1883.
NEW ZEALAND.

MIDDLE ISLAND RAILWAY EXTENSION.

REPORT OF COMMISSION APPOINTED OCTOBER 24, 1882.

Presented to both Houses of the General Assembly by Command of His Excellency.

To His Excellency Sir William Francis Drummond Jervois, G.C.M.G., Governor of New Zealand, &c., &c.

MAY IT PLEASE YOUR EXCELLENCY,—

Having received the Commission directing us to make inquiry into "the "probable cost and economical value of the several lines proposed for the extension "of the main trunk line through the Middle Island, northwards from Canterbury, "and further to make inquiry whether any other line would be less costly and "more advantageous to the colony than any one of the lines herebefore proposed," our first duty appeared to be, to gain by personal observation a general knowledge of the character and the apparent or probable resources of the country affected by the several lines mentioned. We have, accordingly, traversed as closely as practicable the route of the proposed Central line from Blenheim *vid* Tophouse and Tarndale to Waikari and Christchurch, and similarly have followed the course of the proposed East Coast line from Waipara by way of Cheviot, Kaikoura, and Flaxbourne, to Blenheim.

We have held public sittings at Christchurch, Kaikoura, Blenheim, Nelson, and Wellington, and have taken all such evidence, oral and documentary, relative to the subject committed to us, as was obtainable at each of these places; notes of all of which, together with the original documents, are respectfully presented herewith. We have everywhere met with frank assistance in the prosecution of our inquiries, and have received and recorded information which we hope will be found to be valuable. We would refer especially to the evidence collected at considerable expense by the Committee of gentlemen who interested themselves in the railway question on behalf of the people of the Provincial District of Nelson, and which may be regarded as having importance from a general as well as a local point of view; and to the report of Mr. C. Y. O'Connor, which deals with the present and prospective values of the various routes, in a lucid and comprehensive manner.

The expression "economical value of a railway" means, we presume, its value as a work directly reproductive, or as giving promise, within a reasonable time, of returns sufficient to defray working expenses, together with some margin of profit to represent interest on cost of construction; or, indirectly, as opening large areas of lands available and fit for settlement; or as giving facility of communication with a market to a population already settled and producing, or likely soon to produce, commodities which would serve to make traffic for the line; or as affording facilities for a large passenger traffic not otherwise provided for. If we are right in thus interpreting the terms of our Commission, it is our duty to report that we have not found any of these conditions actually existing, or

likely to exist in the near future, in regard to the Central line, the East Coast line, or any other line between Nelson or Picton and Christchurch.

While comparing the relative merits of the Central and East Coast routes, we were naturally drawn to take into consideration the propriety of so locating the main line as to favour, if possible, its future connection with any line to be constructed between the East and West Coasts. From the evidence before us, we have come to the conclusion that no divergence to the westward of the proposed Central route would be advisable.

In the absence of an accurate and detailed survey, no more than an approximate estimate of the cost of either of the proposed lines of railway, from Canterbury northwards, can now be made. It is in evidence, however, that the cost of making either line will probably exceed the average cost per mile of the lines already completed in this Colony; and that, mile for mile, the East Coast line will be, of the two, the more expensive to construct.

Mr. George Blackett, the Resident Engineer of Nelson and Marlborough, gives £8,000 per mile as the probable cost of the Central line; whilst with regard to the East Coast line by Cheviot, Mr. Rochfort, accepting Mr. Blackett's estimate for the Central line, gives it as his opinion, based upon recent examination, that the East Coast line would cost £2,000 per mile more, or £10,000 in all. The probable cost, then, adopting the estimates of these two gentlemen, of 175 miles of the Central line, from Waikari to Blenheim, still to be constructed, would be £1,400,000; and of the East Coast line, 146 miles, from Waipara to Blenheim, £1,460,000. Mr. O'Connor's estimates — viz., £1,290,000 and £1,350,000—though somewhat lower, show the same difference in relative cost.

The land suitable for agricultural settlement on the East Coast, which is of considerable extent and value, may be said to be wholly in the hands of private individuals, in large holdings, and almost exclusively occupied, except at Kaikoura, as sheep runs or for grazing purposes. The wool from the stations on and near the proposed line of railway, is now sent by sea, from various points on the coast, to Lyttelton or Wellington, and the necessary supplies are received in the same way. The wool and supplies would, we are advised, continue to be so transmitted if the railway were made, because of the greater cheapness of the sea freight as compared with the railway charges. The population in the whole district to be served by the line is small, and with a few exceptions, as at Kaikoura, all are engaged in pastoral pursuits. Even if the landed proprietors were prepared to throw open such portions of their estates as are suitable for agriculture for sale, or settlement, a long time must elapse, in the present condition of the colony as to population, before any considerable quantity of the land could be thus productively occupied. Between Parnassus and Flaxbourne, a distance of eighty-two miles, throughout which the line follows the seashore, there is no prospect, owing to the configuration and broken character of the country, of any appreciable increase of population or produce, except perhaps in the immediate neighbourhood of the small settlement of Kaikoura.

The same objections may be said to apply, generally, to the construction of the Central line: the differences of advantage in its favour being, mainly, that a much larger proportion of public land would be opened and served by it than by the East Coast line, that its cost of construction would be somewhat less, and that geographically it would have more of the true character of a main trunk line, as going through the heart of the country instead of along its seabord. But, owing to its elevation and distance from the sea, the climatic conditions are so little favourable, that it is only under circumstances of extreme pressure by population that any considerable settlement, except for the prosecution of pastoral pursuits, on such public land as is now to be found in the district, can be looked for. The agricultural land at each end—separated by a district almost wholly pastoral, which stretches between the Hanmer Plain and Marchburn, in the Wairau, a distance of 120 miles—is, as in the case of the East Coast line, in the hands of private individuals, and occupied mainly for pastoral purposes.

It has been urged that a through line connecting the Southern settlements with a port in Cook Straits is an accepted portion of the public-works policy of the country, and that it must be carried out. That being so, it is alleged that the

East Coast route, being the shortest between the extreme points of lines already constructed, might, as a passenger line, be found to possess economical advantages sufficient to justify its being immediately proceeded with. The inquiries which we have been enabled to make have shown that this expectation would not now at least be realized, as the line could not successfully compete for the passenger traffic between the islands with steamers running in the night hours between Lyttelton and Wellington: the time occupied in transit would be longer, the expense greater, and the objectionable sea voyage, in its worst part, could not be escaped.

As a passenger route, the same objections would apply with even greater force to the Central line, on account of its greater length and the high country to be traversed.

In conclusion, while we cannot recommend the present prosecution of "a main trunk line northwards from Canterbury," we feel it our duty to state that no line hitherto proposed or suggested seems to offer, at the present time, fewer disadvantages than the one by the East Coast. With every predisposition to favour a route which should traverse the interior of the country, which should utilize and increase the value of public lands rather than of private lands, which should, if possible, offer facilities for connection with Nelson and the West Coast, we are reluctantly forced to the above conclusion by the evidence before us, which testifies that this route, though somewhat more costly than the Central one in construction, is thirty-eight miles shorter, that its summit level is 2,300 feet lower, that it passes through more agricultural land, and that it promises more satisfactory results.

Opinions, which may have some future importance, as to the best route from Picton to the connecting port in the North Island, have been given by Captain Johnson and Captain Fairchild, and will be found in the report of the evidence given by those officers.

All which we most respectfully submit for your Excellency's consideration.

JAMES FULTON, M.H.R.
DANIEL POLLEN, M.L.C.
J. T. THOMSON.

Dunedin, 7th February, 1883.

COMMISSION.

VICTORIA, by the Grace of God of the United Kingdom of Great Britain and Ireland Queen, Defender of the Faith: To our trusty and loving subjects, James Fulton, of Dunedin, in the Colony of New Zealand, Esquire, M.H.R.; the Honourable Daniel Pollen, of Auckland, in the said colony, Esquire, M.L.C.; John Turnbull Thomson, of Invercargill, in the said colony, Esquire.

WHEREAS the Administrator of the Government of our said colony hath, by and with the advice and consent of the Executive Council thereof, deemed it expedient that a Commission should forthwith be issued for the purposes and in the manner hereinafter set forth: Now, therefore, know ye that we, reposing great trust and confidence in your zeal, knowledge, and ability, do by these presents constitute and appoint you, the said

JAMES FULTON,
DANIEL POLLEN, and
JOHN TURNBULL THOMSON,

to be our Commissioners for the purpose of making inquiry into the probable cost and economical value of the several lines proposed for the extension of the main trunk line through the Middle Island northwards from Canterbury, and also to inquire further whether any other line would be less costly and more advantageous to the colony than any one of the lines hereinbefore proposed, it being the intention of these presents that you shall make investigation and inquiry in the most ample and complete manner into all the facts and circumstances necessary or proper to be considered in determining the best line for the completion of the main trunk railway through the Middle Island. And, for the better enabling you to carry these presents into effect, we do authorize and empower you, or any two of you, to make and conduct any inquiry under these presents at such place or places in the said colony as you may deem expedient, and to call before you such persons or person as you may judge necessary, by whom you may be better informed of the matters herein submitted for your consideration; and also to call for and examine all such books, documents, papers, maps, plans, accounts, or records as you shall judge likely to afford you the fullest information on the subject of this our Commission; and to inquire of and concerning the premises by all other lawful ways and means whatsoever; and our further will and pleasure is that you, or any two of you, do report to us under your hands and seals (with as little delay as may be consistent with a due discharge of the duties hereby imposed upon you) your opinion on the several matters herein submitted for your consideration, with power to certify unto us from time to time your several proceedings in respect of any of the matters aforesaid, if it may seem expedient to you so to do. And we do further declare that this our Commission shall continue in full force and virtue, and that you, our said Commissioners, or any two of you, shall and may from time to time proceed in the execution thereof, and of every matter and thing therein contained, although the same be not continued from time to time by adjournment. In testimony whereof we have caused these our letters to be made patent, and the seal of the said colony to be hereunto affixed.

