

Number of Sample.	Average Value per pound.	Value per Ton.	Average Value of the Ore in the Lode.	
1	Nil	Nil	Nil	Poor quartz, of same kind as rich specimen No. 9.
2	"	"	"	Volcanic quartz; contains no minerals of value.
3	"	"	"	Barren quartz, granular type.
4	"	"	"	Green chert. Barren cross-seam.
5	"	"	"	A barren vein of jasper-quartz.
6	"	"	"	This is said to be a barren portion of vein, but similar to the rich quartz, being parallel in part, although not so evident.
7	£1 4s. to £2	£2,688 to £4,480	Not given	Some masses are more than half gold. This is from a pocket mine, the other quartz being of no value.
8	..	£4 8s.	"	This is from the usual run of ore. Masses of quartz exceedingly rich occur in the lode.
9	Not given	Not given	"	The sample was quartz from the specimen ore.
10	..	£2 8s.	12s to £1.	No remarks.
11	Not given	Not given	Not given	Average ore going to stamps.
12 and 13	£13	£29,120	12s.	The good quartz from all parts of the lode has this character, while the barren quartz-block is like No. 3.
14	..	£100	£100	The large dark spot is native gold. Parts of this quartz are nearly as parallel as No. 12.
15	Not given	Not given	Not given	Average ore shows no free gold.
16	..	£15 to £120	"	Narrow veins of high-grade sulphurets, with some free gold in granite walls.
17	..	14s. to £2 8s.	"	The specimen shows free gold.
18	..	Not given	"	Same in formation as No. 16.

CONCENTRATION BEFORE AMALGAMATION FOR LOW-GRADE SILVER ORES.

We not only have large deposits of low-grade auriferous ores, but it will be found also, when the silver ores found at Puhipuhi come to be tested properly, that there will be a considerable quantity of low-grade ore found in that district. When the ores are decomposed, or partially decomposed, very low-grade ore, if suitable for concentration, can be made to pay for working. The following is an extract of a paper read before the American Institute of Mining Engineers, at the Colorado meeting, in June, 1889:—

"The treatment of silver-ores of too low a grade to justify either smelting or preliminary roasting, and yet not free enough to permit of raw amalgamation, has ever been a serious problem. As bearing upon it, the operations of the Combination Mining and Milling Company of Black Pine, Deer Lodge, Montana, during the past year, may not be without interest. It is not claimed that the process to be described is not susceptible of improvement, nor is any claim of originality made for it; but its use is, as yet, not very general, and it seems to offer a means of profitably working the large class of partially-decomposed argentiferous ores, which, by reason of their low-grade, demand some cheap and continuous process for their profitable treatment.

"Taking the average of the vein exposed during the past year, its width will not exceed 2ft., its greatest size being 4ft., and its smallest 6in. It is usually laminated in structure, bands of from 6in. to 18in. of decomposed ore, assaying from 20oz. to 200oz. of silver per ton, being attached to both the hanging- and foot-walls, having the middle portion of the vein consisting of quartz more or less barren. It has been noticed that where the country rock was hard and tight the vein was always pinched and impoverished, and no change for the better occurs without a concomitant change in the walls of the vein. Quantitative tests of the ore gave, on analysis, the following results:—

	Per Cent.		Per Cent.
"Silica	84·09	Zinc	0·30
Sulphur	0·19	Manganese	0·35
Iron	7·05	Antimony	0·66
Copper	1·31	Silver	0·08
Lead	1·01	Arsenic	0·05

The value of gold per ton being about 2s.

"Milling.

"The mill, as originally constructed by Messrs. Fraser and Chalmers for the Black Company, was an ordinary ten-stamp wet-crushing mill, with room left between the battery and the settling tanks for concentrating machinery should it be found necessary to add it. As illustrating the impracticability of working these ores by raw amalgamation alone, a short summary of the operations of the Black Pine Mining Company may be given.

"The mill was started on the 16th July, 1887, and the run lasted until the 14th September of the same year. During this period 1,178 tons of ore were treated, assaying 17·5oz. to the ton, containing 20·615oz. of silver. Of this amount there was recovered, in the form of bullion, 9,482·9oz., or 46 per cent. of the battery-assay. We need only note the points of difference between the Combination Company's plant and the form of mill ordinarily employed for treating silver-ores of the class usually termed 'free milling.' These are well known, because their low grade precludes their profitable treatment by the various other more efficient, but vastly more expensive, methods. The ore is stamped, passed over four Frue vanners, the light pulp that goes over their 'tails' being settled in tanks, shovelled into pans, and there amalgamated, discharged into settlers, and the resultant amalgam strained, retorted, and melted in the usual manner. An analysis for the month of October, 20 tons into 1, gave the following results:—