts of the Province for assay are invariably too small to give satisfactory returns. High assays obtained from 'pet samples' are altogether misleading, and are calculated to destroy confidence in assaying as a means of ascertaining the richness of a vein. For a surface prospect an assay is just as satisfactory as a milling test, since a proper assay for gold and silver gives remarkably accurate results—the whole difficulty lying in improper or careless sampling. I would suggest that a stipulation be made, requiring not less than one pound samples for assay.

"I have, &c.,

"Hon. John Robson,
"Minister of Mines."

(Signed) "WILLIAM J. SUTTON."

COAL.

The following table shows the output of each year from 1874 to 1888, inclusive:—

Year.	No. o Tons.
1874.....	81,000
1875.....	110,000
1876.....	139,000
1877.....	154,000
1878.....	171,000
1879.....	241,000
1880.....	268,000
1881.....	228,000
1882.....	282,000
1883.....	213,000
1884.....	394,070
1885.....	365,000
1886.....	326,636
1887.....	413,360
1888.....	489,300 /

REPORT OF THE INSPECTOR OF MINES.

“ NANAIMO, B. C.

“ 4th February, 1889.

“ SIR,—I have the honour, in compliance with the provisions of the ‘Coal Mines Regulation Act, 1877,’ to respectfully submit my annual report, as Inspector of Mines, for the year 1888, for your consideration.

“ During the year 1888, coal mining has been carried on in the following Collieries:—

“ Nanaimo Colliery, of the Vancouver Coal Mining and Land Company, Limited.

“ Wellington Colliery, belonging to Messrs. Robert Dunsmuir & Sons.

“ East Wellington Colliery of the East Wellington Coal Co.

“ Union Colliery, the property of the Union Colliery Co.

“ The output of coal for the year ending 31st December, 1888, amounted to 489,301 tons, as follows:—

Nanaimo Colliery	output.....	258,817 tons.
Wellington Colliery	”	198,392 ”
East Wellington Colliery	”	30,092 ”
Union Colliery	”	2,000 ”
Total output in the year 1888.....		489,301 ”
Add coal on hand 1st January, 1888.....		2,899 ”
Total coal for disposal in 1888.....		492,200 ”

"The coal exported in 1888, amounted to 365,714 tons, viz. :—

Nanaimo Colliery export.....	215,252 tons.
Wellington Colliery	124,649 "
East Wellington Colliery	25,813 "
Total exported in 1888	365,714 "
Add home consumption in 1888.....	115,953 "
On hand 1st January, 1889	10,533 "
	492,200 "

"The exports were chiefly to ports in California, viz. :—San Francisco, Wilmington, and San Diego; and sundry cargoes were shipped to Seattle, (W. T.); Portland, Oregon; Alaska; Petropavloski; Hawaiian Islands; China and Japan (per C. P. R. steamers). Coal has also been supplied to H. M. Navy, and U. S. War and Revenue vessels, and also to ocean mail steamers and other vessels calling for fuel.

"In the year 1888, there was an encouraging increase in both output and exports over the previous years' results, as exhibited by the following table, viz. :—

	Output.	Export.
1884.....	394,070 tons.....	306,478 tons.
1885.....	365,596	237,797
1886.....	326,636	249,205
1887.....	413,360	334,839
1888.....	489,300	365,714

"The coal denoted as 'home consumption,' includes coal used in the collieries, and is returned as 115,953 tons as compared with 99,215 tons returned under that head in 1887.

"The following statement shows the sources from which the State of California, our principal market, is supplied :—

	1884. Tons.	1885. Tons.	1886. Tons.	1887. Tons.	1888. Tons.
British Columbia, including 64,395 tons to Wilmington and San Diego in 1887, and 48,932 tons in 1888.....	291,546	224,298	253,819	324,949	345,681*
Australia.....	190,497	206,751	287,293	155,649	271,612
England and Wales.....	108,808	170,656	160,869	91,248	126,167
Scotland.....	21,143	20,228	19,795	12,615	10,680
Eastern States (Anthracite, &c.).....	38,124	29,334	19,517	24,102	30,118
Seattle.....	125,000	75,112	57,552	199,079	568,948†
Carbon Hill.....	122,060	157,241	124,527	179,526	
Green River, Cedar River, &c.....	77,485	71,615	90,664	121,791	
Renton, Newport and South Prairie.....	60,413	67,604	73,654	69,314	
Coos Bay.....					
Japan.....					47,015
					13,808
	1,035,076	1,023,339	1,087,690	1,178,273	1,414,029

* These totals represent the quantity of coal *actually received* in San Francisco and other Ports in California, during the respective years.

† Total from Puget Sound Collieries in 1888.

"It must be noted that the above statement, excepting in the case of British Columbia, does not state the quantity of coal received in Wilmington and San Diego in 1887 or 1888. For the year 1887 the coal entered at these two ports was estimated at from 175,000 to 200,000 tons, which added to the total of 1,178,273 tons in the statement, showed the State of California to be a customer for coal in 1887 to the amount of upwards of 1,300,000 tons. Now, in 1888, it is said by a recognized commercial authority, that quite as much as 200,000 tons were received in Wilmington and San Diego direct from the mines, by the sea; and this amount, less the receipts at these two ports from this Province—say 48,932 tons—added to 1,414,029 tons, the total for 1888 in the above statement, makes 1,565,097 tons as the amount of coal absorbed by California in 1888 for her manufacturing, domestic and steamship purposes, or the remarkable increase of 265,097 tons above the consumption in that State in the year

1887, without taking into calculation sundry receipts of coal at San Francisco from Utah, Colorado and Wyoming Territories during the last half of the year.

"The increased demand for coal and the satisfactory price which our excellent product has realized in the market during the year 1888, have greatly enhanced the prosperity of the coal industry of Nanaimo, Wellington, and Comox, where, as will be seen by the returns appended to this report, upwards of 2,000 men are constantly working in and about the coal mines, a large number of whom have families and homes of their own, and are, to all appearances, contented, prosperous and permanent settlers in the Province.

"NANAIMO COLLIERY.

"The coal in this colliery, as in all other collieries in this district, has been in good demand during the past year.

"No. 1 PIT, ESPLANADE, IN NANAIMO.