Witness our trusty and well-beloved Sir James Prendergast, Administrator of the Government in and over Her Majesty's Colony of New Zealand and its dependencies, and issued under the seal of the said colony at Wellington, this twenty-fourth day of October, in the year of our Lord one thousand eight hundred and eighty-two.

(L.S.) JAMES PRENDERGAST.

Issued in Executive Council.

FORSTER GORING,
Clerk of the Executive Council.

MINUTES OF PROCEEDINGS.

MONDAY, 6TH NOVEMBER, 1882.

THE Commissioners met at Wellington at 2 p.m., and, after hearing the Commission read, on the motion of Mr. Fulton, seconded by Mr. Thomson, the Hon. Dr. Pollen took the chair.

On the motion of the Chairman, *Resolved*, That Mr. St. Barbe be appointed the secretary to the Commission, and that Mr. W. Mitchell be appointed the shorthand writer to the Commission.

The Commissioners received and perused various papers and plans relating to the country through which the proposed lines pass, and, after deliberating as to their movements, adjourned.

TUESDAY, 7TH NOVEMBER, 1882.

The Commission met at 10 a.m.

All the members being present, the Commission deliberated, and adjourned till 11 a.m. to-morrow.

WEDNESDAY, 8TH NOVEMBER, 1882.

The Commission met at 11 a.m.

Present: All the members.

The minutes of the previous meeting were read and confirmed.

The Commission then adjourned.

MONDAY, 20TH NOVEMBER, 1882.

The Commission, having travelled from Wellington *viâ* Blenheim, Tophouse, Tarndale, Jollie's Pass, and Waikari, met in Christchurch.

Present: Mr. Fulton, Hon. Dr. Pollen, and Mr. Thomson.

Mr. Edward Dobson, C.E., examined.

A deputation from the West Coast Railway League waited upon the Commission, and, after some conversation, withdrew.

The meeting then adjourned.

WEDNESDAY, 22ND NOVEMBER, 1882.

The Commission met at 10 a.m.

Present: All the members.

Mr. H. B. Huddleston, C.E., and Mr. John Tinline, examined.

The meeting then adjourned.

THURSDAY, 23RD NOVEMBER, 1882.

The Commission met at 10 a.m.

Present: All the members.

A deputation from the West Coast Railway League, consisting of the Hon. E. Richardson, T. S. Weston, Esq., M.H.R., and W. Chrystall, Esq., waited upon the Commission and read a statement relating to the western route.

Mr. C. Y. O'Connor waited upon the Commission, and, having been supplied with the heads of matters upon which the Commission requires information, undertook to provide it shortly.

Mr. Frederick Back, Traffic Manager, Christchurch, and Mr. John Inglis, examined.

FRIDAY, 24TH NOVEMBER, 1882.

The Commission met at 10 a.m.

Present: All the members.

The minutes of the previous meetings were read and confirmed.

A telegram from the Hon. the Minister for Public Works was read.

Mr. C. Y. O'Connor, C.E., produced, in compliance with the request made to him yesterday, a tabulated statement showing length, probable cost, distance constructed and to be constructed, of lines between Christchurch and Picton and Christchurch and Nelson; also showing what agricultural, pastoral, and barren land the lines would pass through, and also showing amount of Crown and private land along the routes. The tables not being quite perfect, Mr. O'Connor requested the Commission to allow him more time for their completion.

Resolved, That Mr. O'Connor be requested to report whether a divergence *viâ* Maruia would be advisable, in view of the possibility of connecting the West Coast districts with the central line of railway northwards from Canterbury.

Mr. Atkinson, of Rangiora, examined.

The meeting then adjourned.

TUESDAY, 28TH NOVEMBER, 1882.

The Commission, having travelled from Christchurch *viâ* Cheviot and Greenhills, met at Kaikoura.

Present: All the members.

Mr. H. Inglis and Mr. Bullen, having been appointed to represent the interests of Kaikoura, waited upon the Commission and made statements relating to the line of railway.

Captain Davidson and Mr. Passeau, Sheep Inspector, were examined.

SATURDAY, 2ND DECEMBER, 1882.

The Commission, having travelled from Kaikoura *viâ* the coast, Woodbank Station, and Flaxbourne, met in the Courthouse at Blenheim at 10 a.m.

Present: All the members.

Mr. Henderson, chairman of the Blenheim Railway League, was present, and addressed the Commission.

The following gentlemen were examined: Mr. W. G. Clark, Commissioner of Crown Lands and Chief Surveyor for Marlborough; Mr. Elliott, farmer; Mr. Vincent Hewitt, settler; Mr. John Murphy, cattledealer; Mr. John Mackenzie, butcher; Mr. Alfred Dobson, surveyor; Mr. Macalister, Inspector of Telegraphs for Marlborough and Nelson; Mr. A. P. Seymour, runholder.

Affidavits by Mr. George Edward Kinsey, of Marlborough, and by Mr. Henry Alexander MacShane, of Balclutha, were put in.

The meeting then adjourned.

NELSON, TUESDAY, 5TH DECEMBER, 1882.

The Commission met at Nelson at 3 p.m.

Present: All the members.

Mr. Fell, on behalf of the Nelson Railway Committee, addressed the Commission, and introduced and examined the following witnesses: Mr. Robert Disher, of Waimea West, farmer; Mr. Adolph Wiesenhavern, of Wairoa Gorge, Brightwater, formerly of Tophouse; Mr. William White, Chairman of the Waimea Road Board, formerly lessee of the Tarndale Reserves and land adjacent; Mr. Nathaniel Fowler, of Stoke, near Nelson, farmer.

The meeting then adjourned.

WEDNESDAY, 6TH DECEMBER, 1882.

The Commission met at 10 a.m.

Present: All the members.

Mr. W. T. L. Travers, of Wellington; Mr. John Kerr, late a partner with Mr. Edwards in the Tarndale and Rainbow Runs; Mr. Donald McGregor; Mr. Jonathan Brough, of Nelson, contractor; Mr. James Crowe Richmond, of Nelson, engineer, and also Secretary of the Nelson Railway Committee; Mr. John George Blackett, Resident Engineer for Nelson and Marlborough; Mr. Henry Percival Pilkington, of Nelson; Mr. John Rochfort, C.E., Nelson, who handed in a statement and plans; Mr. Alfred Greenfield, Commissioner of Crown Lands, Nelson; Mr. Oswald Curtis, formerly Superintendent of Nelson Province; and Mr. John S. Browning, Chief Surveyor of Nelson Province, examined.

The Commission then adjourned.

WELLINGTON, FRIDAY, 8TH DECEMBER, 1882.

The Commission met in the Parliament Buildings at 12 a.m.

Present: All the members.

The Secretary was directed to request the attendance of Captain Johnson, Captain Fairchild, and Mr. Crombie, of the Property-Tax Office.

The meeting then adjourned.

SATURDAY, 9TH DECEMBER, 1882.

The Commission met at 10 a.m.

Present: All the members.

Captain Johnson, Captain Fairchild, and Mr. Crombie, of the Property-Tax Office, were examined.

Mr. Crombie was also requested to furnish a statement *re* tenure of land, &c., along the proposed lines of railway.

Resolved, That it is desirable to obtain the cost of the purchase of land for railway purposes northward from Amberley and southward from Blenheim, and also the result of any surveys that have been made of the several passes in the range between the East and the West Coasts of the Middle Island.

The minntes of the last six meetings were read and confirmed.

The meeting then adjourned.

DUNEDIN, SATURDAY, 3RD FEBRUARY, 1883.

The Commissioners met in the Public Works Office at Dunedin to consider their report.

Present: All the members.

Mr. C. Y. O'Connor was in attendance, and was examined as to certain portions of his memorandum and tables.

Portions of the draft report having been discussed, the Commissioners adjourned until Monday, the 5th instant, at 10 a.m.

MONDAY, 5TH FEBRUARY, 1883.

The Commissioners met pursuant to the adjournment of the last meeting.

Present: All the members.

On further consideration of the report, and in reference to the subject of a deflection of the line from Hanmer Plains towards Maruia, the following resolution was moved by the Chairman: That, seeing that the Colonial Government may be said to be committed to the extension of the central railway line northwards from Waikari to the Red Post, and that the line from Greymouth to Reefton is an authorized line, and that both these sections will in due time be completed,—in view also of the urgent demand now being made for a West Coast line,—a deflection of the central line from Hanmer Plains to the Maruia Valley, and thence to the Tophouse and Picton, might constitute a main line northwards from Canterbury which, while meeting the immediate wants of the West Coast, would, in the end, be found to be "less costly, and more advantageous to the colony," than either the central or the East Coast lines by the routes respectively herebefore proposed.

After some discussion the Commission divided, and the motion was negatived.

Aye, 1: Hon. Dr. Pollen.

Noes, 2: Mr. Fulton, Mr. Thomson.

The Commissioners then adjourned.

