

In view of the present stage of mining operations, I am doubtful whether or not the whole of the water would be used for any length of time for crushing purposes, even if it were at present available. I would therefore point out that until the development of mines at the Thames clearly shows that a sufficient quantity of payable quartz is available such large expenditure for increased water-power is not warranted, and I am of opinion that for the present a work of this magnitude should not be undertaken by the Government.

The plans and report by Adams and Harding I left with the County Council, for which I obtained a receipt from the Clerk.

I have, &c,

GEO. WILSON, Inspecting Engineer.

The Under-Secretary, Mines Department, Wellington.

No. 3.

Mr. T. PERHAM, A.M. Inst. C.E., to the UNDER-SECRETARY, Mines Department, Wellington.

SIR,—

Mines Department, Wellington, 24th June, 1898.

According to request by memorandum, dated the 2nd April (Mines 97/895), to continue my last year's reports upon water-conservation works on the goldfields of the colony, I proceeded on the 5th of that month to the Hauraki district as instructed, to examine into the best means of obtaining a supply of water for domestic purposes at the mining townships of Coromandel, Karangahake, Waihi, and Waitekauri, Te Aroha afterwards being included.

A report being also required upon the proposed low-level water-race from the Kauaeranga River to be constructed by the Thames County Council, and the work being of a different character to the other matters upon which I have to report, I propose to submit that first, and take the other localities in the order in which they were visited.

I have, &c.,

The Under-Secretary, Mines Department, Wellington.

T. PERHAM.

Thames County Low-level Water-race.

As previously arranged, I placed myself in communication with Mr. Hollis, County Clerk, and after going through the plans (which are produced in a clear and excellent manner) in company with Mr. McLaren, County Engineer, and Mr. Adams, the engineer who surveyed and designed the race as an additional water-power to Grahamstown, I went over the ground with those gentlemen, and made an examination from the intake to the terminal point at Karaka Creek proposed reservoir, to judge of the scheme being practicable.

The proposed head-works, with automatic gates, are situated at a convenient rocky point on the right bank of the Kauaeranga River, about three miles from and below the intake of the present high-level water-race, and near Stephen's Hotel, and the race follows generally the surface contour to the proposed reservoir. The gradient is 4 ft. of fall to the mile. The whole of the race is laid out in curves of a fixed radius of 133·5 ft. (which has the advantage that the pipe-sheets may be made to suit short chords, or cut to the curves) where the line is not direct, and the lowest radius used is 202·2 links. The distance from the head to the reservoir is about 5 miles 75 chains, made up as follows: Ground race, length 11,836 ft.; tunnels, length 9,132 ft.; flume on ground, length 6,614 ft.; flume on trestles, length 3,766 ft. The chords, tangents, and straights of the whole race are pegged from end to end, and it is designed to convey 100 cubic feet of water per second—*i.e.*, 100 sluice-heads—and the total available head to high-water mark at Grahamstown is 76 ft. Ample by-washes, and all necessary manholes, valves, &c., are provided at convenient distances for the discharge of surplus water.

There is no doubt, I think, that by the employment of tunnels and pipes, although at first cost expensive, instead of all open ditching and box-fluming, thus avoiding a considerable cost in maintenance, that the most direct and *finally* economical route has been adopted. The country was prospected by Mr. Adams on the left, or opposite, bank of the river to decide any advantages by that route, but the distance found to be longer and more expensive generally, the sidelings being steep, and the only recommendation the compensation for land taken less in cost. By the selected route the difference in height between the low, or summer, water-level at the head of the race and high-tide level is practically 100 ft. The loss of head by the race is 24 ft., leaving 76 ft. of effective head at Grahamstown. This head is calculated to furnish six hundred effective horse-power for eight months of the year, and is claimed to be a valuable source of supply to the goldfield.

Quoting from Mr. Adams *re* a full delivery by race to the timber booms at Parawai, as against delivery by pipes to the same place: "The pipes necessary to deliver 100 cubic feet per second with a loss of even 37 ft. in friction-head would require to be 5 ft. in diameter, and the cost of work would be at least £10,000 more than by the present scheme, whilst the loss of fall would be more than double the present scheme, which from the booms is 8 ft. The effective head at the booms is 84 ft., so that the loss is 9·5 per cent. in the two miles distance." This is in favour of delivery by race to Grahamstown, as against the electrical transmission advocated.

As before mentioned, the tunnels to gain a direct route and also to avoid loose sidelings, frequent fluming, and consequent heavy maintenance are at first expensive, and with the pipes are the heaviest items in cost of construction. The total estimate for the whole undertaking is £57,777, but I am of opinion the work could be done for a somewhat less amount by making several modifications in the timber, piping, and general details of ironwork. An illustrative sketch-plan (a reduction of the original drawings), showing a longitudinal section and plan of the features of the race, together with the principal details of construction, is attached.