when held, but crumbles away when loosened, in which state the chlorine acts better upon it. It is then placed in the chlorinization vats. These vats are generally made circular, being 7 feet in diameter, and capable of holding three tons of ore each. They have each of them a false bottom, perforated with auger holes, one inch above the true bottom, and it is covered with a layer of quartz, then a layer of finer quartz, and finally a layer of sand, the three layers being 5 inches in depth, and serving as a filter, upon which the roasted and moistened ore is placed. The space below the false bottom is communicated with by two holes. Into one of them passes a leaden pipe, attached also to the generator and conveying the chlorine gas from it; to the other a cock is attached for the discharge of the solution. The chlorine gas itself, conveyed in the manner just stated to the vat, is thus formed:—For every three tons of ore there is used—

30 lbs. of pulverized manganese.
30 or 40 lbs. of common salt.
75 lbs. of sulphuric acid.
45 lbs. of water.

The gas, before entering the false bottom of the vat, passes through a water purifier, entering at the bottom and ascending to the top of the water, which absorbs the muriatic gas or acid. About six hours must pass, from the time the chlorine gas enters the vat until it reaches the top of the charge, and the operation is usually permitted to continue twelve or fourteen hours. The covering of the vat is now removed, and water poured in until the charge is covered, when the cock at the bottom of the vat is opened, and the solution run off into a trough, whence it is conveyed into what is termed the precipitating tub, a circular sort of vat 4 feet in diameter, and 3 feet high. The precipitation, a solution of sulphate of iron known as "copperas," having been previously prepared by putting 60 lbs. of old wrought iron into five or six buckets of water, and 20 lbs. or 30 lbs. of sulphuric acid, is thrown into the precipitating vat in such quantities as are required. The mixture generally stands undisturbed over night, and in the morning the liquid is carefully drained off, after which the gold is introduced into a filter and then dried in an iron vessel.

The average cost of the chlorinization process, thus imperfectly described, is 15 dollars a ton.

Published Plans of Mines and Mining Machinery.

My efforts to procure plans have been unsuccessful. These plans are only prepared by private companies for the benefit of the shareholders or owners of the different mines, and are therefore unprocurable, unless specially drawn by some mining engineer; but as this is a very expensive proceeding, I do not feel justified in incurring so heavy an outlay, the doing so being outside the scope of my instructions. I have, however, obtained a plan of the Lutro Tunnel, a topographical map of the great "Cornstock lode," and Mr. Raymond's work on "The Mines of the West," which contains some profile sketches of a few of the principal mines. These, together with some other works of interest, accompany this report.

III.—*Concluding Remarks.*

Perhaps it may not be out of place, before drawing to a close this Report upon those branches of mining submitted to me, to say a word or two as to the present condition of mining throughout the State of California generally, and also in reference to one or two points I have not yet touched upon and should not care to pass over in silence. For upwards of twenty-two years, this great industry of mining has been followed in California, and subjected to the various ups and downs which, as a rule, appertain to it elsewhere. During those twenty-two years, in round numbers, the enormous sum of one billion of dollars' worth of the precious metal has been extracted from the earth, being an average of 45,000,000 of dollars annually, or, say £9,000,000 sterling. The maximum production was in the year 1853, when it averaged 65,000,000 of dollars; since when there has been a gradual decline in the returns, which in the past year (1869) amounted only to 23,000,000 of dollars. This latter sum, however, does not include any portion of the receipts from the neighbouring States and Territories, amounting to about 250,000,000 of dollars for the gold and silver produced; but the same remarks, as to the decline of production, apply to these also. The total decline in the production of gold and silver throughout the several Pacific States for the year 1869, as compared with 1868, is estimated at eight millions of dollars.

Giant Powder.—The use of giant powder, as an explosive, is now largely tried instead of the common powder: it is found more powerful and economical, especially in the removal of hard rock, the saving effected being calculated to exceed 35 per cent. It is also said to possess the additional merit of being usable with greater safety than the common powder. Mr. Cassalls, manager of the Hunter Valley Mine, has made some experiments with regard to its employment, which are referred to in Mr. Raymond's report. He found that the drilling of 105 feet of rock for the common powder cost 92 cents the foot, whilst the drilling for the giant powder costs only 51 cents a foot. The saving effected is principally in the drilling—the former explosive requiring an inch and a half hole, the latter requiring one an inch in diameter only. Two men will do 200 inches of the smaller hole required for the giant powder in the same time that it takes them to drill 84 inches of the larger-sized hole. Its action also is more powerful, and, unlike the common powder, the giant "tears to the very bottom, never seeking an outlet by the least resisting portion of the surrounding surface."

Value of Gold in San Francisco and London.

My attention having been directed to this point by some eminent assayers in San Francisco, who state that the value of gold is relatively more in this city than in England, I considered the matter worth looking into, and I herewith present the result of my researches in figures. Before doing so, however, a word or two of explanation is necessary. The standard value of gold in the United States is 900—that is to say, in every 1,000 oz. or 1,000 parts of gold, 900 of it is pure. In England the pure gold is 24 carats fine or 96 grains, and the standard 22 carats or 88 grains. Reduced to the United States decimal system, this would make the English standard gold as equivalent to $916\frac{2}{3}$. Again, the charge for refining gold in San Francisco is 8 cents the oz., and now this includes coinage