

Although the trial sections show little difference in the magnitude of the works on the two routes, I have no doubt the detailed surveys will make a great difference in favour of the Coast line. This is in consequence of the low average gradient in the latter case as compared with that on the Green Hills route. The chances are that the works will be increased in setting out the line on the steep gradients, whereas the contrary effect will be produced with the flat ones. Indeed I am confident that much of the tunnelling on the inclines on the Coast route can be eliminated. But were the cost twice as great, the balance of advantages would still be in favour of the Coast route. The gradient on the Green Hills line and the disposition of the inclines are particularly objectionable. A 1 in 25 grade is too steep for ordinary locomotives and too flat for the Fell system. Then the gradients are not concentrated in such a manner as to be economically worked. In the first 21 miles north of the Whale's Back there are fourteen distinct inclines in both directions of 1 in 25, three of one 1 in 26, and ten varying from 1 in 30 to 1 in 50. Exceptional gradients also occur at the twenty-sixth mile. The main, if not the sole object in making a railway in this direction is to provide the quickest means of transit between the southern settlements and the North Island, and this object will certainly not be attained by the line just described. Altogether, I have not the slightest hesitation in rejecting the Green Hills route in favour of the Coast line.

CONCLUSIONS AS TO ROUTES.

Having reduced to a minimum the number of direct routes to choose from between the East West Coasts, and between Amberley and Cook Strait, it is now necessary to consider them collectively, and as a part of a general railway system.

Reverting to the question of making one route available for both purposes, I subjoin the following table, showing the distance between Christchurch and Wellington by the different routes :—

Route, &c.	Miles.	Hours.
<i>Via Grey Valley and Nelson :—</i>		
Railway, at 17 miles per hour	315	18½
Steamer, at 13 miles per hour	120	9½
Totals	435	28
<i>Via Picton :—</i>		
Railway, at 21 miles per hour	205	9¾
Steamer, at 13 miles per hour	60	4¾
Totals	265	14½
<i>By sea direct :—</i>		
Railway to Lyttelton	8	0½
Steamer, at 13 miles per hour	202	15½
Totals	210	16

The only way by which the distance to Nelson could be materially reduced is by making the line *via* Cannibal Gorge and the Maruia Valley. This will save 48 miles between Christchurch and Nelson, but it would increase the distance between Brunnerton and Christchurch by 51 miles. It would also avoid the Grey and Inangahua Valleys altogether, and introduce exceptional gradients between the main range and Brunnerton. These objections far outweigh the advantages of the saving that is effected in the distance.

In addition to its excessive length, a line from Amberley to Nelson has the disadvantage of crossing the main range twice, whereas a railway can be taken to Picton without crossing once. Again, the former would end at an indifferent tidal harbour of limited capacity, whereas the latter terminates at one of the best harbours in the Middle Island, accessible in all states of the tide and in any weather, and capable of accommodating in safety the navies of the world. From its natural advantages there is not the slightest doubt that Picton harbour will ultimately become the northern *entrepôt* for the Middle Island, and, it is equally certain that the through line will become a necessity some day, it is therefore as well to recognize the position at once, and work up to it. Any effort to divert the stream of communication from its natural course can only result in failure and disappointment.

Failing to get one line that connects Canterbury with the West Coast and Cook Strait, the next best alternative is to adopt separate lines between those places. So far as the line to Cook Strait is concerned there is no difficulty in making a selection. The coast route terminating at Picton is undoubtedly, and beyond all comparison, the best. There are, however, several points for consideration before a similar conclusion can be arrived at with reference to the West Coast lines. We have already reduced the number from which a choice has to be made to two—viz., the Arthur's Pass and Hope routes. For all practical purposes their carrying capacity and cost may be considered equal, so is also the area of good country accommodated; the decision, therefore, depends entirely on the facility provided for transporting the products of the West Coast to a market. If Christchurch alone were the market, there would still be little to choose between the two routes, for the difference in the distance is only 8 miles. But in order to give the West Coast coal-mining the utmost encouragement it is necessary to extend the market at its command; this can only be done by shortening the distance of carriage to the populous districts south of Christchurch. The distance from Brunnerton to