

the scrub keep the crown of a small spur to the flat near the pond; cross below the terminal face of the Roberts Glacier, and follow the river as far as the open extends; then leave it and keep up through the scrub (the best line is not far from the foot of the mountains) till an open creek-bed, situated about a mile and a half from the glacier, is reached; go down this, and cross the river just below its junction and above a small island, where there is a good ford. From here onward it is a matter of taste whether the river, with its huge rocks to climb over, or the dense scrub and bush is followed. We did both at intervals, as appeared best at the time, but found it much quicker, as a rule, to go through the bush. We also travelled on both sides of the river, but it is best to cross to the flat shown on the plan, and follow the Powers' horse-track down to Paringa.

T. N. BRODRICK, District Surveyor.

RECONNAISSANCE SURVEY OF NEW ROUTES TO THE HERMITAGE.

The following is District Surveyor Brodrick's report:—

According to instructions, I visited the Mackenzie County, and thoroughly explored it for new routes to the Hermitage, and have now the honour to submit for your consideration four schemes for shortening and improving the road. It will perhaps be more convenient to give the total lengths of the rival routes here, and afterwards describe them in detail.

The present road *via* Pukaki is ninety-six miles long, divided as follows: Fairlie to Tekapo, twenty-six miles; Tekapo to Pukaki, thirty miles; Pukaki to the Hermitage, forty miles. By the Mackenzie County Council's proposed route *via* the Clay Cliffs and Burnett's the length would be fifty-nine miles; by Old Braemar Road to Burnett's, thence by new route same as above, the length would be sixty-three miles; by Lake Pukaki route, with steam-launch, the distance would be seventy-seven miles; and by bridges across island from Braemar to Jack's Creek it would be sixty-five miles.

It is not possible to shorten the first route *via* Pukaki by more than two miles, but the road can be made into an excellent one by the expenditure of sufficient money—from Pukaki Bridge to Birch Hill, by following the lake, by making slight deviations here and there, and by forming where it is required; this might be done for about £2,500. From there to the Hermitage the road should always have a surfaceman on it, for no formation would ever stand. This part is, however, by no means a bad road. Following the lake round would make it a more interesting drive for the tourists than it is at present, and the long toilsome pull uphill for miles, only to zigzag steeply and awkwardly down to the lake again, would be avoided. The time saved by the new route along the lake cannot be estimated by the difference in the lengths of the two roads. The cost of the new piece would be about £1,400.

The route *via* the Clay Cliffs, as proposed by the Mackenzie County Council, from Tekapo to trig. L is roughly formed, but it is a good enough summer road, equal to the one now in use between Tekapo and Pukaki, with an excellent ford over the Fork Stream. From trig. L to Z very good gradually-ascending grades and a good ford over the Landslip Creek can be got, but from there to the Jollie River, a distance of about three miles, the grade could not be made easier than 1 in 13 without a zigzag. The Jollie would have to be bridged at the gorge with a one-span bridge from rock to rock of 86 ft., and a deep cutting made to get at it from the south side. From there to Block Point, four miles and a half, it is flat formation on a shingly soil, with the exception of 61 chains of side-cutting, half of which is very heavy. At this point the real difficulties commence, which are, in my opinion, so great as to condemn the route at present, because of its great cost, for from this point to the site of the proposed bridge across the Tasman (two miles) the river often runs right into the foot of the hills, and the only way to make it quite certain that traffic would not be interrupted is either to cut a road along the hillside (which has an average slope of 40°, and for one-third of the distance is solid rock, and for the remainder a loose mixture of rock and clay, which would most certainly slip when cut into) or to build it up with rubble along the foot of the hills. Indeed, I am of opinion that the latter is the only plan which could be adopted, and then it is probable that part of it would be destroyed from time to time by the river. Then comes the Tasman Bridge, of 35 chains in length, the cost of which would, of course, depend on the kind of structure required, which would in any case have to be very strong; and from there to the road (about a mile) is a high gravel-bank of old formation, cut through here and there by channels from the Hooker overflow and the creeks, which might stand for ages, but might, on the other hand, be washed away by the next flood. The road, with the bridge over the Jollie, could, at a rough estimate, be made at from £4,000 to £4,500, but the bridge would be a costly addition, for the pipes would have to be driven very deep.

By the old Braemar to Burnett's Road, thence as above, the new formation from trig. L to Burnett's and the steep incline into the Jollie would be saved; but the length would be four miles longer, and at least £1,200 would have to be spent on the old road to make it at all passable.

The lake route: This seems to me to be the most passable of any. From Tekapo to the deviation the road is already formed, and is in places metalled; and is, in fact, a fair summer road. No doubt, should it ever be made the main road, more formation and metalling would have to be done; but it is no worse in this respect, than the coach-road now in use between Tekapo and Pukaki, which for a great proportion of its length is neither formed nor metalled. The four miles and a half of new formation to the navigable water of the lake can be made at a good grade for about £500, and a steam-paddle ferry-boat capable of carrying the coach and horses might be employed to ply between this point and Boundary Creek—say, one similar to those employed on Sydney Harbour; or a simple steam-launch, to carry passengers and luggage only, would do very well, with a coach for each side of the lake. About £1,000 spent between the lake and the Hermitage would now make that portion of the road very passable indeed. I think this route would not be a very wearisome one-day journey to tourists. The distance would be broken and monotonous relieved by the four