Following the great lode, we come to Grass Valley, in Nevada County, the richest and most prosperous quartz-mining region in California. It is computed that this district has produced from twenty-seven to thirty millions of dollars from its mines. The veins in the districts are very narrow, some of them not exceeding a foot in width, and the bed rock is mostly greenstone and slate. In this district lies the "Eureka," the richest claim in this State. The vein varies in width from three to four feet, and is encased in a hard metamorphic rock. When this vein was first worked, and down to 30 feet, the yield of quartz was from 6 to 12 dollars a ton; at 100 feet depth, it paid at the rate of 28 dollars a ton; at 200 feet, 37 dollars; and at 300 feet, 60 dollars a ton. The average yield for the past year has not been so high. There are 170 men engaged on the works, the average wages being about 3 dollars a day. The chlorinization works of the "Eureka" are the most perfect in the State, the manager, Mr. Deetkin, having been the first who introduced the process into California. The following statement was presented to me by the Secretary:—

STATEMENT OF THE "EUREKA" MINE.

Date.	No. of Tons of Quartz Crushed.	Cost of Extracting per Ton.	Cost of Crushing per Ton.	Gross Yield per Ton.	Net Yield per Ton.	Depth each Year.
1867						
1868	15,944	Extracting and Cr	ush. 12 dls. 44 c.	30 dols. 36 cents.	17 dols. 92 cents.	
1869	20,638	6 dols. 80 cents.	2 dols. 85 cents.	27 80	18 80	

It is very difficult to give any general estimate of the cost of working quartz reefs: indeed it is impossible to do so with any degree of accuracy; but I hope the statistics upon this subject, already given, may help to throw some light upon it. Extracting the quartz from the reef, and crushing it afterwards, form the two items in working the ore. The first of these items depends entirely upon local circumstances—upon the hardness of the vein, upon the hardness of the rock in which the vein is encased, the depth of working, the amount of water in the mine, and such like. The consequence is, that owing to these varying circumstances, the expense of extracting the ore, in some cases, does not exceed 2 dollars a ton, whilst in others it reaches as high as 25 dollars. As a general rule, however, when the vein is say from five to six feet wide, the expense of extracting the ore averages 5 dollars a ton.

Professor Ashburner, of the State Geological Department, reports upon twenty-eight mines, and gives the following statistics:—"In eight of the mines visited the cost of extracting the quartz is between 2 and 3 dollars. In four mines it is 3 dollars, and less than 4 per ton. In two it is 4 and less than 5 dollars; in five mines it is 5 dollars and less than 6; in two mines it is less than 2 dollars; in three it is between 7 and 14 dollars; in one mine it is 15 dollars; and in one 26 dollars." With regard to milling, however, there is more certainty. The following estimate has been given to me by a reliable authority:—

In quartz mills with water grants attached ...	1 dollar 10 cents	per 2000 lbs.
In quartz mills when water is purchased ...	1½ dollar	„ „
In steam quartz mills	2 dollars	„ „

Extraction of Gold from Tailings.

The direct method of attacking ores is by fire, but the plan used now-a-days is by amalgamation, the pan process being the most effective gold manipulator now known. This process of amalgamation is, however, too well understood to need any description at my hands. But after the pulp passes through the amalgamator it is found that certain impurities, known in the Colonies as "mundic" and in this country as "sulphurets," chill the mercury, preventing its taking hold of the small particles, and in this way a large percentage of the gold, estimated in California at from 30 to 35 per cent. of the entire production, is lost. Several plans have been tried to extract the gold from these impurities, but, except the chlorinization process, all others have failed. This process is now used throughout the country with signal success; and, briefly stated, is the application of chlorine gas to the ore previously roasted in a furnace. The sulphurets are roasted for about twenty hours in this furnace at a red-hot heat, and the tailings are then allowed to cool, when they are sprinkled with water and shovelled over. In this wet state, they are put into wooden tubs with false bottoms, perforated, which permits the chlorine gas to ascend and penetrate the entire mass. The tubs are closely covered, and chloride of gold is formed. Water is next poured in, the chloride of gold dissolved, and a solution formed, which is drawn off into glass vessels, when, by the addition of sulphate of iron, the gold is precipitated in a metallic condition as a powder. To carry out this process, two requirements are necessary:—1st, the gold must be in a metallic state; and 2nd, the chlorine gas must be freed from muriatic gas. In carrying out the process, the tailings are, as already stated, subjected to the following operations:—

1st. Roasting.
2nd. Impregnation of roasted ore with chlorine gas.
3rd. Filtration of soluble parts by cold water.
4th. Precipitation of the gold by sulphate of iron.

The roasting is the most important point in the whole operation, care being taken that the "mundic" is stirred frequently, until the roasting is finished and the "sulphurets" decomposed. If the ore is dry, it must first be sprinkled over with water; but if it consists of fine wet tailings, it must be dried in the sun or air, and then run through a sieve, otherwise it would probably be roasted into a hard lump. The ore is kept in the furnace from sixteen to twenty-four hours, and until all sulphurous smell has disappeared; charcoal being of use as a final test. If the blue flame disappears when the charcoal is thrown in, the ore is considered to be properly roasted. The roasted ore is next removed from the furnace, and several tons are spread out in a place prepared for the purpose, made of thin boiler-iron, 10 feet square and 2 feet high. Here it is moistened by a hose, until a handful forms a lump