

*Dam in Thompson's Creek.*

The claimholders at Tinker's are proposing a scheme to conserve water in Thompson's Creek, at a point about half a mile above the head of Mr. Ewing's head-race. Two sites have been surveyed and plans prepared by Mr. R. Brown, Engineer for Maniototo County Council, for two alternative reservoirs, one in the left branch and the other below the junction of the two creeks. The one in the left branch shows an embankment 120ft. in depth, having a length on the top of 395ft., and this shows a storage capacity of 168,300,000 cubic feet of water. The embankment for the reservoir at lower site, if constructed to a height of 100ft., would have a length of 388ft. on the top and a storage capacity of 88,725,188 cubic feet of water; but if the embankment at this point were raised to 150ft., the length on the top would be 540ft. and its storage capacity 294,510,688 cubic feet of water. The estimates of cost being given as follows: 100ft. embankment, £7,000; 120ft. embankment, £11,950; 150ft. embankment, £17,000.

Sufficient details were not given me so as to form an idea whether these estimates are reliable, but the plans show that a large quantity of water can be stored during wet weather. Allowing 40 per cent. for evaporation and leakage, the 100ft. dam would supply twenty-five sluice-heads for twenty-five days continuous working. The 120ft. dam would supply twenty-five sluice-heads for fifty-two days and a half; and the 150ft. dam would supply twenty-five sluice-heads for eighty-seven days, if there were no water coming into the reservoir. It is well known that there is plenty of ground in the vicinity of Tinker's which would pay for working if water were available, and also that there is far more water-rights granted from Thompson's Creek than there is water to supply in ordinary weather. The construction of a reservoir in Thompson's Creek would only be an advantage to the present claims on the field; it would not allow fresh parties to come in and work new ground unless some arrangements were made with the present claimholders as to the quantity of water they were willing to accept for the rights they actually held.

Although there is very little water in Thompson's Creek in a dry season, it is a very large stream during wet weather, and it is only then and in time of flood that water could be conserved; but such a reservoir would have the effect of giving the claimholders who have water-supply from Thompson's Creek a constant supply. When hydraulic-mining is carried on, every available spot should be utilized for the construction of reservoirs, and the water conserved; but the difficulty is, there is so many who have interests in the water, that it becomes a serious matter to make satisfactory arrangements to get each party interested to contribute towards the construction of such a work. The interest that each one has in the creek is so varied, that is as regards the rights they hold, being the first, second, or tenth right, as the case may be; as, for instance, a person holding the first right from the creek may say, "This scheme does not affect me; I hold a certain right, and am bound to be supplied so long as there is water in the creek before any one else takes out any water." So that each party is affected, therefore, in accordance with the priority of their rights.

The manner in which it is proposed to construct the embankment of the reservoir is to sluice material in and form an embankment, which would, no doubt, lessen the cost considerably; but the question is, although a low embankment can be cheaply constructed in this manner, and be thoroughly watertight, will an embankment of 150ft. high be equally successful in resisting the pressure. It is true that the force of resistance should be equal whether the embankment is only 20ft. high or 150ft., if constructed in proportion to its height; and that being the case, if a low dam can be effectively constructed by merely sluicing in the material, it should be equally as effective whatever height the embankment is, so long as there is sufficient sediment and clay in the sluiced material to form a close compact mass. It is a question with engineers at the present day as to where a puddle-wall in an embankment for a dam should be; the generality of them prefer the puddle-wall in the centre of the embankment, while others state that the wall ought to be on the inner slope directly under a coating of sand, where stone-pitching is generally laid. Embankments 70ft. and upwards in height have been made in America on the latter principle, and have stood for many years; the arguments in favour of the latter mode of construction being that the puddle-wall being in front of the ordinary earthwork embankment prevents the water percolating through, and therefore the material is in a drier state, and has a much greater resisting force than it would have if partly saturated with water. When the puddle-wall is in the centre all the ordinary earthwork in front of the puddle-wall is liable to be saturated with water, and, if so, the resisting force of that portion of the embankment—which is always the largest in cubic contents—is considerably reduced; indeed, it becomes a question, if saturated with water, whether any resisting force can be calculated; on the other hand, if the earthwork embankment in front prevents the water from reaching the puddle-wall, then the latter is of no use.

The construction of an embankment for a reservoir by sluicing proper material into its position has the effect of making the whole of the embankment impervious to water, or acts the same as a puddle-wall in front. Care will have to be taken in constructing it to get proper material, and to remove all rocks and large stones to the outside. The manner in which Mr. Browne shows the mode of construction as regards stone-facing is objectionable, and contributes to the cost; but even omitting this, the estimated cost of construction of either of the embankments, taking outlet, tunnels, and by-wash into consideration, appears to me to be considerably under-estimated; but not having seen the site nor the place where the material will come from for the embankment, but merely the plans, Mr. Browne's estimate may probably be correct.

Apart from the cost of construction, if the reservoir can be constructed at this point so as to insure a constant supply of water to the present claims, it should be undertaken, as the known richness of the ground in this locality will soon repay the cost of construction even should it cost a few thousand pounds more than is estimated.