"This mine, forming part of the Nanaimo Colliery, belongs to the Vancouver Coal Mining and Land Company, Limited. The working places in the mine have not been as extensive or prosperous of late as may be wished, yet there has been a considerable quantity of coal taken out, some of it from the No. 1 North Level; but the greater portion came from the part which is known as the No. 3 North Level. In the No. 1 Level a drift has been made for a long distance without any coal, until during the last few months, when coal was got into, which is good but not as thick as the seam generally is, although it is improving in thickness. In the No. 3 North Level there appears to be a good prospect for coal on this, the year on which we have now entered, having also passed through a fault.

"Ventilation in this pit is very good. There is little or no gas now found in the working places of the mine. The motive power of this ventilation is a Murphy's fan. The Company have a duplicate of the fan which was destroyed by fire on that memorable explosion, but it has not yet been erected. This mine is free from dust, and there is a regular system of pipes by which water may be led to any place where it may be needed.

"No. 3 PIT (CHASE RIVER).

"This shaft has been mentioned in a previous report. It is situated near the mouth of Chase River, about two and a half miles south of Nanaimo, and belongs to the Nanaimo Colliery of the Vancouver Coal Mining and Land Company, Limited. The coal in this mine has been and is at present of very good quality, and hard, although varying in thickness from three to nine feet. All the working is by a slope, starting from near to the bottom of the shaft and going to the dip. The system of working is that of the pillar and stall. You will see by my former report that the Company were sinking a second shaft, which was to be in connection with this mine. That second shaft was put down and connected with No. 3 Pit early in the year, and now this second shaft is the upcast or return way for the air to the surface.

"Ventilation is good; motive power, a fan on what is now called the upcast shaft. Since this fan has been working I generally found 38,000 cubic feet of air passing per minute, for the use of forty-five men and seven mules, and well conducted into the face with brattice or otherwise. This mine has been free from gas since it started, and also free from dust. Everything is kept in good order. In this mine, as well as in all the mines belonging to this Company, the workmen send a deputation of men chosen from among themselves to examine the mine, under section 46, General Rule 31, of the 'Coal Mines Regulation Act, 1877.' The finding of the condition of the mine is recorded in a book kept for that purpose, so that all may see it and know the condition of the workings.

"SOUTH FIELD MINES, NOS. 1 AND 2.

"These mines, which used to be separate mines, may now be classed as one, as they are both connected and working into each other. During the past few months some coal has been taken out of what was known as the No. 1 mine, from along the outcrop, but the great bulk

of coal came out of the No. 2 mine. Both of these mines are worked by way of slope from the surface. No. 2 is down about 700 yards, with an easy grade until near the face, where the pitch of the coal is greater. This has been, and is now, a valuable mine, and for months back the company have been getting out of it over 600 tons of coal per day. At present they are working four levels—two to the east and two to the west side of the slope. The coal keeps good, although some of it is not very thick.

“Ventilation is excellent,—motive power, a large fan on the top of the upcast shaft. This mine is ventilated on the separate split system. There are three divisions—one to the west and two on the east side. The upper part of the east side is aired by No. 1 mine as the intake; the west and the lower level on the east side is aired by the No. 2 slope, and, after leaving the No. 2 slope, it ascends till it comes out of the fan. This mine gives off some gas, but, with ordinary care, there is not any danger. The current of air, when I tested it in December, was 52,000 cubic feet per minute for the use of 140 men. This mine is free from dust, the floor being wet throughout.

“The principal output of coal by the Vancouver Coal Company during the past year has been from this mine, with workings to the east and west sides of the slope.

“A selected deputation of workmen (under Section 46, General Rule 31) examines every part of the mine once a month. This puts them in a position to know the condition of the workings of the mine, and to judge as to its safety for themselves. The results of such examinations are recorded in a book kept for that purpose, and left open for any one to inspect, so that it is useful for both manager and workmen.

“No. 4, SOUTH FIELD MINE.

“This is a new slope, forming part of the Nanaimo Colliery. This slope starts at the surface, about half a mile in a southerly direction from No. 3 pit, and on the side of the railway of the No. 1 and 2 mines, which are about a mile and a half south of this No. 4 slope. This slope is now down about 300 yards, with a counter slope as a return airway. The coal has been very thin for the most of the distance, and in some places there was none. From the west side of the slope a level has been started, and is now drifted in about 40 yards into good saleable coal, and as the workings of No. 3 pit, coming towards this level, are in good hard coal—8 feet thick in some places—it may reasonably be expected that the coal reached in this level is a continuation of the same coal, and they are looking for the slope to get into it soon.

“WELLINGTON COLLIERY.

“This colliery belongs to Messrs. Robert Dunsmuir & Sons, and is situated in Mountain and Wellington Districts.

“WELLINGTON MINE AND ADIT LEVEL.

“Work was done in this mine for a short time only, and in the adit at the beginning of the past year. Both of those places are stopped for the present, but at some future time there may be some coal extracted along the outcrop.

“No. 3 PIT, WELLINGTON COLLIERY.

“This is the shaft worked in the valley of the Millstream River, with the fan-shaft as upcast, and is the only mine worked in this valley by Messrs. Robert Dunsmuir & Sons. As I have before mentioned in previous reports, all the workings of this mine are by way of a slope starting about 70 yards south from the bottom of the shaft. The coal is worked here on the pillar and stall system, which is the general plan of working in this colliery—large pillars (of coal) are left, being nearly two-thirds of the bulk of the coal. The coal in this mine has been and is very good in quality and hard, as is the usual character of Wellington coal. The mines have been worked steadily most of the year, there not having been anything out of the regular course here to cause any delay. The coal is worked from six feet to eleven feet high, hard and good, leaving a coal roof overhead.

"No. 5 PIT, WELLINGTON COLLIERY.

"This is the pit belonging to Messrs. Robert Dunsmuir & Sons, to which there is a branch line from the Esquimalt and Nanaimo Railway, so that the railway company's locomotives go under the shute at the pit for their own supply of coal. From this pit also trains of cars loaded with coal are dispatched to Victoria.

"In this mine all things went on as usual, until the 24th January of last year, when the workmen on the surface became suddenly aware that a terrible explosion had taken place in the mine, where 168 men were then engaged below. The working of the hoisting cage was stopped by the force of the explosion, and nothing was heard from any person below for quite a time after. The covering of the fan-shaft was also broken. This was, however, with all speed temporarily repaired and the fan kept running to its full speed, so that where it was possible, pure air might be got in to the workings, until such time as help could go down from the top.