WEDNESDAY, 7TH FEBRUARY, 1883.

The Commissioners met at 10 a.m.

Present: All the members.

The report was completed and signed, and the Chairman was directed to transmit the same, with the minutes of proceedings, the minutes of evidence, &c., to His Excellency the Governor.

This concluded the Commission.

INDEX TO WITNESSES, ETC.

MINUTES OF EVIDENCE.

CHRISTCHURCH, MONDAY, 20TH NOVEMBER, 1882.

THE Commission met at 2 o'clock, in the Provincial Council Buildings.—(Hon. Dr. Pollen in the chair.)

Mr. EDWARD DOBSON, Civil Engineer and Surveyor, examined.

1. *The Chairman.*] You have been engaged, under the Colonial Government, in making a survey of the East Coast route?—Yes, lately. I had previously laid out a line through the Hurunui to Hokitika for the Provincial Government. That was many years ago.

2. On what particular part of the East Coast line have you been employed lately?—Between the Waiau and Kaikoura.

3. Have you made a complete survey of that line?—I have made a complete survey of that portion of the line. I have made a complete plan and section of it; it is all pegged out.

4. Will you be good enough to tell us the character of the country through which the line passes?—It is very hilly, but perfectly practicable for railway communication.

5. What is the length of the section?—My survey was twenty-seven miles. When Mr. Blair sent me down to set it out, it was considered to be the most difficult part of the East Coast line.

6. Have you made any estimate of the cost of the work?—Yes. Mr. Blair has complete reports and estimates in detail. The report I sent is very complete.

7. Do you remember generally what the estimated cost of the whole would be?—I would rather not trust to memory. Mr. Blair will no doubt furnish the Commissioners with the report. The piece that I have been surveying is considered to be the most difficult and most expensive of the whole of the East Coast route.

8. Are the plans available here, so that the Commissioners could see them?—I do not know whether Mr. Blair has sent them up yet. They were sent to Dunedin about a month ago.

9. Have you been over any other portions of the line than that you were employed upon specially?—Not to the north. I reported on the East Coast line about four years ago up to about ten miles north of Kaikoura.

10. You know nothing of the country further on than that?—I have not surveyed it, and I should not like to speak positively about it. It was not considered necessary to go beyond Kaikoura with the detailed survey, because Mr. Foy had already reported on the practicability of the portion of the line north of the Kaikoura. I know the line very well from Blenheim down to Awatere, but not further south.

11. The cost of the work on the part of the line you surveyed would be exceptionally heavy generally?—Yes, about ten miles of it would be exceptionally heavy.

12. The average cost of our railways being £6,000 a mile, that portion would be much more expensive?—About ten miles of that portion would cost about £15,000 a mile. [Section produced.] This section represents the most difficult part of the East Coast line; the most difficult ten miles to construct.

13. How long is it since you got instructions to undertake this survey?—Four years ago—in April, 1878.

14. *Mr. Thomson.*] What is the highest point of the line that you have to go over?—490 feet.

15. *Mr. Fulton.*] Can you tell us the character of the land through which this line goes?—Up to the Conway it is very fine land indeed.

16. Is it private property?—All private property; there is scarcely any Crown land at all there. All the Parnassus Estate is private land; also the Hawkswood Estate. Fernyhurst is also private land. The greater part of Claverly is also freehold, and a considerable portion of the Kahutara Run is freehold. Up to the Conway the land is very fine indeed. Then you come into a district which for several miles is nothing but pasturage. The steep hill-side is covered with rich soil, with a dense growth of either forest or fern.

17. *The Chairman.*] There is not much land under cultivation?—There is no cultivation, except here and there a paddock for growing oats for the station horses. There is no farming whatever on that portion of the country.

18. The line starts from Waipara?—Yes, the line would start from Waipara and go up the Omihi Flat.

19. No work has been done on that line?—None whatever; nothing beyond the Waipara Station.

20. What line is that which is being made from Waipara through Waikari?—I do not know what the Government call it. Of course it would lead to the Waiau Township through the Weka Pass.

21. Have you any idea of the amount of population in the district through which you have carried your line?—There are just eleven houses in thirty miles. There is no population. There is no settlement; nothing but runs.

22. Is it entirely open country? Is there any timber on it?—There are twelve miles of timber on the twenty-seven miles of my survey.

23. What is the character of the timber?—It is chiefly small birch, manuka, and scrub. It is of no value for timber purposes.

24. Not fit for saw-mill purposes?—Not at all; it is only valuable for sleepers and posts and rails.

25. *Mr. Fulton.*] On the map accompanying Mr. Foy's report of the 26th July, 1878, the railway line recommended passes through Waiau Township, over the Whale's Back to Kaikoura; can you say why that line was then recommended in preference to the one of which you are now speaking?—I can merely say that Mr. Foy was of opinion at that time that it was not possible to go along the coast. Mr. Carruthers spoke to me on the subject with special reference to the summit height on Mr. Foy's line of 1,500 feet, and I told him that I thought the line could be got along the coast with a summit level of not more than 500 feet. He then sent me to take a trial section, which I have just shown to the Commissioners, and the result of that was that, after four years' deliberation, the Government requested me to stake out that line, which I have done. Mr. Blair, before requesting me to stake it out, went over the coast line with Mr. Foy's report and mine in his hand, and examined the ground mile by mile.

26. *The Chairman.*] You were also engaged on the survey of the West Coast line?—Yes; I surveyed the line for the West Coast years ago.

27. On what part of the line were you employed?—I had the superintendence of the whole survey.

28. From where to where?—From the Weka Pass right to Hokitika. I conducted a series of railway surveys for railways over the whole of the Canterbury Province. The result is, I believe, in one of the offices in Wellington—a large atlas of maps showing the whole of the lines.

29. Over which of the passes on the range was your survey carried at that time?—Through the Hurunui Pass; I took barometer sections of all the passes south of the Hurunui.

30. With what view was that survey undertaken? Was it undertaken as part of the main trunk line, or as a special line to the West Coast?—It was undertaken as a special line to the West Coast at the time the gold fields broke out there. Mr. Moorhouse was very anxious indeed to get the line through.

31. It was not contemplated as forming any part of the trunk line from Canterbury northwards?—Not beyond Canterbury. I laid out the north line. An approximate survey of the West Coast line was a continuation of it.

32. A portion of that West Coast line would be a continuation of the trunk line?—Yes; of the northern line from the Hurunui.

33. *Mr. Thomson.*] What elevation did you go over to get to the West Coast?—Somewhere about 3,000 feet. I proposed to go over the Teremakau Saddle by a surface line with a summit grade of 1 in 15.

34. You could not go over with a grade of 1 in 50?—No; not without a very long tunnel. The best that you could get is 1 in 25 with a tunnel of two miles in length. But by a grade of 1 in 15 you went sidling up the valley so as to get over the Saddle without a tunnel. There is no real difficulty excepting that at the Saddle.

35. Where did the northern line that you laid off separate from the western line?—It did not separate. We did not go beyond the Hurunui, because they were all provincial surveys within the Province of Canterbury.

36. Did you consider at all the best route that the northern line should take?—Yes; I always considered the East Coast line as the only practicable line—that is to make a line that you can have payable traffic upon.

37. Did you not at all consider the line by Tarndale and the Hanmer Plains?—No; I did not consider it practicable for payable traffic—not such a line as would be worth making under the circumstances. I looked also at Arthur's Pass, but the difficulties were so great that I did not consider it at all available; I rejected it. A five-mile tunnel would be requisite up this Pass.

38. *The Chairman.*] Can you form an estimate of the traffic on the East Coast line?—No; that is a different thing altogether. I cannot see any present traffic on that line. There may be occasional traffic.

39. At present there appears no indication of it?—At present there is nothing whatever to make traffic. If the runholders would cut up their properties, both the country north of Cape Campbell and south of the Conway would carry a large population; but at present there is nothing but sheep.

40. The property of these runholders could be made much more valuable than it is by carrying a railway through the country?—Yes; very valuable indeed. I think that is shown by the fact that the moment the Government made the line up to the Waikari, Mr. Moore has made arrangements for cutting up the whole of the Waikari Estate, consisting of 12,000 acres, into farms consisting of from 50 to 150 acres each.

41. Can you give any idea of the increment of the value of the land from the fact of a railway being carried through it?—Mr. Moore's Omihi Flat and Mr. Robinson's Cheviot Estate might be so cut up that the flats and low downs would sell at from £12 to £18 per acre.

42. Is that possible?—Quite possible; it is magnificent land. There is plenty of room for sheep on the hill-sides, where there is good pasture. There are plenty of lovely flats capable of being cut into farms. It is magnificent country. A great part of the Hawkswood Estate is the same.

43. *Mr. Thomson.*] But independently of the profit which occurs to the runholders, does not a railway do good in this way: that economical laws come to bear upon them, and they are forced to cut up their land, and does that not do an immense deal of good to the colony in general by putting population on the land?—It would do a great deal of good in many ways. In the first place a great deal of valuable land would be brought into cultivation—land far superior to much of that which is being cultivated on the Canterbury Plains. It would establish a great number of thriving homesteads, and attract a very large and valuable population, and in course of time they would bring traffic to the railway.

44. Then, provided a through line, if required for colonial purposes, were to be made, there is no reason why, because the runholder gains a benefit by the railway, it should not go on?—Certainly not. If you had a hundred people with a hundred acres of land each, it would be considered an argument for going on with the railway.

