

## REPORT ON MINING IN THE STATE OF CALIFORNIA, MORE PARTICULARLY AS REGARDS WATER RIGHTS, ALLUVIAL DIGGINGS, AND QUARTZ REEFS.

### *Water Rights.*

BEFORE considering the question of water-rights, as now existing in the State of California, perhaps it may be proper to state the plan I have adopted in reporting upon this portion of the subject submitted to me.

For the convenience of reference and other reasons, I have divided my remarks into two portions, the first being for the most part introductory, and containing, amongst other matters, some passing observations upon the materials now being used in the construction of water-races, and the measurement of water as carried out in the State. In the second portion, I intend giving an account of the water-right system itself; the right upon which this system is based; the legislation in reference thereto; and as many of the principal cases which have been decided by the Courts of Law, Supreme and State, as I have been able to procure.

### *General Remarks.*

Even if the time at my disposal had been of sufficient length to permit of my doing so, it would be useless to enter into any description as to the modes adopted throughout the State of California, and those States adjoining wherein the pursuit of mining is followed, in the construction of water-races, dams, &c.; for the methods adopted in this State and in New Zealand differ very little, if at all. Here, as with us, the water flowing down from the high snow-clad ranges in channels, for the most part steep and precipitous, is preserved in reservoirs, and conveyed along races or "ditches" for the supply of alluvial or "placer" diggings and quartz-reef workings. As a general rule, however, the reservoirs and races of this country have been constructed on a more gigantic scale, and at a proportionately larger outlay of capital, than in New Zealand. But, as a rule, experience shows that these large and costly undertakings have not paid; whilst, on the other hand, the smaller works have usually been successful. Indeed, taking the water operations throughout the State generally, failure has been the rule and not the exception. Of late years a great decline has taken place in the alluvial diggings of California, and a corresponding decline in the demand for water has of course followed. It is estimated that 25,000,000 dollars have been invested in the water-works of the State, and that the present actual value does not exceed 5,000,000 dollars. The Trucker, for instance, a race which was constructed at an original outlay of 105,000 dollars is, I am informed, now gone to ruin. Many miles of water-races in the district of Columbia, and in other districts as well, have been abandoned; nor do I think it is too much to say that the annual decrease is fully 15 per cent. of the whole number. From an experience, such as is that of California, acquired by the loss of so much time and so much treasure, some useful lessons may be gathered. Not the least noteworthy of these, perhaps, is that fluming, wherever possible, is to be avoided, even under the most favourable circumstances. The cheapest flume in the country costs twice as much as the cheapest race, of the same capacity; whilst the cost of keeping the flume in repair is fully 80 per cent. more. Then, it is found that to erect a flume 25 feet high, costs twice as much as to lay it on the ground; whilst at 60 feet, it costs four times as much; and the keeping of a flume in repair annually costs a seventh of the original outlay expended upon it.

### *Iron Piping.*

Iron piping is now very generally used as a substitute for fluming. It is not only cheaper and more durable than the ordinary fluming, but it possesses this advantage also, that by its use water can be carried across gullies of a very considerable depth, and where fluming would be impossible. For instance, at a water-race now in course of construction at Feather River, by means of this piping water is carried across a gully of considerable width and 800 feet deep. The Secretary of the Spring Valley Water Works, from whence the water supply of this city is obtained, who gave me the above particulars, further informed me that this piping is now being extensively used along the works of the Company. Speaking from personal experience, I know of no gold field in New Zealand where this method of conveying water is now in use, nor do I believe it has been tried on any of them, or if it has, it has been on a limited scale only. I have therefore used every effort and devoted some time in procuring all possible information about the matter. I believe the system to be peculiarly applicable to the nature and requirements of the Colony. The sheet-iron most commonly used in making the pipes is No. 20, and the size of the sheet 6 feet by 2 feet. The diameter of the pipe is usually 11 inches, and the pipes are made in joints 2 feet long; the joints being riveted together form sections 20½ feet in length. Small hooks are fixed in the ends of the several sections, and these are lashed together by tying them with wire, by which means the sections are kept from moving and in their proper positions. The piping is used in the form of an inverted siphon, carrying the water down the side of the gully which has to be crossed, and up again the opposite side to the same level. In laying down the pipes, each section is secured to a post, and the post itself kept in its proper place by a board placed edgewise and crosswise in the ground. An inch and a half or two inches is allowed for the lap of each section, and it is perhaps needless to say the ends must be carefully fitted into one another, so as to be water-tight, or as nearly so as possible. It may be further stated that the piping must be, as nearly as circumstances will