"After a communication was got with those below, it was encouraging to know that there were a great many men in the bottom waiting to be taken up, and this was done after an unavoidable delay of nearly three hours. As the men came up enquiry was made as to where the explosion had taken place, but no one could tell. There were men brought up that came from the slope and the west side, but none of the men from the east side came up, and nothing was known about them. As none of the men that worked in the east level were sent up, it was certain that that was the place or division of the mine in which the explosion had taken place. This conclusion, afterwards, proved too true, as after all the men that were in bottom of the shaft were got out to the number of 91 (ninety-one), there were yet 31 (thirty-one) white men and 46 Chinese missing, and from the condition of the ventilation of the mine it was plain that it was not possible for any of the men in the east side or level to be got out alive, but at the same time there was no want of men to go down to see if they could get some out; not one, however, of those that were in the east level was left alive to tell the tale. There was only one injured got out, and he was near the bottom of the shaft.

"As it was impossible to get far into the workings, owing to the after damp being so strong, air had to be taken in as we went along, and the bodies got out as they could be got at; so that by noon of 26th January, the bodies of all the white men and of 37 Chinese were got out, leaving yet 9 Chinese to be accounted for, and those were got out from time to time as the mine was cleaned up, when on the 9th day of May the last body was got out, making 77 deaths; and, in my opinion, it was owing to their being able to keep the fan running, which kept the after-damp from the downcast shaft, that the 91 men who were got out alive were saved.

"As I have observed, previous to the explosion everything in and about the mine was in good order, nothing seemed lacking. The ventilation was very good; at the time when I was down, previous to the explosion, there were 86,610 cubic feet of air passing in the mine for 175 men and 9 mules; and of this volume of air, 45,400 cubic feet per minute were going in the east side, which includes the slope.

"This mine, before the explosion, was the best ventilated mine in the district, the air at no place having far to travel until it was on the return for the fan-shaft, and the airway being very large.

"After the public inquiry that has been made into that terrible accident, conducted by Mr. Taylor for the Crown, and by Mr. Pooley for Messrs. Dunsmuir & Sons, the evidence and result of which was published at the time, I do not think I can do better than refer you to the record of the inquisition filed in the Department of the Honourable Attorney-General, in case it should be desired to obtain further details of the lamentable occurrence.

"In this No. 5 Pit, a start was again made about the middle of February to take out coal on the west side, and at the same time work was done towards placing the east level in order, so that those wishing to work might have a chance.

"I have been through all the works in this mine, frequently, since the explosion, both with a safety lamp and without one, and since the airways were put in proper order (after the explosion) I have never seen gas burn in the safety lamp.

"Ventilation is good, and well conducted into the face by a brattice or otherwise, and well around the caves where pillars have been taken out. When I went down, on the 22nd December, I found 106,000 cubic feet of air per minute passing, for the use of 170 men and 13 mules. This mine is free from dust, and no expense is spared to keep it so. They have an adequate system of water works, or pipes, to take water to any place in the mine where

"Ventilation, good. When I was down in December I found, on testing it, that there were 35,000 cubic feet of air passing per minute, besides a large quantity of air which came in from the No. 4 Pit at different places that it would be difficult to get measured; the above-mentioned air being for the use of 77 men and 15 mules. This mine is ventilated on the separate split system, one on the south side and two main divisions to the north side of the slope; the stall furthest away in each division getting the air first, then returning by way of the working places and old works to the upcast shaft. The motive power is a large fan with an engine of considerable power on each side of the fan. This being the first ventilating fan that was erected in the district, has been almost constantly worked during the past eight years. Messrs. Robert Dunsmuir & Sons were so satisfied with the result of the working of this fan that in opening all their other mines they made preparations for the use of ventilating fans. There is now very little gas in this mine. Everything in and about the mine is kept in good order, and nothing is spared that may be wanted for the successful working of a mine. There, as in the other extensive mines of the Wellington Colliery, the workmen send a deputation from those employed in the mine every month to examine every part of the mine, they being furnished with all things that may be necessary to make a complete examination of the workings (see section 46, General Rule 31). This examination places those employed in the mine in a position to know the condition of the mine, as to its safety, etc. The results of the examinations are recorded in a book, which is open for reference by any one wishing to see it.

"No. 4 PIT, WELLINGTON COLLIERY.

"This pit is put down on the top of a high bluff which overlooks the Millstream Valley. Mining here is carried on very extensively by Messrs. Dunsmuir & Sons. Here, as in No. 3 Pit, they have been working steadily during the greater part of the year, excepting when they had to lay off for a day or two for necessary repairs and to render assistance during the casualty in No. 5 Pit.

"The coal is worked from what are known as the north and south side workings. All the workings of the mine are on the pillar and stall principle, except a small place on the south side where they are now opening out to the long-wall system. The coal in this mine is very good, but not so difficult to get out on the north as on the south side. Although the coal has been good, yet they have had considerable trouble with faults of one kind and another.

"This mine is connected in different places with the workings of the No. 3 Pit. If required those places could be taken advantage of at any time; besides these connections they have their fan-shaft by which the men could be taken out if emergency required it.

"Ventilation is good,—motive, a large fan on the top of the upcast shaft, kept constantly running by a powerful steam engine. This mine is also ventilated on the separate split system; the two main divisions are at the bottom of the shaft, to the north and south sides, and in the north side it is again divided further in in the workings. The workings of this mine are spread out over a great area, but the air is kept well under the control of the overman, so that it cannot steal away to one district, leaving the other wanting. All the different divisions are well ventilated, so that after the air has gone round its several districts, it all gets into one body again near the bottom of the upcast shaft. When I was down, in December, I found the current of air travelling on the return to be 1,200 feet per minute, passing 92,400 cubic feet of air, which was for the use of 180 men and 14 mules. This mine gives off some gas, particularly where the pillars are taken out; it comes from the roof, but it is well looked after and gets no chance to collect. The fireman seldom finds any in the stalls. Everything is kept in good order, no expense being spared to make the works safe and keep the mine in good condition and working order. This mine is not dusty, as there is a regular system of pipes put in the workings wherever it is thought that water may be required for the laying of dust, as well as to provide a means of extinguishing fire in case a fire should break out in the workings. They can have water at most of the places in a short time.

"In addition to the fireman and shot-lighters (who are travelling through the mine all the day) the miners taking out pillars are also furnished with safety lamps, so that at any time when, or, if a cave should take place (fall from the roof) they, in the absence of either the fireman or shot-lighter, may make an examination with the safety lamp to ascertain if the place is safe or otherwise. In this mine also the mine is examined monthly by a deputation of the workmen in the manner before described.

it may be required. The mains are along the levels and main roads, with small pipes to the stalls. Sprays of water are blown off here and there throughout the mine, and the air carries the moisture along, so that everywhere it is not only damp but wet. The water is supplied from a large reservoir on the surface, therefore the pressure is the depth of the shaft, 260 feet.