45. Then I suppose you argue in this way: that by putting one hundred people on the land instead of one you do benefit the colony in the extra taxation they can bear, and so forth?—The extra taxation and the extra production. I think you may take the Cheviot Hills as a very good example. Mr. Robinson keeps about 60,000 sheep on 96,000 acres. At least 30,000 acres of that land might be in farms.

46. And supporting how many men, women, and children to the acre?—Perhaps three or four individuals to the acre. I think you would get a very large population on this land.

47. Then, considering the tendency of economical laws, you hold that a railway through good land will always be valuable to the colony?—Always.

48. Independent of whether it is Government land or not?—Yes; I think that is a leading principle. It is quite a question how far such a line should be made by the Government, and how far by private companies.

The Commission met again at 3 o'clock. They received a deputation from the Railway League of Christchurch, consisting of the following gentlemen: Messrs. Ruddenklau (Mayor), T. S. Weston, M.H.R., E. Richardson, W. Chrystall, C. E. Button, D. Reese, A. G. Howland, Thomas Pavitt, John Inglis, and T. B. Craig (secretary). Mr. Richardson introduced his Worship the Mayor of Christchurch, who then introduced the members of the Committee selected by the West Coast Railway League, who formed the deputation.

Mr. Richardson: I may state that I have been asked to act, to a certain extent, as spokesman on this occasion, and I have been requested to ask you, Mr. Chairman and Commissioners, whether the terms of your Commission will allow of your examining the various routes that have been surveyed and reported upon from time to time between this part of the Island and the West Coast.

The Chairman: The terms of the Commission—which no doubt the members of the deputation have seen—confine us to a report upon the several main trunk lines leaving Canterbury and going northward. Any West Coast line properly so called would scarcely come within the terms of our Commission. The terms of the Commission are very distinct in that respect. It says that we are to "inquire into the probable cost and economical value of the several lines proposed for the extension of the main trunk line through the Middle Island northward from Canterbury; and also to inquire whether any other line would be less costly and more advantageous to the colony." That means any other line going northward.

Mr. Richardson: Of course the Commission will understand that there are various interests represented in this room, and some of those interested are particularly anxious that the Commission should consider it a part of their duty to take into consideration some at all events of those routes which have been so far called West Coast routes, but still, at the same time, might be considered of such importance that they would be called trunk lines without absolutely, in the first instance, going direct north. I need hardly mention any of the routes, but I think the Commission will follow me in regard to the nearest possible way that the communication can be got between this side of the Island and the two main centres of population on the other side. If that can be brought in as part of the trunk line—if it can be considered by you to form a portion of the trunk line—the deputation would be only too glad that you should examine and report upon it.

The Chairman: That is a matter which may fairly come within the scope of the Commission.

Mr. Richardson: The deputation understand that the Commission have been placed in possession of the reports that have been so far made by the various Government officials since the initiation of the Public Works scheme. Amongst them will be found reports upon two or three routes at all events. One of them was referred to particularly by Mr. Macandrew in his Public Works Statement of 1878 as being a line which it would be very desirable to make as a part of the trunk line. That line was the line through from Amberley to Brunnerton, part of which has already been constructed. I think, from your answer just now to the deputation, you may perhaps be able to take that line into your consideration and report upon it. Of course the League that has been formed here have viewed with considerable alarm the proposed intention of the Government to construct a railway along the east coast of this Island direct north; and one object of this League has been to convince the members of the Government, and now to endeavour to convince you—or to request you to pay particular attention to their views in the hope that you may agree with them—that it is absolutely inadvisable to make such railway. I think I am safe in stating that they also consider that what is known as the part inland and part coast route has also the same objection. The deputation are led to believe that the route the Commission have already examined—that is, the route coming down direct from Tophouse through the centre, if I may call it so, of the northern part of this Island—is also objectionable for many reasons. I think what we now wish to ask you is: whether, in the course of your duties, you will take into consideration, and critically examine and report upon, the route which was proposed in 1873 and 1874. I think from your position, Mr. Chairman, you will remember that at an earlier date than that it was proposed that the trunk line northwards should go somewhere through the hills and join the line adopted by Parliament, so as to connect Nelson with Greymouth and Hokitika. That the deputation consider must come within the scope of your Commission without doubt. From any information in the papers we have seen here we are not aware that your special attention has been called to that route, and the deputation are particularly anxious that, before reporting on this question, you should have at all events all the information. I believe I am right in stating that there is ample information to enable you to form a conclusion as between the various routes without requiring detailed observations, except it be a verification of the statements that have been made as to the natural resources of that part of the country by Government geologists or whoever you may deem necessary to consult on the matter. I think the Commission will see that there are two points there: one is, that one large interest which is represented here to-day is particularly anxious that the trunk line should be made as far as it is possible to accommodate the interests on the West Coast; and the other is, that in whatever direction this line may go, it should be taken where it will be of the greatest advantage—in terms of your Commission—commercially and otherwise, to the interests of the colony at large. I think that is about all I was requested to say here to-day. As you have already stated that any line which can be shown to

form a part of the trunk line will come within the scope of your Commission, I am sure the deputation will be glad to hear from you that one or two at all events of these lines will so come within the terms of your Commission.

The Chairman: I can only state, gentlemen, that the Commissioners are in search of information, and will most gladly receive any information upon the subject which has been committed to them for investigation, from any quarter from which it may come. I am quite aware, from my own personal recollection, that the line originally contemplated by the Government in 1873 and 1874 proposed to form a connection with the west coast of the Middle Island; and I observe, from the terms of the resolution which has been transmitted to the Commission, that the deputation were instructed to collect statistics and information regarding the different routes northward as well as to the West Coast. Although, as I have already said, we cannot report specially upon any West Coast line, so called, we shall be very glad indeed to receive information upon any portion of that line which can be said properly to form a portion of the main trunk line northwards—that is to say, that any portion of the line from Canterbury northwards across the ranges to the West Coast, which might properly be taken to form part of the line to the north, would be held to be part of the subject on which we desire to obtain information, and on which it would be competent for us to report. The only question is as to the form in which that information should be communicated to us. I think it would be convenient if the deputation would see fit to appoint one of their number to prepare information; to get up all the statistical information you desire to give upon the question of this route, and present it in as compendious a form as possible to the Commission. I do not know whether I have sufficiently answered the question which Mr. Richardson has put to me. If there is any other information the deputation wish to have as to the intentions of the Commission, and the purport of their visit, I shall be very glad to give it.

Mr. Weston: I understand, from the remarks you have been good enough to make, that you would not regard a direct line from Christchurch to Brunnerton, for instance, as a line within the terms of your Commission.

The Chairman: No, clearly not.

Mr. Weston: Would you and your colleagues regard a railway from the Hanmer Plains to Nelson Creek as a line coming within the terms of your Commission?

The Chairman: I think not, unless you could show us that that was really a portion of the trunk line north. That is the indispensable limit, I take it, of our jurisdiction.

Mr. Weston: From the answer you gave to my friend Mr. Richardson, I conclude that you would regard a line from the Hanmer Plains up to Reefton, and from Reefton direct to Nelson or Blenheim, as the case might be, as a line coming within the terms of your Commission?

The Chairman: Not even so, I think. I did not specify any particular route. I said generally that any line taking the west side of the main range, that could be shown to properly form a portion of the main trunk line, would come within our inquiry.

Mr. Weston: The Commission would not even bind themselves to take Reefton *en route?*

The Chairman: Not specifically at present. We can only bind ourselves to that which is within the four corners of our Commission, and the making of a line to any particular point on the West Coast would be certainly outside it.

Mr. Weston: I followed you somewhat carefully, and you stated, I think, that you would be glad to consider any portion of the line that might ultimately lead to the West Coast.

The Chairman: To receive information upon it.

Mr. Weston: To receive information upon it; but of course it is perfectly evident that a line the half length to the West Coast would be for all profitable purposes *per se* useless.

Mr. Button: Would it be outside the Commission, in the report you would send in, to make any reference to the strong representations that might be made as to the urgent requirements of the West Coast line?

The Chairman: We should be prepared to receive that as part of the information which the Committee might submit to the Commission.

Mr. Weston: I understand you to say that you would not report specially upon information of that kind—that it would be beyond the terms of your Commission.

The Chairman: We would be glad to receive it, but we have no authority to make any report upon it; it is entirely outside the scope of our Commission.

The Mayor: If that is your answer I think our mission here is almost useless. It was understood, by the terms of your Commission, that it was part of your instructions to examine and see the utility of a trunk line to be extended along the West Coast to Nelson. Of course, as far as Canterbury is concerned, we consider the East Coast line and the inland line completely premature and not beneficial to the public. We consider the only line in the interest of the public would be one *viâ* the West Coast, and I think the province is unanimous in that opinion. We have formed a league composed of the representatives from the different local bodies, who are all of opinion—not one of them against it—that the £180,000 should be devoted to the construction of a line *viâ* the West Coast. If the Commission of course are going to examine the best route, we want to ascertain positively if it comes within their instructions to consider the advisability of constructing the main trunk line *viâ* the West Coast, because we consider the other lines are premature. They are at present fancy lines, and the country cannot now afford to construct these lines. They will not pay the interest on the capital expended, and besides they will not be beneficial to the public.

Mr. Weston: If I may be pardoned for again rising, Mr. Chairman, it seems to me, from the remarks you have made, that after all you will be left pretty much to one of two lines—either the East Coast proper or from Canterbury *viâ* Tophouse. I was going to ask you whether you could not regard as within the terms of your Commission Reefton as a point *en route.* [Plan produced and explained to the Commission.]

