

it seemed that trade would concentrate. Long spaces between the stations were also avoided. We put a station every four miles if possible, and in that way one station more got in on the western route than on the eastern.

44. In view of the fact that the ruling grade on the western route is 1 in 50 in both directions, and that there is a greater length of 1 in 50 on the western route than on the eastern, and that there are  $7\frac{1}{2}$ -chain curves on the western and only 9-chain curves on the eastern, how do you estimate that the total resistances are 14 per cent. in favour of the west?—It must be due to the increased height to which the eastern route rises.

45. You have taken the total length of grade and the resistance on that grade?—Yes, resistance multiplied by the distance over which it occurred.

46. If the two steepest grades are compared, is there not a difference of 20 per cent. in favour of the western?—There are two steep grades which you know of probably—one of 1 in 52 with  $7\frac{1}{2}$ -chain curves going up the Kirikopuni, and the other one running the other way, from the Wairoa to Maungakaramea. These two grades will be found, I think, to be the two heaviest on the routes, and they give a result of 20 per cent. in favour of the western route.

47. From an engineering point of view, which do you consider the better route, if there is any difference between the two?—There is not very much to choose between them.

48. Have you any knowledge of land-values?—I have not much knowledge of land-values, but I think I know good land from bad.

49. On which route do you consider the most suitable land for settlement lies?—I consider the advantage is with the western route, as far as I have seen, and judging by the evidence I have heard.

50. You refer in your evidence to a probable diversion of the western route at Waikiekie, in order to shorten the branch to Whangarei: do you think it is feasible to make a diversion from McCarroll's Gap, midway between the east and west routes, through Waikiekie to Waiotiri Valley, then joining the present western route in the Tauraroa Valley, with a branch to Whangarei through Maungakaramea? I should say that it is quite feasible. It will shorten the Whangarei branch by two miles, possibly more. I am not sure whether it would lessen the western route.

51. Can you give the Commission any information as to the ruling grade and the minimum curvature up to McCarroll's Gap?—1 in 50, with a minimum curvature of  $7\frac{1}{2}$  chains radius.

52. What is the ruling grade and minimum curvature north of Parakao?—There is nothing worse than 1 in 50 there, or  $7\frac{1}{2}$  chains.

53. Are there any  $7\frac{1}{2}$ -chain curves?—I am not sure. The country is rather better for constructing a railway north of Parakao.

54. As the Commission has to consider the question of railway communication from McCarroll's Gap through to Kaikohe, can you give the Commission the estimated cost from the Gap to Kaikohe of the line?—I am not able to furnish such an estimate at present. I will do so within the next few days.

55. What is the estimated cost of a branch line to Dargaville and of a branch line to Whangarei?—I am unable to say, because the cost would depend so much on the location of the branches.

56. Taking it at per mile?—I do not think I know sufficient of the country between the two points to say anything regarding the matter, especially as regards the branch to Dargaville, which I think would be the more expensive of the two.

57. Would it be fair to take the average of the main line as the average cost of the two branches?—I think you would be safe in doing so.

58. *Mr. Stallworthy.*] In reference to the diversion of the eastern route on the north, what was the object in diverting the eastern route to the west further south?—The idea was to shorten the eastern route.

59. Or to shorten the whole length from Kaikohe to the Gap?—It would not shorten the whole length, if you were following the western route: but it would do so if you were following the eastern route.

60. Would the diversion of the eastern route at a point farther south improve the whole length between Kaikohe and the Gap?—I do not think it would. It puts the eastern route right on to a bad place, and gives the eastern route the disadvantages of both lines.

61. That answer puts me in a fog as to why this divergence is suggested?—It was a trial line, and it was run with a view to seeing whether the eastern route could not be shortened advantageously.

62. As compared with the west?—Yes.

63. And as compared with the whole line from Kaikohe to the Gap?—It would hardly affect the whole line from Kaikohe to the Gap if the western route were adopted: and I do not think it is an improvement in any way.

64. *Mr. Steadman.*] You have stated that some of the curves on the western route could be improved by tunnelling: would that increase the cost materially?—Yes, of course it would.

65. Can you give us any idea as to the distance?—I have not looked into the matter sufficiently to say.

66. Can you do so approximately?—I am afraid I cannot, because we have not cross-sections on that line at anything like close distances.

67. It might materially increase the cost?—Possibly.

68. Is there any slippery country on the western route?—Yes, and it has been allowed for. On the west there is about half a mile altogether shown on the plans, as against a mile and a half on the eastern route. It is not pretended that that is all the slip country that would be met with, but that is all we were able to locate on the survey.