"This mine is examined monthly by a deputation from the miners employed here, under the provisions of the section and rule to which I have drawn attention, the result being posted up on the pit head, as well as entered in a record book, so that all may see it.

"No. 6 SINKING SHAFT, WELLINGTON COLLIERY.

"Messrs. Robert Dunsmuir & Sons have started to put down another shaft, to be known as No. 6 Pit. This shaft is fully 900 yards east of No. 4 Pit, and is not far from the No. 2 East Wellington Pit. The No. 6 Pit is now down 170 feet, and will have to go nearly 200 feet further before the coal is reached; and by that time the workings of No. 4 Pit will not be far away from them.

"They have already extended their railway system to the pit, so after they get to the coal there will be no delay in waiting for the cars to take away the coal.

"As the coal is good in No. 4, and in East Wellington Pit, it is almost sure to be good in No. 6 Pit.

"EAST WELLINGTON COLLIERY.

"This colliery is described in a previous report as the property of R. D. Chandler, Esq., of San Francisco, but it is now known as the mine of the East Wellington Coal Company. The mine has been worked steadily during the greater part of the year, although not taking out a very large quantity of coal.

"At the time of my last report the Company were sinking their second and what is called their No. 2 Shaft. The two shafts are fully half a mile apart in a direct course; the places are connected underground, and in the winding of the workings there are 1,400 yards of a level to connect.

"All the workings in this colliery are on what is known as the long wall system, which is very successfully carried out, both for safety and in the matter of leaving no coal behind to be lost.

"In the No. 1 Pit the level going east from the shaft was stopped on a fault, and it has been standing for a long time. About three months ago they resumed work here, and after drifting a few yards struck good coal, and they are now into it for quite a distance, keeping very good and thick, with a good roof.

"The coal in the west side continues to keep good and hard, although not so thick as the east side, but here the roof is very strong.

"In the No. 2 Pit of the East Wellington Colliery the coal is very good and hard. After the Company got their shaft down the appearance of the coal gave them great encouragement, so they spared no expense in fixing up appliances on top for economizing labour in the handling of the coal. There are two large shutes for ordinary use, besides large bunkers for storage of coal in case there should be no ships at their loading wharf ready to receive it, the bunkers being high enough above their railway to admit of the coal running into the cars without handling. The coal in this mine is very hard and of its usual good quality. The roof is, however, not as strong as in the No. 1 Pit.

"As I have mentioned, this mine is worked on the long wall system. After the shaft was got down and everything ready on the top, they then began to take out the coal, commencing at the shaft and taking all the coal out, putting wood cogs to support the roof; so that, with the exception of the roadways, it was well filled, and has not settled far. Now that they have got the coal worked out for a considerable distance all round, the further they get away, the greater will be the spread of the faces (or stalls), the shaft being the centre. Ventilation is good; motive power, a furnace at No. 1 Pit, one division of which is upcast for both places, the other division being the downcast for part of the workings of the No. 1 Pit. As you will have seen, the workings being long wall, the air comes in at one end of each division, sweeps along the face and out at the other end; and as the goaf behind is well filled, there is not

much chance for gas to collect. As, however, the workmen have to blast rock from the roof in the roadway to give them sufficient height, and in so doing sometimes tear up a few inches, leaving what is by miners called a 'pot-hole,' in which, as the roof settles, gas may be found, precaution is taken, and if, on searching for it, any gas is found, a curtain is put up directly, leaving a space on the top for air to go over, and by so doing the gas is carried away.

"These are now the only mines of any extent in which the workmen do not send deputations to examine the mines, under section 46, General Rule 31. The Manager (Mr. Chandler) has asked them on different occasions to examine his mines, and stated that he would supply them with anything they required for the purpose, and would also send a man along with them who was acquainted with the workings, so that no place would be missed. The response of the miners was that they were satisfied with the mines.

"While the East Wellington Company are adopting all necessary measures for the proper working of their mines and the safety of the workmen, as you will have noticed from my previous remarks, the Company are at the same time energetically proving their property, with excellent prospects for the present year (1889), both in the No. 1 and No. 2 Pits. The Company are generally admitted to be deserving of success, and it is hoped they are now about to realize the same, after having passed through so many difficulties as they have had to encounter since they began operations.

"UNION COLLIERY (COMOX).

"This is a new colliery in course of development, in the Comox District, by the Union Colliery Company.

"The District of Comox, for many years back, has been supposed to be rich in coal, but there was comparatively little done to prove it until the Union Colliery Company commenced operations last spring, and started to open out the coal measures there, with the view of establishing a successful colliery. They found the coal, and in the outcrop they started levels in two places, with airways going parallel to and only a few yards from them. Those levels were drifted in for about 500 feet, and for nearly all that distance the coal is good and very hard, and will average fully 3 feet in thickness, but at this point the levels were stopped until the railway could be completed. The mining operations were, however, by no means stopped, as attention was turned to another place about 800 yards from the above-mentioned levels, where they set about exploring for a lower seam of coal which was known to be below them, and this seam they succeeded in finding. In the first place they sank a shaft and ran a slope from the bottom of the shaft for a long distance to the dip, the coal improving as they went down. On seeing how the coal was, as to its quality, regularity, and pitch, they then started to run a slope in from the surface, and, after being much troubled with water and slum, they got to the coal. This slope is now a long distance down—a thousand feet—with good coal the most of the way. The coal is very hard, and of good quality, and will stand all necessary handling and shipping without much breakage or waste. As to quality and nature, this seems to be the same as Wellington coal, and now, from the successful result of the explorations, and the extensive character of the works in course of construction, it may be taken as a settled fact that there is going to be a large and very extensive colliery in this locality. During the work of prospecting for and finding the coal, those who were engaged in the department of the railway and other works required for the transport of the coal to the seaboard, and its shipment there, were not by any means idle. The engineers surveyed and located the line for a railway from the mines to a shipping terminus, and as soon as that was done hundreds of men were employed and the work was pushed on with all haste. There is one very large bridge with a Howe truss over the Trent River, on the line of the railway, which, from the shipping wharves to the mines, is eleven miles in length. The rails are laid to the standard gauge for the full distance. At the harbour, which bears the appropriate name of Union Bay, there are very commodious wharves. I think I will be quite safe in saying that they are the largest wharves in this Province. Four of the longest ships could lie at the principal shipping wharf, and all be loading coal at any stage of the tide. At the other large wharf freight can be discharged and loaded directly on the cars; at the same time coal may be loaded into vessels there if required.