Mr. Reese: From the answer given to Mr. Richardson I gather that the Commission are prepared to receive any information with regard to the necessity for a railway to the West Coast, so long as we do not pretend to lay down a particular route.

The Chairman: It being understood that it is entirely without our province to report specially upon it.

Mr. Reese: The question is, whether the latter part of your Commission does not give you that right. The answer that we received from a member of the Government here leads us to believe that you would be prepared to report upon the advisability or otherwise of a railway to the West Coast.

The Chairman: Nothing is clearer, from the terms of the Commission, than that our duties are confined to examining and reporting on the routes for a main trunk line northwards.

Mr. Reese: I think the latter part of the Commission refers to any other line that would be beneficial to the interests of the country.

The Chairman: No; the instructions are very plain, that the line must be carried northwards. It means any other trunk line in that direction.

Mr. Reese: Mr. Foy reported on a main trunk line northwards going from Amberley to Brunnerton, and from Brunnerton to Nelson. Does that not come within your province to consider as a main trunk line northwards?

The Chairman: No; a line going south-west can hardly be said to be a line northwards. The object is by the shortest main route to connect the ports of the North Island with the ports of the South Island.

Mr. Reese: The whole object of the Canterbury people here has been to try if possible to get connection with the West Coast in preference to having the East Coast railway. There cannot be a necessity for the East Coast railway and a necessity for the West Coast railway. I might give you a few statistics that would be the means of showing that Canterbury is a great producing province. Last year Canterbury exported more than all the other provinces of New Zealand; and, consequently, we want consuming power. Possibly, if we had communication with the West Coast, we would be able to get minerals to supply our local industries in and around Christchurch. That is really what we want, to a certain extent, to be able to encourage local industries in and around Christchurch, and at the same time to increase population on the unexplored portions of the West Coast. We want the West Coast railway to get direct communication if possible. We are quite prepared to leave the route with the Government if they will only go into the question of a West Coast railway.

The Chairman: That is a question for the Government and the Legislature, and not for the Commission. All we have to do is to follow the directions and use the authority which have been given to us. These are very definite, as you can see.

Mr. Reese: Then anything we could do would not have the effect of getting you to report on the West Coast railway?

The Chairman: Of giving us authority to make a special report on the West Coast railway, clearly not. I put it plainly to you that it is outside our jurisdiction. I would point out that there is another way in which the interests of the West Coast might be very greatly forwarded—namely, by the deflection of the line to the west side of the main range. In that sense I think it would be well for you not to give up the further prosecution of the inquiries you have begun.

Mr. Reese: Mr. Foy's No. 3 route is an extension northwards, and goes over what is known as the Amuri Pass, up the Wairau and up the Hope River, and down to Brunnerton. Anything like that would satisfy the greatest population on the West Coast. The population on the West Coast is 15,000 as against 7,000 on the Nelson side of the Grey on the Reefton Gold Fields, and there is an unexplored portion of the West Coast extending for 150 miles from Hokitika to Jackson's Bay. What we want is, if possible, to divert the money for the construction of the East Coast railway to the construction of the West Coast railway, and give Canterbury as direct communication with the West Coast as possible.

The Chairman: That the Commission of course have no power to do.

Mr. Pavitt: The deputation now find that your duties are strictly limited to the extension of the Northern Trunk Railway. It has been decided that we as a body should come here and represent the necessity of the construction of the West Coast railway, but as far as I can form an opinion any information that we might give would be almost valueless for the object we have in view. I take it that unless we can bring a certain amount of argument to prove to you that the construction of a line to the West Coast would form a portion of the main trunk line to the north, whether to Blenheim or Nelson ultimately, our business is simply at an end, and we have occupied your time this afternoon almost uselessly. We were led to think, from remarks made by the Minister for Public Works the other day, that you were in a position to receive information regarding the construction of this particular West Coast railway as well as to hear what we had to say in favour of delaying the construction of the East Coast railway. There can be no question that the whole body of the Canterbury people are very clear as to the uselessness of the construction of the one and the importance of the construction of the other. I am sorry that our duties seem to be valueless so far.

The Mayor: I would add to what Mr. Pavitt has stated, that as you have no power to consider the West Coast line, the best plan would be for us to endeavour to get the Government to amend your instructions, so as to enable you to consider the advisability of examining the West Coast line as one of the main trunk lines. Of course Canterbury will not be satisfied with any other recommendation, and it might be satisfactory to the people of the province, while there is time, if we were to make representations to the Government to enlarge your instructions, so that you could consider the advisability of the trunk line going *viâ* the West Coast.

Mr. Weston: After what you have said, Mr. Chairman, perhaps I need hardly ask you whether you would be prepared to inspect any of the routes connecting the East and West Coasts.

The Chairman: That will depend altogether upon the evidence as to the practicability of the routes and the advantages that would be derivable from the deflection of the line in that way. It was upon that point we expected to receive information and assistance from the deputation. I find from the terms of their resolution that they were "to collect statistics and information regarding the different routes northward, and West Coast." We do not refuse to receive any information on the subject of the West Coast proper, but it is outside our jurisdiction to report upon it. Our duties are strictly confined to the main trunk line—not going west but going north; that is, the main trunk line connecting Canterbury with some part of Cook Strait.

Mr. Weston: Of course you have the reports of several engineers upon the various routes, and I think Mr. Blair, reporting on Arthur's Pass, refers to the commercial value of the line. We have also Messrs. Thornton and Brown's surveys; and Mr. O'Connor's report also touches upon its commercial worth. It occurs to me, and to the members of the deputation, that if you should think fit to inspect that line, with all those data before you, we should be very glad on your return to supply you with further information, which may assist you in estimating its business worth, and so forth. We are not prepared with a bundle of statistics at this moment, as it was only a day or two back that we heard you would be here very shortly. Unless you were prepared to make a recommendation upon it for the consideration of the Government and of Parliament, it would be scarcely worth our while to take the very great trouble that the preparation of these statistics would give us, or indeed to trouble you to read them.

Mr. Howland: I understood you to say that the Commission would be prepared to receive information on any of the lines, and would report on the information, but not on the lines; that you could not report on any line that was not marked out as a trunk line.

The Chairman: I have stated that the duties of the Commission were confined absolutely to reporting upon the best route for a trunk line to connect Canterbury with some northern port in Cook Strait; that the West Coast line, properly so called, was not included in our Commission, and would be entirely out of our jurisdiction. I may say moreover that the West Coast line proper has not been, so far as I understand, contemplated by the Legislature at all, inasmuch as no specific appropriation has been made for a West Coast line. That being the case, before the mind of the Legislature was known on the subject, it might not be competent for the Government, except for the sake of collecting information on the subject, to issue a Commission for the purpose of determining that question. What we have to do is outside of that. It is possible that, in exercising the jurisdiction which has been confided to us, you might be able to show us that it would be exceedingly desirable to take the line northwards on the west side of the range. I think, if that could be accomplished, the interests on the West Coast would be very considerably promoted thereby. At any rate, I think it would be worth while to get those persons interested in the subject to assist us in the way proposed by the resolution of the committee of the League, by giving us all the information and statistics to show that such a deviation was desirable. Once the railway was made through the best available part of the ranges on the West Coast, all the rest would follow as population increased and the necessities of the districts arose. No doubt Parliament would take care that the interests of the West Coast would not be neglected in the future as they have not been in the past. Members have hitherto been active enough in the discharge of their duties in protecting the interests of their constituents, and no doubt in the future there will be opportunities of getting something more done. If so much could be done, and if it could be shown to us that this portion of the West Coast line could properly be regarded as part of the trunk line northwards, a great deal of that which the West Coast people advocate might be attained. It is in that direction, I think, it would be wise for the deputation to act. They should apply themselves to that particular point, and give us such information as will help us to come to a proper decision on that subject.

Mr. Howland: I understand that the Commission would be prepared to receive information in regard to a line which is considered a main trunk line—any information regarding the West Coast line.

The Chairman: We must not fence with words. I have endeavoured to make myself understood. The Commission have no sentiment, no prejudice or preconceived opinion upon any possible line. We seek to do the best we can, and we shall feel obliged to any one who will render us assistance so as to enable us to come to a proper conclusion. I shall be very plain in saying that the West Coast line proper is entirely outside our jurisdiction. We have nothing to say to it. There is no provision for making it, and it cannot be made just now.

Mr. Button: You have to report on the way to get to Cook Strait.

The Chairman: Exactly.

Mr. Inglis: I presume that if we could put before you information regarding the East Coast line to show that the probable traffic in that direction would be extremely small, whereas another route might be pointed out which would bring a certain amount of traffic very much in excess of that on the East Coast, you would be prepared to receive any information with regard to that other line.

The Chairman: We would be happy to receive such information from you.

