

The plans and sections show a steep creek with two branches, the waters running together about eleven heads. Both gorges are deep and narrow, and it is proposed to trap the water just below the junction of the branches. There is an alternative scheme, however, for a dam in the left-hand branch, 118 ft. high and 395 ft. in length on the top.

A dam is also shown on the plans 150 ft. high and 540 ft. long on the top, estimated to conserve about 294,000,000 cubic feet of water. There is necessity here for high dams, the creek-beds being so steep, deep, and narrow; but this work would be very costly.

A 100 ft. dam just below the junction of the two creeks seems to be the one advocated, and certainly would be the most useful and practicable. It is 388 ft. long on the crest, and the water is intended to flow over like a weir stone pitched both back and front, and is estimated to store in both branches 88,726,188 cubic feet of water, equal to 1,026 heads for twenty-four hours.

There is no estimate of cost given in either case. I have, however, taken the quantities, on prices given me for similar work in the neighbourhood, of the 100 ft. dam, and formed the approximate estimate (supposing the foundations are favourable, &c.) to be £38,500. This is an undertaking I think will be considered of too great a magnitude to entertain.

Here, as elsewhere, there is a great demand for water for mining, but it is difficult to obtain.

Mr. Naylor, of the Clyde, has a fine farm here on the Ophir Road, showing what can be done with the soil by the means of a simple system of irrigation.

CLYDE-DUNSTAN FLAT IRRIGATION.

I left Ophir for Alexandra and Clyde in a snow-storm on the 29th May, and was met by Mr. McGeorge, County Engineer, and commenced, in company with Mr. Naylor and Mr. Ironsides, Stock Inspector, an examination of the Waikerikeri Valley and Gorge. Went about three miles up the gorge to the catchment dam of the Golden Gate and Clyde Town Water-races. The creek runs from six to seven heads at a minimum, and there are three prior rights, including one head owned by Mr. Bodkin, of the Monte Christo Farm.

It is proposed to dam the creek at the mouth of the gorge, which is 550 ft. above Clyde, is deep and narrow, with a small and very steep rocky watershed. The supply, as in many similar cases, is mainly dependent on the melting snow running down from Leaning Rock Gully, in the Dunstan Range, and a few small streams from the branch gullies. For six months in the year the main stream is reported to run nine heads. This is the only creek of any importance on the north-east side of the flat from which a permanent supply could be drawn for irrigation. The gorge is about 2 chains at the mouth, with rock at both sides, and then widens out to about 4 chains, with a fairly flat bottom. A dam 40 ft. high would throw the water back about 20 chains, with an average depth of 15 ft. to 20 ft. The rock, however, on the left bank of the creek is very broken, and the strata erratic, and would have to be removed in considerable quantities to get a good foundation for the core at that end of the dam, and, as in the case at Eweburn Dam, trial borings are necessary to determine the nature of the bottom for foundations.

Provided the reservoir could be filled, it would be a fair conservation, even after the existing rights were satisfied; but I am of opinion the dam would be very costly—that is, in comparison to the benefit to be gained—and do not, therefore, think it can be recommended.

Picnic Valley.

A dam-site surveyed by Mr. Calder, District Surveyor, was next examined, in a flat dry branch of the Waikerikeri Valley. It has a deep shingle bottom, however, and the loss of water from percolation would in any case be great. Moreover, a reservoir here would require an expensive earthen dam, 50 ft. high and 7 chains in length, between the confining terraces to impound any quantity of water. There is no water running in the valley, and a race would have to be cut from the Waikerikeri, or borrow from the township water-race. Under all the conditions I do not consider the site a suitable one even for irrigation.

Waipuna or "Mutton Town Gully."

Considering the Waikerikeri water not available for the reasons above stated, I next explored for a site that would serve the experimental farm of two thousand acres lately set aside for the purpose, and found about a mile from it a suitable place where water could be conserved in a moderate quantity by an earthen dam 15 ft. high and about $6\frac{1}{2}$ chains in length, running between the end of a spur on one side of an old creek-bed and a low terrace in the flat on the other. A small stop-bank would be required in addition to dam in depression in the terrace. It has been used as a sludge-channel, and may be again, but the channel could be diverted and led round the reservoir. There is a small stream running about two heads. A 15 ft. dam would throw the water back about 13 chains, with an average depth of 7 ft., and it would fill in flood-time. This is the only available site to be found on this side of the flat, and would conserve sufficient water to irrigate the farm and immediate neighbourhood. A sketch-plan is attached, and I think the dam may be built for a sum not exceeding £500.

With regard to irrigation of the flat on this side of the bank of the Clutha, the land is fertile, and with water there is no doubt it could be made highly productive—that is, with the exception of a portion about two miles and a half from Alexandra, which is perfectly useless, on account of a heavy and increasing deposit of fine wind-blown drift-sand from the constant cutting-away of the river-bank by the gold-workings.

The farm-land is flat, with a gentle slope to the river and Alexandra, and is suitable for a perfect and cheap system of irrigation. I recommend the above dam-site at the Mutton Town Gully for favourable consideration.