"All the work of prospecting, railroad construction, and wharf-building has been done, since the commencement made in last spring, by the well-directed energy of a numerous body of workmen, involving the expenditure of a large amount of capital, which has greatly helped on the District of Comox, and has and will doubtless prove a benefit to the country in general.

"It is hoped that the enterprising proprietors will have good returns as the result of their gigantic enterprise. As yet, they have not shipped any coal, but I expect this colliery will have a large output by the end of the year.

"There is, in addition to the works mentioned, a steam saw-mill of considerable capacity erected near the mines, and situated conveniently to plenty of timber of all sizes.

" PROSPECTING.

"There has been a considerable amount of work of this nature done during the past year, not included in the works already mentioned. Amongst these by the Vancouver Coal Co. is a bore started and now at work in the bottom of No. 2 Esplanade Shaft. This bore-hole is now down 760 feet below the bottom of the shaft, or 1,370 feet from the surface. Measures are favourable for finding what is known as the Wellington seam.

"In the above-named Company's North Field, in Mountain District, three bores were put down to the Wellington Coal and several other trial shafts were put down to the rock, and now they are so far satisfied with the prospects that they have begun to put down a shaft with engine for hoisting, head gear and other appliances, and from what is known of the bore-holes the coal may be expected to be reached at 400 feet from the surface.

"The Vancouver Coal Company also commenced boring at about half a mile from Nanaimo River in their South Field.

"The same company has also done some prospecting, on their property called Harewood Estate, by sinking a shaft 70 feet to the coal. They drifted a little but the coal was not good as they appeared to have got down on a fault. It is their intention to continue the exploring here in the coming summer.

"The bore-hole mentioned in a previous report as being put down by the Vancouver Coal Company in Gabriola Island, and which was, at the time of my report, down 1,000 feet, has been continued during the most of the past year, and has now reached the depth of 1,970 feet, and has not yet reached the coal, but the core now got out shows that they are in the productive measures overlying the coal, and it is to be hoped that it will be struck soon.

"The above described exploring of the Vancouver Coal Company, and the prospecting that Messrs. Dunsmuir & Sons have been doing, may fairly be expected to yield handsome results, which will prove an encouragement to others to start.

" ACCIDENTS

"IN AND ABOUT THE COAL MINES FOR THE YEAR ENDING 31ST DECEMBER, 1888.

"On the 24th January the following persons were injured and killed by an explosion in the No. 5 Pit, Wellington Colliery:—

"Injured, a Chinaman, Bong.

"Killed.

"R. Greenwell, John McNeill, D. McDonald, John Barki, John Stewart, William Wilks, John Belloni, Frank McCoy, Charles Tillar, David Gordon, John Marshall, Richard Vincent, Ezra Godfrey, Robt. Robinson, James Morrison, Flavier Regard, William Finch, Joseph Chenat, Lance Robson, James Jones, Jacob Klinn, Elisha Davis, Leopold Regard, John Williams, Valencia Valaria, Robert Williams, John Wienkottee, John Ness, Alex. Ross, William Dowler, William Horne;

Chinaman No. 14, Bun ;	Chinaman No. 79, Fie ;
" 15, Soon ;	" 81, Dan ;
" 17, Fue ;	" 94, Saul ;
" 22, Chung ;	" 100, Sing Fom ;
" 23, Gin ;	" 16, Sing ;
" 99, Yoo ;	
R. Robinson's Chinaman, No.	34, Jow ;
E. Godfrey's "	37, Eye ;
J. McNeil's "	62, Lock ;
William Finch's "	63, Wing ;
John Stewart's "	64, Fong ;
Lance Robson's "	65, Paden ;
James Jones' "	66, Fue ;
William Wilks' "	67, Tate ;
F.-McCoy's "	68, Jim ;
Alex. Ross' "	69, Ack ;
John Marshall's "	70, Hen ;
R. Vincent's "	71, Sam Sug ;
David Gordon's "	72, Ah Len ;
R. Greenwell's "	73, Ah Kee ;
John Wienkottee's "	74, Ah Foie ;
Charles Tillar's "	75, I Yon ;
James Morrison's "	76, Yon ;
" "	78, Ton.

" February 1st—Andrew McKnight, engineer, while at work in No. 5 Pit, Wellington, fixing a column of pipes in the shaft, received a bad cut on the head by a piece of timber falling on him.

" February 16th—Samuel McKinnon, running coal in No. 3 Pit, Nanaimo Colliery, was hurt about the head by an empty car.

" March 12th—John Wynne, miner in No. 4 Pit, Wellington, was seriously injured by a fall of coal, while at work in his stall.

" March 30th—H. Warrell, mule-driver in South Field Mine, had his leg broken by being jammed by an empty car.

" April 6th—William Pocklington, miner in South Field Mine, had his collar-bone broken by a piece of coal falling on him while at work in his stall.

" May 1st—David Carruthers, miner, had his foot very slightly injured by a box in No. 4 Pit, Wellington.

" June 13th—Charles Weir, miner in South Field Mine, was injured about the knee by coal thrown from a shot.

" June 13th—Daniel Thompson, miner, was killed by a fall of coal while at work in his stall in South Field Mine.

" July 5th—Charles Rowe, runner of coal in South Field Mine, was hurt about the head by being jammed by a loaded car.

" July 26th—Richard Gowland, miner, was hurt about the back by a fall of coal while at work in South Field Mine.

" August 18th—Adam Ross, overman of No. 3 Pit, Wellington, was injured on the leg by a piece of rock falling on him while taking down brattice.

" August 29th—John G. Jones, miner working in No. 3 Pit, Nanaimo Colliery, had his leg hurt by a fall of roof while at work in his stall.

" October 1st—Jos. Peckurini, miner in No. 4 Pit, Wellington, was burned about head and face by a premature explosion of a shot of giant powder.

" October 3rd—Henry Smith, miner, had his thigh broken by a fall of rock from the roof, while at work in No. 3 Pit, Nanaimo Colliery.

" October 4th—Thomas Smith, miner, had his arm broken by his drilling machine falling on him, while at work in No. 3 Pit, Wellington.

" October 5th—Feodamard Gevin, miner, was killed by a fall of rock, while at work in the Union Colliery.