Mr. Inglis: With regard to the East Coast line, the general opinion in this part of the Island is that there cannot be any paying traffic upon it for many years to come. With regard to the line direct by the Hanmer Plains and by the Tophouse, as to the engineering difficulties of course we know very little, but at all events it is known to be a somewhat impracticable line, inasmuch as it is subject to snow to a very great extent, and that the nature of the country itself is not such as would be likely to produce any trade whatever. Then, on the other hand, leaving the third route, which is merely a slight alteration of the East Coast line, there is the route to Reefton which I understand has been proposed as far back as 1873 or 1874. This is supposed to start from the Red Post, as it is called, on the Waiau, go up the Waiau, and over one or other of the saddles, and find its way to Reefton itself. If the League can show that along a considerable part of that route there is a great quantity of timber, coal, gold, and minerals of all kinds, which would be carried by the line and produce a traffic, then I presume it would not be unreasonable for the League to expect that the Commission would receive such information in the direction of connecting Christchurch with Cook Strait. I know something of the route myself, having been over a considerable part of it, and by getting to Reefton we meet the railway which is proposed to go to Nelson; and at the Tophouse, if funds are available, there will be no difficulty in connecting with Blenheim. We are narrowed down very much to this position: that if we can show that there is a route that practically takes us north the Commission will be prepared to receive all the information we can give them on the subject.

The Chairman: Certainly.

Mr. Inglis: I shall be glad to help the Commission in any way, and I can do so by producing the evidence of gentlemen acquainted with the country to show that a direct route to Tophouse is quite

inadmissible. I should be sorry, by anything I might say, to induce the Commissioners to go over the routes themselves. It is quite unnecessary, as it would be easy to get statistics and information without travelling the route. These are engineering questions, but it seems to me that the League might assist the Commission very much by furnishing statistics in regard to the different routes that have been proposed.

The Chairman: That is exactly the information the Commission would desire to receive.

Mr. Chrystall: I understood you to say that the Commission could not report upon any line involving a deviation as far west as Reefton?

The Chairman: I cannot answer that question. We are bound by the terms of the Commission, and while feeling ourselves so bound we do not refuse to receive any information that may be tendered to us upon the subject of the West Coast line connecting with Canterbury. It must, I repeat, be clearly understood that the duty of reporting on the West Coast line is not within the four corners of our Commission at all, and that we have nothing to do with it. We are directed to report upon the best route for a main trunk line northwards.

Mr. Richardson: All the lines referred to directly or indirectly to-day are laid down in the various maps which are probably in your possession. It appears to me that if some one were appointed by the deputation to wait upon you and ascertain upon the maps which of the routes you would take into consideration, then they could get sufficient statistics to enable you to arrive at a just conclusion hereafter. It seems to me that that would be the best practical way of getting what you want, otherwise we should be working in the dark.

The Chairman: I think you are quite right, and the Commission would be glad to adopt that suggestion. We may be said now to have broken the ice of this inquiry, but the real work of collecting statistics, evidence, and such information as can be relied upon must be done by one or two persons. Our proceedings to-day are of a conversational character, each one endeavouring to arrive at the other's views, but the proper way of obtaining reliable information is that which has been suggested by Mr. Richardson.

Mr. Richardson: I might be allowed to ask you, on behalf of the deputation, to indicate what your movements will be—whether you will remain any length of time in Christchurch, or go away and return again.

The Chairman: If the deputation are prepared to give us the information we will remain as long as it is necessary to get it.

Mr. Richardson: The statistics and information with regard to any particular route to be inquired into can be readily obtained. The members of the deputation could probably put their fingers upon it if they only knew the direction you wished the information to go.

The Chairman: The particular information we should be glad to get would be with respect to the character of the country, and the difficulties of that particular line that would cross through the Cannibal Gorge and up by the route through the valley of the Maruia to the Tophouse, and thence to Nelson or down the Wairau Plains to Blenheim.

Mr. Weston: Would you like special information with regard to the other northern routes?

The Chairman: Yes.

Mr. Reese: Do we understand that any statistics or information we may give you in reference to the West Coast line would have some kind of report attached to it; or are we to gather this information without the hope of a report on the West Coast railway?

The Chairman: I do not know that we could report officially at all on the West Coast railway; but no harm would be done in giving us any information. We do not refuse to receive it; but we have no authority as to the West Coast railway at all.

Mr. Richardson: As far as this meeting to-day is concerned that is all we need trouble you with, and I have to thank you for the patient hearing which you have given us. No doubt the hints you have thrown out will be availed of, and a communication will reach you as to who has been appointed by the deputation or League to afford you all the information we can possibly give you on the matter.

The deputation then withdrew.

CHRISTCHURCH, WEDNESDAY, 22ND NOVEMBER, 1882.

The Commission met at 10 o'clock.

Mr. HENRY BOGIE HUDDLESTON, Civil Engineer, examined.

49. *The Chairman.*] I understand you wish to give us evidence relative to the main trunk line of railway northwards?—Yes; my principal object in seeking an interview this morning was to afford some information upon the East Coast railway, on an alternative section of which I was engaged to report. I am very well acquainted with the district.

50. What do you call the East Coast line?—I call the East Coast proper anything that does not go by the West Coast. It is divided into what you may call three independent schemes at the present moment. There is the line starting at the Waipara by way of Cheviot Hills, Hawkswood, and on to Kaikoura. Then the constructed line to Waikari continued on to Waiau, and thence by the Greenhills to Kaikoura. That is the East Coast proper. Then there is the line that the Nelson people are most anxious about—a divergence at the Waiau, across the Hanmer Plains by the Clarence, the Acheron, over Tarndale, through the Wairau Gorge, and by the Tophouse to Nelson or Blenheim, as the case may be.

51. With which of these routes are you most familiar?—I am perfectly familiar with them all; but the one I wish to speak particularly about is the line by way of the Greenhills, and an alternative route joining Mr. Dobson's line by Fernyhurst. In carrying the line from the Red Post by way of the Greenhills there is a great difficulty in regard to the levels, otherwise the district is desirable as a country for settlement. A very large extent of country would be opened up by carrying the line that way to Kaikoura. To obviate the difficulty regarding the levels I explored two other alternative lines between the Waiau Township and Kaikoura—one taking a route between the Monkey-Face Spurs and the Greenhills Station, which considerably reduces the summit level at that point. The

other is an entirely new line, as far as my own experience goes. It starts a few miles south of the Red Post, at a point known as the Culverden Post Box; from there crossing St. Leonard's Run to the centre of Mount Palm, and by a tunnel through Mount Palm on to the north-east corner of the Cheviot Hills Run; thence across the Waiau and on to the Parnassus Run by way of Hawkeswood and Fernyhurst, joining Mr. Dobson's East Coast line on Mr. Robert Tinline's property.

52. Did you make an exploration or a survey of the line?—It was merely an exploration. But this is a route which I think it would be well, if it were possible, for the Commissioners to look at on their journey. It is worth the time it would occupy, because to my mind it has so many advantages. It uses the whole of the constructed line as sanctioned by the Government. You might start at the Red Post, but it would be more convenient to begin a few miles further south, because you get an easier grade. From the commencement to the end of this route it is a falling grade the whole way.

53. Were you employed officially?—I was employed professionally by the Kaikoura Railway Committee.

54. Have you any plans?—No; it was not a survey, it was an exploration. I can point out the route to you on the plan. [Plan produced and explained to the Commission.]

55. Will you supply the Commission with a sketch of the route spoken of?—I shall do so; I shall state at the same time what I consider the advantages this route possesses over the other suggested routes, and afford you as much information as I can regarding it.

56. Is there any Crown land available for disposal in the district through which your line goes?—The Crown land that is available is not very extensive and not of very great value.

57. There is a very small quantity of it?—A very small quantity.

58. Then the whole of the country would be in the hands of private individuals?—Yes.

59. The general character of the land is good?—Yes, between certain points. The character of the land, where ploughable, is all corn-growing land.

60. Can you give the Commissioners any idea of the population of the district?—It is very sparsely populated, and merely in connection with the runs.

[Mr. Huddleston subsequently furnished the Commission with the following preliminary report on suggested route for connecting the Amuri District with the East Coast by railway:—

To the Hon. Dr. Pollen, M.L.C., President of the Middle Island Railway Commission.

SIR,— Christchurch, 23rd November, 1882.

I have the honour to bring to your notice, and that of the Commission, an alternative route lately discovered by myself for extending the Great Northern Railway to the East Coast, and at the same time utilizing the whole of the present constructed and sanctioned line to within a few miles of the Red Post on the Culverden Run, Amuri, thus affording means for opening up the principal blocks of agricultural land suitable for settlement in that part of the Nelson and Marlborough Provincial Districts.

The place at which I suggest diverging from the present northern railway route is known as the Culverden Post Box, situate only a few miles south of the Red Post, from whence, in a north-easterly direction, an even and almost level grass plain extends to the Waiau River, having the Township of Rotherham and the Isolated Hill Run on the north and the St. Leonard's Station on the south and west. Following this valley for some six miles, a hill known as Mount Palm is reached, forming the north-east end of the Lowry Peaks on the St. Leonard's Run, passing under which by means of a tunnel—probable length 120 chains—another similarly level plain extends to the western side of the Cheviot Hills Run, a point from which a large block of agricultural land could readily be made available for settlement, and a very important inland railway-station and township established. From thence the line would cross the Waiau River on to the Parnassus Run, where another considerable plain, east and north of the station, is to be found; crossing this and following the western boundary of the Hawkswood Run, by way of the Leader, a stream having very low and even banks, much more good land is made available, and the Conway reached without materially increasing the grade, and at a point opposite the Fernyhurst Station, where a junction with Mr. Dobson's proposed line from Waipara to Cheviot could be readily effected.

