

remainder of the distance to Burke's Pass. The Albury Branch extension is well located; in addition to opening up good country it forms a link in the direct communication between the Timaru District and the plains in the Waitaki watershed.

Waimate towards Hekatarema.—Ten miles of this branch has been surveyed. The curves and gradients are good, but the works are rather heavy, the estimate being £47,000, exclusive of rolling-stock, &c. This line is not well located for opening up the country, so I would not recommend the Government to undertake its construction. I understand, however, that a private company has been formed to make it.

Oxford to Malvern (11 miles).—A survey of this line by the Provincial Government is in existence, so it was not considered necessary to make a fresh one. With the exception of the descent into the Waimakariri River bed, where there is some little earthwork, the works are light. The estimate is £35,000 for formation, permanent way, and stations.

Southbridge Branch to Little River.—A company having been formed to make this line there was no occasion for the department to make a survey.

Malvern Branch Extension to Kowai Coal Mines (6 miles).—As stated in my annual report, it is proposed to make this line in the usual way, so as to enable the native coal to be brought down for use on the railways. A sum for its construction is put on the Estimates.

General.—Of the eight branch railways named in "The Canterbury Railways Land Reservation Bill, 1877," one is provided for in the general Estimates, and two are taken up by companies, leaving five for which provision has not yet been made, viz.:—

	Miles.
Oxford to Malvern line	11
White Cliffs to Rakaia Gorge	22
Ashburton to Alford Forest	20
Albury to Fairlie Creek	10
Orari to Hilton	13
Total	76

The estimated cost of the whole, in working order and fully equipped with rolling-stock, is in round numbers, £330,000.

The scheme of the Canterbury branch railways, as above laid down, is open to several objections. Some of the lines run a short distance up a valley and there stop, it being impossible to extend them, while possibly another valley close by leads to good country beyond the immediate terminus. Again, some of them are branches, not only off-branches, but off-subsidiary branches—a very objectionable feature in working. Every one of the "dead ends" beyond the last junction will require a separate plant, no matter how light the traffic may be.

Instead of having a number of branch railways on the Canterbury Plains running at right angles to the main line, as the present system will inevitably lead to, I would propose to construct a subsidiary main line, commencing at Oxford and skirting the foot of the range *via* Malvern Hills, Ashburton Forks, and Geraldine to a junction with the main line at Orari, Winchester, or Temuka, together with one connecting branch between South Ashburton and the Ashburton Forks. The subsidiary main line above described would be about 85 miles long, and its cost about £380,000. Except at the riverbeds, it presents no engineering difficulties, and several of the road bridges now erected over the larger rivers could be utilized. Its adoption would save the two lines at the Ashburton Forks and the Orari-Hilton Branch now proposed, and several more of the same kind that are sure to follow.

RAILWAYS IN OTAGO.

Otago Central (Strath-Taieri) Railway.—The survey of this line has been in progress during the past year, and the information collected is sufficient to enable a fair estimate to be formed of the character of the line obtainable, and the nature of the works required.

The general direction of the Otago Central Railway is as described in my report of last year. The line ultimately adopted at the commencement is the combination of the two alternatives suggested in the report. It leaves the Clutha Railway at the Wingatui Station, Chain Hills; goes straight across the Taieri plain, and ascends westward to the Totara Saddle. It was found impossible to utilize the Outram Branch as far as North Taieri without materially increasing the length or cost of the line, or making the gradients steeper. In the Taieri Gorge it has been found advisable to cross the river near the Mullocky Junction, and follow up the western bank all the way to Strath-Taieri. The line keeps generally about 20 feet above flood level to the Deep Stream, after which it rises from the river-bed altogether, and follows the table-land.

The works generally, from North Taieri to the Strath-Taieri Plains, although very heavy, are no worse than they were expected to be. The tunnel in the main range at Totara Saddle will only be about 18 chains long; but there is a small one through a spur adjoining of about 6 chains. The heaviest earthwork on the line is between the Saddle and Mullocky Junction. The works in the Taieri Gorge consist mainly of a long succession of rock cuttings—nothing exceptionally great, but a large extent of rather heavy work. The works in the Pool Burn Gorge are somewhat heavier than the reconnaissance survey by the late provincial authorities led us to understand; still there is nothing very serious.

The curves and gradients on the Otago Central Railway will be as good as on the main line. The incline on each side of the range is 1 in 50, with 10-chain curves. In the Taieri Gorge the trial survey is made to 7½-chain curves, but it is proposed to reduce them to 6, with about a chain of straight between when permanently setting out the line. This is better than 7½ reverse curves, as on the main line.

The working survey of the Otago Central Railway is in progress from Chain Hills to the Taieri, 10 miles; and from the Rough Ridge to Clyde 30 miles. Both of these sections could be got ready for