" October 9th—Thomas Goad, miner, was slightly burned about the face and hand; explosion of gas while at work in No. 4 Slope, Nanaimo Colliery.

"October 17th—George Stenhouse, miner, had his arm broken and otherwise injured by a fall of coal, while at work in No. 1 Pit, Nanaimo Colliery.

"October 24th—William McGarrigle, mule driver, had his arm broken by being jammed between a column of pipes and loaded boxes in No. 1 Pit, Nanaimo.

"October 25th—D. McLittle, miner in No. 3 Pit, Nanaimo Colliery, had his thigh broken by being jammed between the cars on the railway, while riding home.

"November 5th—Gustave Nelson, miner, working in No. 5 Pit, Wellington, was killed by a fall of rock, while at work in his place.

"November 16th—James Rae, mule-driver, had his ankle sprained by the cars in No. 4 Pit, Wellington.

"November 17th—Nat Kilpatrick, runner in No. 1 Slope, Union Colliery, was seriously injured by the cars on the above slope. He died on November 27th.

"December 18th—Edward Bullock, miner, was severely burned about hand and face by an explosion of gas in East Wellington Colliery from a small pot-hole, when going to work in the morning. Mr. Mason, miner, was very slightly burned at the same time.

"December 18th—Thomas Adams, miner in No. 5 Pit, Wellington, was slightly injured by a fall of coal, when at work in his stall.

"December 18th—G. Karlson, cager in No. 5 Pit, Wellington, was slightly injured on the hand by a small piece of coal falling down the shaft.

"December 20th—Charles Wildgross, miner, had the small bone of his leg broken by some of the roof falling on him, while at work in his stall in the No. 5 Pit, Wellington.

"December 22nd—Matz Herri, runner in No. 3 Pit, Wellington, was seriously injured by being jammed between the cars and a prop. He died on January 5th, 1889.

"I am sorry to have to make out such a numerous list of accidents, both serious and fatal. There were 25 reported as serious, yet there were some of those so slight that the injured parties were at work in a few days.

"The fatal accidents were 82 in number. On looking over the list you will see, that of the above stated accidents, 77 of those that were fatal, and one of the serious accidents, occurred on the occasion of the sadly memorable explosion of the 24th day of January, 1888.

"Eight of the casualties in the list were caused by cars in the mine, two of them being fatal. Six by falls of rock, two being fatal. Six by falls of coal, one being fatal. Three by explosion of gas, not included in the explosion of the 24th of January. Two by shots in the mine. Two in the shaft. One by a drilling machine in the mine, and one by cars on the railway.

"I have inquired into the circumstances which attended all these accidents; and in nearly all instances went and saw the place when I knew it had not been disturbed.

"Public inquest has been held whenever requisite, at which all the evidence that it was possible to obtain was taken, and as the depositions and proceedings of the inquisitions so held are filed in the Honourable Attorney-General's Office, I beg leave to refer you to the same for any further information that may be needed.

"With respect to all the accidents, I have not discovered that any blame or negligence could be attached to any one, and on looking over the list you will notice that nearly all the accidents took place when the men were at work. The workmen are presumed to be skilful enough in the particular work at which they may be employed to know when there is danger, and to judge for themselves when they are at work, subject to the directions of the overman, fireman, or any person in authority from the manager, as they have the shot-firer and firemen going in the mine at all times of the shifts.

"In view of the terrible calamity that has befallen this district during the past year, and as I have said previously, it is incumbent upon every one of us in the year upon which we have entered to be watchful, as we are surrounded by danger of all kinds, and at all times, after we have entered the mine, and I trust that the greatest care will be taken so as to prevent accidents even of the slightest kind.

"Now that the workmen in all the extensive mines in this district send a deputation chosen from themselves to examine every part of the mine (see section 46, General Rule 31) the manager furnishing them with everything they wish, so that a complete examination may be made, as well as a man to conduct them, so that no place may be missed.

"The results of these inspections, at some pits are posted up in some conspicuous place, where all can see them, as well as entered in a book kept for that purpose, so that such inspections are useful for both manager and workmen.

"I need hardly state, that I am always ready to attend to any matter that may be brought before my notice as Inspector, by any one who has a cause for complaint.

"I will now conclude my report with the hope that the year before us may be free from any serious accidents, and it may prove a prosperous year to the mining industry and the workmen in common.

"Appended hereto are the Annual Colliery Returns :—

"I have, &c.,

(Signed)

"ARCHIBALD DICK,

"Government Inspector of Mines.

"To the Hon. John Robson."

COLLIERY RETURNS.

NANAIMO COLLIERY.

Output of Coal for 12 months ending December 31st, 1888.		No. of Tons sold for home consumption.		No. of Tons sold for exportation.		No. of tons on hand on 1st January, 1888.		No. of Tons unsold, including coal in stock, Jan. 1st, 1889.	
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.
258,817	8	39,731	11	215,252	12	1,238	9	5,121	14

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
30	819	80	16	\$2.00 to \$4.00	\$1.00 @ \$1.25	\$2.00
Total hands employed 945				Miners' earnings, per day \$3 to \$4		

Name of Seams or Pits—South Field No. 2, South Field No. 3, and No. 1 Shaft.

Value of plant—\$350,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—South Field No. 2, worked by slope, seam 6 to 10 feet; South Field No. 3, worked by shaft, seam 5 to 10 feet; No. 1 Shaft, worked by shaft, seam 5 to 12 feet.

Description and length of tramway, plant, &c.—Railway to South Field, 5 miles with sidings; railway to No. 1 Shaft, 1 mile with sidings; rails are of steel, 56 lbs. per yard of standard gauge, viz.: 4 ft. 8½ in.; 8 hauling and pumping engines; 12 steam-pumps; 4 locomotives; 150 coal cars (6 tons), besides lumber and ballast cars; fitting shops for machinery repairs, with turning lathes, boring, drilling, planing, screw-cutting machines, hydraulic press, steam hammer, etc., etc.; diamond boring machinery for exploratory work (bores to 4,000 feet); wharves, 1,070 feet frontage, at which ships of the largest size can load at all stages of the tide.

SAMUEL M. ROBINS,

Superintendent, The Vancouver Coal Mining and Land Co., Limited.

WELLINGTON COLLIERIES.