The special advantages of the route described in this preliminary report for the extension of the railway north consist in directness, easy grades, cheap construction, and no greater engineering difficulties than driving a short tunnel through free-working rock and providing a combined railway and road bridge at a very important point (prospectively) on the Waiau River, where a desirable site exists. A road-station at the Culverden Post Box and a second-class railway-station about half-way to Mount Palm would bring the Waiau Township, with its adjacent blocks of agricultural land, within twelve miles of the railway, and the St. Leonard's Run, now in several distinct holdings, would be served by the same railway-stations; also the Township of Rotherham and the Isolated Run, an estate well suited for subdivision into farms. Another railway-station would be formed on the Cheviot Run, which eventually would develop into a leading position on the line, forming a nucleus for extending settlement. The further extension of the line over the Conway to Fernyhurst offers no greater difficulty than a long bridge at a moderately high level to join Mr. Dobson's surveyed line by the Kahutara River and the ocean. In the event of Mr. Dobson's route north proving too expensive, I doubt not, judging by my own local knowledge of the country, that another and cheaper line could be found by exploring the valleys, terraces, and passes between the Conway and its tributaries and the Kahutara Hills.

The accompanying sketch-map, though on a small scale, will I hope assist the Commissioners better to follow the written description. I have, &c.,

H. B. HUDDLESTON, C.E.]

The Commission met again at half-past two o'clock.

Mr. JOHN TINLINE, examined.

61. *The Chairman.*] You have, I understand, taken some interest in the establishment of railway communication from Canterbury northwards?—I have.

62. On which of the projected routes are you in possession of the most complete information?—I am in possession of information upon both routes.

63. You have compiled some statistics respecting these lines which have been published?—Yes.

64. Have these statistics and maps reference to any particular line?—To both lines—the Central line and the East Coast line proper.

65. Can you state to the Commission which of these routes is, in your opinion, the better one?—In my opinion the central line is far before the other one. If there is to be a line to Cook Strait, there is no comparison between them as to the benefits that would be done to the colony.

66. On what ground is that opinion based?—Upon the returns before you which I have compiled. I have bestowed considerable care in compiling them. They are authentic, to the best of my belief, in every way. The country that you see coloured yellow on the map would send its produce by the central route. The country that is coloured pink would be benefited by the East Coast line. A larger extent of country would certainly be benefited by the inland route. It would also be the means of making the railway system between here and Cook Strait complete, whereas if you take the line to Picton and Blenheim alone you leave out Nelson and its railway, and you leave out also all connection with the West Coast.

67. You regard the extension of the central line as giving the West Coast people the opportunity of obtaining communication with the main trunk line?—Yes.

68. Having given some attention to the matter, have you ever made any calculation as to the possible traffic upon this route?—No; but I have given it a considerable amount of care; and I will put a case like this: A person coming up from Dunedin for the purpose of going to Wellington starts from Dunedin by the morning train and arrives in Christchurch at 8 o'clock in the evening. He there meets the train at 8.15, which takes him to the Port, and even by the indifferent steamers now running that passenger arrives in Wellington about luncheon-time next day. If he preferred the overland route to Wellington, as we have got no night-trains he would require to wait in Christchurch the whole night. He starts again in the morning, and it will be late the next night before he gets to Picton, and then he has a sea-passage to undertake before he gets to Wellington. I am speaking now of passengers coming from the South to Christchurch. That person would lose twenty-four hours in the journey to Wellington. Supposing he wished to go to Taranaki or Auckland, he would be a gainer of time if the central line were extended to Nelson from the Tophouse and a direct steam service between Nelson and Taranaki and the Manukau.

69. You are aware that it is probable within a very short time a steam service will be established on the coast running from the Manukau to Lyttelton, calling at Wellington only?—I was not aware of that. I knew that there were fast passenger-boats building to run between Lyttelton and Wellington. I was not aware that they were to go to the Manukau.

70. Supposing such a passenger steam service were established making the voyage from Wellington to Lyttelton within ten hours, and keeping in view the traffic between the two Islands, you think there will be a considerable loss of time in getting from Dunedin to Wellington by going along this projected line?—Yes, I am quite sure of that.

71. The steamer from Lyttelton would afford a speedier means of getting to Wellington than the projected railway to Picton?—Yes, it would.

72. The present population on the East Coast line or the central line is very small, I believe?—Very small.

73. Greatly scattered and very few in number?—Yes.

74. As a matter of fact the prospects of immediate traffic upon the line would be very small?—Yes. I think a good deal of the land might be more profitably occupied than by sheep runs. I think if there were better accommodation the Hanmer Plains Springs would attract a considerable number of people. Even now people go up there from time to time. What frightens people is the Waiau River; it is a very fatiguing journey. The land round the Springs is not the best, but it will grow something, and it is still in the hands of the Government. It is a reserve belonging to the Government.

75. Is not a great bulk of the land along the route in the hands of private individuals?—Not between Hanmer Plains and Tophouse; it is nearly all Government land. On your journey you would hear all sorts of statements about the inclemency of the weather, and about the land there being of no value. From my knowledge of it, it is what is called a fattening country, and is exceedingly valuable. It is a country that will fatten stock, and, as I say, most of it is still in the hands of the Government.

76. *Mr. Thomson.*] In advocating the central route which line do you take, the line by Tarndale or by Maruia?—By Tarndale; but either one or the other is much preferable to the one on the East Coast.

77. But the Maruia route is even better than the East Coast one?—Yes.

78. Which terminus, Nelson or Picton, would you recommend?—I would have two termini. Let the Nelson railway join on at the Tophouse and the Picton railway come up from Blenheim to Tophouse.

79. Have you calculated the distance between Christchurch and Nelson?—I have not.

80. By either route?—I have not calculated the distance; that would be a matter for an engineer.

81. Do you know the height above the sea to be overcome?—Yes, 3,400 feet.

82. Have you calculated the mileage of agricultural land through which this line would go?—I was asked to do so, and I refused to make any estimate. I could give an opinion of the quantity of good land on each run, but as I might displease many of my own friends if I did so I declined to do it. I have not reckoned the quantity of agricultural land on either route, but I can say that between Hawkeswood and Flaxbourne, with the exception of a few thousand acres at Kaikoura, there is not one single run in this part of the country that could spare an acre for agricultural purposes. Every hilly run must have a certain quantity of level land, and most of these runs have not got sufficient level land to work their hills upon.

83. How much agricultural land is there upon the route by Tarndale, how much pastoral, and how much barren?—There is a good deal of both agricultural and pastoral land. Every run betwixt the Hurunui and the Waiau could spare a quantity of its land for agriculture, but I could not estimate the quantity.

84. Can you give us any estimate of the extent of agricultural country between Renwick and the Hanmer Plains?—I should think there is not very much.

85. Have you any idea how much there is?—I have not the least idea. I should say that the greater part of the Delta Run, although not the best country, might be put down as agricultural land. I think, for the most part, the country up to the crossing of the Waihopai from Blenheim might be termed agricultural land, with the exception of river-beds. I think a good part of Summerlands might be ploughable, but I do not think you would make much out of it in cultivation. I should think Bankhouse Run could spare nothing for agriculture, nor Avondale. There might be some agricultural land at Lansdowne and Hillersden, but I could not say the quantity. From Hillersden to Tophouse there is very little agricultural land. From Tophouse to Tarndale there is nothing but a bush valley, with very little agricultural land. Then from Tarndale to Hanmer Plains I should say there is very little land to spare for agriculture; in fact, all these valleys are wanted for the hills. In the Upper Awatere there is a considerable portion of land that might be available for agriculture. Then the Muller and Langridge is very fair country, but very high. It is ploughable, and could grow something some time or other.

86. Can you give us an idea how many acres of agricultural land there are between Renwick and the Hanmer Plains *viâ* the Tophouse?—No, I could not.

87. Having brought before the public a proposal to carry a railway that way, do you know the mileage between the two points?—I do not.

88. Have you gone into the subject of the gradients of such a railway?—Yes.

89. What is the steepest gradient?—1 in 50.

90. What was the ruling gradient?—The ruling gradient was much less than that, but the steepest gradient was 1 in 50.

91. Have you made any estimate as to the cost of the construction of the railway?—No, I have not; but I have given the matter consideration, and the cost of it per mile would be much less than a railway by the East Coast.

92. Not having made an estimate of the cost, how can you compare it with the East Coast railway—by what means do you do so?—From my thorough knowledge of both the East Coast and inland routes.

93. Have you made any estimate of the cost of the East Coast railway?—No.

94. Then you can give no information as to the cost of either of them?—No.

95. Have you gone into the subject of the cost of maintenance?—No.

96. Or the annual receipts of the railways?—No, nothing of that sort.

97. Have you gone into the question as to the extent of population in the district between Renwick and Hanmer Plains?—I have.

98. Will you kindly state it?—By the latest census returns of 1881 the central railway would affect beneficially 47,000 people.

99. Would you be so good as to state where these people are living between Renwick and the Hanmer Plains?—I do not mean that they are living between Renwick and Hanmer Plains. I think there is a population of about 700 between Renwick and the Tophouse.

100. I am asking as to the population between Hanmer Plains and Renwick, including Tophouse?—I should say that the population between Hanmer Plains and Renwick would be about 700, not including the people living on Hanmer Plains.

101. Have you considered the mileage between Kaikoura Township and Wellington by sea?—Yes.

102. How many miles is it?—About ninety miles.

103. Then supposing the railway was to terminate in the meantime at Kaikoura Township, how long would it take a first-class steamer to run up from Kaikoura?—A first-class steamer going eleven knots an hour would take about eight hours and a half.

104. Does the railway between Christchurch and Kaikoura Township go through good land or bad land?—It goes through exceedingly good land between Christchurch and Waipara.