Output of Coal for 12 months ending December 31st, 1888.		No. of Tons sold for home consumption.		No. of Tons sold for exportation.		No. of Tons on hand 1st January, 1888.		No. of Tons unsold including coal in stock, Jan. 1st, 1889.							
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.						
198,392	—	70,041	19	124,649	—	271	—	3,701	1						
Number of hands employed.				Wages per day.											
Boys.		Whites.		Chinese.		Indians.		Whites.		Chinese.		Indians.			
10		585		100		None.		\$2.00 to \$3.75		\$1.00 to \$1.75		—			
Total hands employed				695				Miners' earnings, per day				\$3.50 to \$4.50			

Name of Seams or Pits—Wellington.

Value of plant—\$250,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—6 to 10 feet thick ; 4 shafts ; 3 air shafts.

Description and length of tramway, plant, &c.—Eleven miles of railway ; 6 locomotives ; 210 coal waggons ; 11 stationery engines ; 9 steam-pumps ; 4 wharves for loading vessels, with bunkers.

R. DUNSMUIR & SONS.

EAST WELLINGTON COLLIERY.

Output of Coal for 12 months ending December 31st, 1888.		No. of Tons sold for home consumption.		No. of Tons sold for exportation.		No. of tons on hand 1st January, 1888.		No. of Tons unsold including coal in stock, Jan. 1st, 1889.							
Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.	Tons.	cwt.						
30,992	tons.	6,179		25,813		2,000		100							
Number of hands employed.				Wages per day.											
Boys.		Whites.		Chinese.		Indians.		Whites.		Chinese.		Indians.			
2		120		10		None.		\$2.50 to \$5.00		\$1.00 to \$1.25		—			
Total hands employed				132				Miners' earnings, per day				\$3 to \$5			

Name of Seams or Pits—East Wellington, Nos. 1 and 2 Shafts.

Value of plant—\$140,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—One seam, 2½ feet to 6 feet in thickness; 5 levels; 2 shafts.

Description and length of tramway, plant, &c.—Railroad, 4½ miles, narrow gauge; 2 locomotives; 30 4½-ton cars; 2 pair hoisting engines; 1 large donkey engine; 1 steam pile driver; 1 steam saw-mill complete, capacity 12,000 feet per day.

EAST WELLINGTON COAL CO.

UNION COLLIERY.

Output of Coal for 12 months ending December 31st, 1888.	No. of Tons sold for home consumption.	No. of Tons sold for exportation.	No. of Tons on hand 1st January, 1888.	No. of Tons unsold including coal in stock Jan. 1st, 1889.
2,000 tons.	None.	None.	None.	2,000 tons.

Number of hands employed.				Wages per day.		
Boys.	Whites.	Chinese.	Indians.	Whites.	Chinese.	Indians.
None.	90	150	None.	\$2.50 to \$4.00	\$1.00 to \$1.25	—
Total hands employed..... 240				Miners' earnings, per day \$3.50 to \$4.50		

Name of Seams or Pit—Union Colliery

Value of plant—\$25,000.

Descriptions of seams, tunnels, levels, shafts, &c., and number of same—One shaft; 1 slope; 4 levels; 3 tunnels; 1 air shaft.

Description and length of tramway, plant, &c.—Eleven miles of railway; 1 locomotive; 3 engines; 2 steam pumps; 1 steam saw-mill; 2 wharves.

JAMES DUNSMUIR,
Managing Director.

PROVINCE OF BRITISH COLUMBIA.

MINING STATISTICS FOR 1888.

Name of Bar, Gulch, Creek, or River.	No. of Companies working.	No. of Interests.	No. of Companies taking out gold.	No. of Companies prospecting.	Average number of men employed during season.		Rate of Wages.		Nature of Claims.					How Worked.					Description of Machinery.		Value of Gold per ounce.	Estimated value of yield for the year.	Total Divisions.	Total Districts.			
					Whites.	Chinese.	Whites.	Chinese.	Bar.	Creek.	Bench.	Hill.	Quartz.	Rocker.	Shuices.	Hydraulic.	Shaft.	Tunnel.	Water Wheels.	Steam Engines.							
CARIBOO.																											
Barkerville Division:																											
Williams Creek and tributaries	21		15	6	35	42	\$4.00	\$2.50		7	2	8	6			3	10	4	4	1	1	16.00	\$26,924				
Mosquito Creek and Red Gulch	3		3	3	15	2	"	"		3	2	1	3			2	5	1	1		17.25	11,000					
Hardscrabble and Sugar Creeks	4		4	1	5	9	"	"		4						4					16.80	3,000					
Lowhee Creek	4		4	1	1	13	"	"		3		1				3	1				17.00	2,000					
Groutie and Canadian Creeks	10		7	3	9	17	"	"		3	1	4				4	4				16.00	3,500					
Antler Creek	10		7	3	13	20	"	"		5	4	1				9		1			16.00	7,000					
Cunningham Creek (Upper)	5		4	1	20	9	"	"		3		2				2	3				16.50	5,500					
Conklin and Scotts Gulches	5		4	1	9	9	"	"		3		2				3	3				16 & 17	7,000					
Stevens, Beggs, and California Creeks and Gulches	3		3		11	11	"	"		3						2	1				16.00	2,300					
Desultory					30												2	1				16.00	7,000				
\$75,294																											
Lightning Creek Division:																											
Lightning Creek	7		4	3	12	25	4.00	3.00		4		1	2				1	4	2	1	1	17.00	4,000				
Van Winkle, Chisholm, Creek, and Perkins Gulch	4		4	3	10	13	"	"		5		2				4		2	1	1	17.00	3,500					
Devil's Canyon and Slough Creek	5		5	1	32	"	"				6	2				5	2				17.25	10,500					
Nelson and Burns Creeks	5		5	7	24	"	"			3		2				3		1	1		17.25	7,600					
Last Chance and Davis Creeks	3		3	2	1	12	"	"		2		3				2					17.00	2,100					
Rushon and Deadwood Creeks	3		3	1	4	6	"	"		2		1				3					17 & 17.25	2,138					
Basford, Campbell, and Peters Creeks	3		3	1	2	9	"	"		2		1				3					17.00	1,300					
Fountain Creek and Swift River	3		3		13	13	"	"		3						3					16.25	1,200					
Desultory					25																	16.25	4,000				
36,536																											
Quesnellemouth Division:																											
Fraser River (from 6 miles below to 20 miles above the town of Quesnelle)	14		14		60		2.50				2	9	3			5	1	8			16.00	39,125					
Cottonwood River	7		7		15		"			5	2	2				2					16.00	6,320					
Quesnelle River	9		9		10		"			4	5	5				6					16.00	5,402					
Hixon Creek	2		2		10		"				1	1				2					16.00	3,000					
Desultory					12		"															16.00	2,500				
56,547																											
Keithley Creek Division:																											
Keithley Creek	5	16	4	1	9	15	4.50	2.50		2		3				1	1	2	1	2	17.40	8,000					
Do. Desultory					10	10																17.40	1,000				
Snowshoe Creek	6	15	6		7	12	4.00	"		3		3				5	1				17.00	7,000					
Do. Desultory					5	5																17.00	750				
French and Snowshoe Creeks, Desultory					7	7																16.50	1,200				
Harvey Creek	2	6	2		6	6	4.00	"		2						2					17.40	3,000					
North Fork Quesnelle River	2	10	2		10	10	2.00	"		1	1					2					16.50	2,000					
Do. do. Desultory					4	4																16.50	600				
Kangaroo Creek	2	16	2	2	3	4	4.00	"		2											16.50	1,200					
Do. Desultory					15	15																16.50	3,000				
South Fork Quesnelle River	4	20	2	2	20	20				1		3				2	1	1			16.50	7,000					
Do. do. Desultory					9	9																16.50	3,400				
Cedar Creek	2	9	2		9	9				2						2					16.50	2,000					
Quesnelle River (from Forks 40 miles down; no organized companies, all desultory mining)					25	25																16.50	6,000				
Horsefly River	4		1	3	9	2	3.50	2.00				4							3		16.50	3,000					
Fraser River, 6 miles below Quesnelle down to Riskie Creek	8	6	8		64	64	\$35 per m				8					4	4				15,000						
Fraser River, desultory					20	20																2,000					
64,550																											
\$232,927																											
CASSIAR.																											
Dease Creek	15	7	15		7	27	5.00	3.50		11	2	4				11	1		3	2	15.50	13,600					
Thibert Creek	9	11	9		10	11	"	"		5		4				5	1		3	1	16.00	6,725					
McDame Creek	10	43	10		6	47	6.00	4.00		7	2	1				7	2		1		17.50	19,000					
Desultory mining																						4,000					
43,325																											
KOOTENAY.																											
Western Division																											
					100	20																10,000					
Eastern Division:																											
Porcupine and Quartz Creeks	7		1	6	29	7	3.00			27						7					18.00	1,202					
Wild Horse Creek	8		6	2	25	7	"	3.00		1		20	2			8	6		2		18.00	24,400					
Do. do. Desultory					35	35																18.00	4,000				
Perry Creek	1		1		10		"					1 (lease)									18.00	515					
Palmer's Bar	1		1		4		"			4						1					18.00	1,600					
Moyas River	1		1		3		"				3					1					18.00	700					
Weaver Creek	1		1		3		"				3	1				1					18.00	5,400					
Bull River	1		1		3		"				3					1					18.00	735					
37,612																											
LILLOOET.																											
Bridge Creek					60	400															15 to 16.50	90,160					
Carroosh Creek																											
Bars and benches of Fraser River																											
90,160																											
YALB.																											
Osoyoos Division:																											
Cherry Creek	10	49	6	4	9	40	3.00	2.00		6		1	3		10	6			1	4	14.50	7,000					
Mission Creek	4	8	4		4	8	"	"		12					4	2					16.50 to 17	2,000					
Rock Creek	6	40	6	6	40	6	"	"		2			40		2												
Okanagan Mines	19	50		10	50		"	"					50														
9,000																											
Similkameen Division:																											
Granite Creek	18	10	18	5	43	32	3.00	1.50		1	9	5	3			14				4	17.75	60,000					
Tulameen River	14	59	14		59	59	"	"		8	6		4			14				8	17.75	8,000					
Collins Gulch	2	5	2		5		"	"			2					2					17.75	1,500					
Slate Creek	3	10	3		10		"	"			3					3					17.75	2,500					
Boulder Creek	6	32	5	1	6	26	"	"			6					6					17.75	8,000					
Similkameen River	12	48	12		6	48	2.50 to 3	1.25		3	9		4			12	</										

PROVINCE OF BRITISH COLUMBIA.

TABLE

Showing the actually known and estimated yield of gold; the number of miners employed; and their average earnings per man, per year, from 1858 to 1888.

Year.	Amount actually known to have been exported by Banks, &c.	Add one-third more, estimate of gold carried away in private hands.	Total.	Number of Miners employed.	Average yearly earnings per man.
1858 (6 months)	\$ 390,265	\$ 130,088	\$ 520,353	3,000	\$ 173
1859	1,211,304	408,768	1,615,072	4,000	403
1860	1,671,410	557,133	2,228,543	4,400	506
1861	1,999,589	666,520	2,666,118	4,200	634
1862	3,184,700	1,061,566	4,246,266	4,100	517
1863			4,400	482	
1864	2,801,888	933,962	3,735,850	4,400	849
1865	2,618,404	872,801	3,491,205	4,294	813
1866	1,996,580	665,526	2,662,106	2,982	893
1867	1,860,651	620,217	2,480,868	3,044	814
1868	1,779,729	593,243	2,372,972	2,390	992
1869	1,331,234	443,744	1,774,978	2,360	749
1870	1,002,717	334,239	1,336,956	2,348	569
1871	1,349,580	449,860	1,799,440	2,450	734
1872	1,208,229	402,743	1,610,972	2,400	671
1873	979,312	326,437	1,305,749	2,300	567
1874	1,383,464	461,154	1,844,618	2,868	643
1875	1,856,173	618,726	2,474,904	2,024	1,222
1876	1,339,986	446,062	1,786,048	2,282	783
1877	1,206,136	402,045	1,608,182	1,960	820
1878	1,062,670	1-5th 212,534	1,275,204	1,888	677
1879	1,075,049	,, 215,009	1,290,058	2,124	607
1880	844,856	,, 168,971	1,013,827	1,955	518
1881	872,281	,, 174,456	1,046,737	1,898	551
1882	795,071	,, 159,014	954,085	1,738	548
1883	661,877	,, 132,375	794,252	1,965	404
1884	613,304	,, 122,861	736,165	1,858	396
1885	594,782	,, 118,956	713,738	2,902	246
1886	753,043	,, 150,608	903,651	3,147	287
1887	573,924	,, 115,735	689,709	2,342*	296
1888	513,943	,, 102,788	616,731	2,007	307
			51,599,957		

* This is exclusive of over 650 white men who, during the season of 1887, were working on or prospecting for mineral claims.