105. Then between Waipara and Amuri does it go through good land?—It would go through some good land.

106. Not much good land?—No; not a very large quantity of good land.

107. Are the Cheviot Hills good land?—There is good land on the Cheviot Hills.

108. Can you state the quantity?—I am not prepared to say exactly.

109. Do you know the quantity?—Yes; I know it pretty well.

110. If you know it well do you not think you are bound to tell us?—I should be glad to tell you, but my estimate might not be exact. There is a good deal of good land on the Cheviot Hills.

111. How many acres?—At a rough estimate I should imagine that 30,000 acres might be available for agriculture.

112. How much on Hawkeswood Run?—With the exception of the Government reserve at the mouth of the Conway there would not be 500 acres on Hawkeswood Run fit for cultivation.

113. Is it your opinion that, supposing the line were carried from Waipara to Kaikoura Township it would not be a payable line?—It would not be a payable line in my opinion.

114. Neither for goods nor passengers?—No; that is my opinion.

115. Then would it be useful, for through passage between Wellington and Christchurch, to take the line from Christchurch to Kaikoura Township and go from thence to Wellington by steamer? I should say it would be useful, but at the same time it would not compete with a direct steam line from Lyttelton to Wellington.

116. Could steamers call at Kaikoura Township?—Not always; the only class of steamers that

could go into the Kaikoura Harbour are vessels like the "Tui," and they could not always get in there. It is a little beach harbour.

117. Is it improvable?—They have improved it very much.

118. By means of more engineering outlay could it be improvable?—Not to any extent for large vessels.

119. How many hours would it take a 12-knot steamer to go from Wellington to Kaikoura?—About seven hours and a half; but allow me to say that large steamers would never get in there at any time.

120. Never at any future time?—No; never at any future time, unless the harbour was made much different from what it is.

121. Supposing you had a railway between Kaikoura Township and Christchurch, how long would it take to make the journey, reckoning fifteen miles an hour?—It would take nine hours and a quarter.

122. That would be about seventeen hours by that route to Wellington?—Yes.

123. And therefore you think there could be no advantage at all in having a railway along the East Coast?—As far as saving of time goes it would be of no advantage.

124. Do you know anything about Cape Campbell?—Yes.

125. Is there anchorage there?—It is simply an anchorage where, when a north-wester is blowing, vessels may take refuge under the lee of Cape Campbell. There is no harbour.

126. Is there any landing there?—No; but there is a very fair landing at Flaxbourne.

127. In ordinary weather could passengers land there?—Yes.

128. Could they land in southerly weather?—No; but in moderate westerly weather they could land.

129. In south-westers could they land at Cape Campbell?—I think not. There is no good harbour from Lyttelton to Cape Campbell, except the small harbour at Kaikoura, which is only fit for vessels of the tonnage of the "Tui."

130. *Mr. Fulton.*] Have you made any estimate of what would be the probable number of passengers, and what would be the amount of freight, by going the central route?—I have not made an estimate. I have got, of course, my own opinion. There is one thing with regard to the central route: everything that is produced there would go by the central route. There is no sea to compete with anything produced on the central route.

131. How much wool would be delivered by that route?—From the carrying capacity of the country, and the present stock on it, there would be 5,000,000 lb. of wool produced between Waipara and Renwick.

132. What proportion of that would be between Waipara and the Red Post?—About one-third.

133. How many miles of country would the Central railway go through that would not be occupied except for pastoral purposes?—I do not think that any of the country between Hanmer Plains and Hillersden can be occupied in any degree for any other purpose than pastoral purposes.

134. Then of course it follows from that that the population of that portion of the country is not likely to increase?—Yes; quite so. I do not think it will ever increase very much. I have no doubt that cultivation could be carried on in some of the valleys. I have heard of people growing grapes and good fruit there. Still it is a pastoral country.

135. Supposing the central route be adopted, would there be any economic advantage in carrying the railway further than Hanmer Plains?—Yes; I think you would always have a certain amount of traffic that way. You would have a far better traffic inland than you would by the coast. I do not think you would have any people going by the coast.

136. Although the time occupied would be so much greater?—The time would be a couple of hours more, but you would connect more settlement.

137. For how long and how deep have you seen the snow lie on the Central route?—During the snow storm of 1867 the fall of snow was three feet and a half in the whole of the Amuri and in the Clarence. That was on the level country, but there were snow drifts much deeper than that.

138. How long did the snow lie there?—For about a month. I had 30,000 sheep, and I lost 4,000 of them during that storm. Most of the losses were near my own house, 500 feet above the sea. Of the flock of sheep I had in the Clarence I do not think I lost 400 during that storm.

139. Have you any experience of the snow-fall in the Acheron Valley?—I have travelled in that valley in all seasons of the year, and the snow never stopped me. The deepest snow I travelled through there was about eighteen inches deep.

140. Is it liable to heavy drifts?—Yes; all that country is liable to heavy drifts.

141. Going from the Hanmer Plains towards Christchurch, is not the land almost entirely in the hands of large proprietors?—Yes, I think it is.

142. Are these persons prepared to part with their land at all for the purpose of settlement?—Yes.

143. Have any of them made any efforts in this direction?—Yes.

144. What have they done?—I will take myself as one of them. I had the whole of my land surveyed under the Land Transfer Act, and I cut it up into small pieces for the purpose of sale and for agricultural purposes.

145. Did you put it into the market?—I had it all in the market.

146. Have you sold any of it?—No; I did not care to sell unless I could sell the whole of it.

147. Is it in the market now?—Yes; it is in the market now for the purpose of settlement.

148. Have any of your neighbours done the same thing?—Yes; Messrs. Wilkin and Davidson are willing to cut up their land into small sections.

149. Is that land in the market now?—I think it is.

150. Can you give us any idea of the price at which it is in the market? Is there a reserve price upon it?—Yes; but it is not very much. Some of the land near Rotherham was lately sold for about £5 an acre, as it is very good land.

151. Have these sales increased the population much in that district?—There is a considerable

population now about the Rotherham Estate. I think the owners of the Culverden Estate might spare a few thousand acres for settlement with advantage to themselves. I also think that a good part of the Balmoral Estate might be sold for agricultural purposes.

152. Would they be willing to sell it?—I think they would be.

153. To small settlers?—Yes. There are certain persons who would not sell. I am quite willing to sell the whole of mine at a reasonable rate.

154. On what terms, not only as to price but conditions, are persons prepared to sell in the Amuri?—I think Wilkin and Davidson give good terms. They told me they wished to sell some of their land.

155. Have any portions of these properties been put up to auction at all?—Yes; the whole of the St. Leonards property was sold by auction some years ago.

156. In what way?—In blocks.

157. Of what size?—Of very large size, with the exception of the small settlement at Rotherham.

158. Then notwithstanding that the proprietors are prepared to sell, no settlement to any extent has taken place?—No.

159. For what reason?—Well I think that most of the people have withdrawn the land from sale.

160. Why?—I do not know.

161. Do you think it is because they are waiting for a railway to increase the value of it?—No; I do not think so.

162. Can you give us an idea of what the land in that district fetched per acre in the market?—I could not say. I heard that Mr. Moore, who is now cutting up the Waikari Flat, is asking from £10 to £15 an acre. Some land at Rotherham, on the Waiau, was lately sold at about £5 an acre.

163. Supposing the railway were constructed as far as the Red Post, to what extent would that increase the value of the land?—I do not think it would increase its value.

164. Then you think that that is a fair estimate of the value of the land throughout that district?—I think from £5 to £6 an acre is a fair estimate for the best agricultural land there. A great deal of the land is not worth more than £2 an acre, and some of it worth much less than that.

165. *The Chairman.*] Do you know anything of the condition of the country about Tarndale and from there to Tophouse during the snow-storm in 1867, the elevation being so much greater?—Yes.

166. What was the depth of snow in Tarndale?—No more than what I have stated. The snowfall was 3 feet 6 inches all round, and reached Fernyhurst and Hawkeswood.

167. Were you in the Tarndale country last winter?—I was not there myself, but I was told by people who were there that the winter was exceedingly mild, and there was but little snow.

168. There is no year in which snow does not fall and lie for a considerable time?—No. We have got a little snow in all that part of the country. In Hanmer Plains there would be two or three falls of snow during most winters a few inches deep, but it would not be for a long time.

CHRISTCHURCH, THURSDAY, 23RD NOVEMBER, 1882.

The Commission met at 10 o'clock.

A deputation from the Railway League, consisting of the following gentlemen, waited upon the Commission: Messrs. E. Richardson, T. S. Weston, and W. Chrystall.

Mr. Richardson: Mr. Chairman, the deputation who have come here to-day have prepared a rough statement which Mr. Chrystall, the Chairman of the Railway League, will read to you. We can then ascertain whether there are any particular points in that statement which you wish to enlarge upon, or whether there is any other information which you desire to be furnished with. The preparation of this statement may be of service to the Commission, and perhaps save them some trouble.

The Chairman: We shall of course be very glad to hear the statement.

Mr. Chrystall read the following statement:—

The Hon. Dr. Pollen, Chairman of the Railway Commission *re* Extension of Middle Island Trunk Line.

SIR,—With reference to what passed at the interview that you were good enough to grant to a deputation from the Committee of the Canterbury Railway League on the 20th instant, the Committee of the League has now the honour to place before you the following figures representing the estimated annual revenue from traffic upon a railway that would connect Canterbury with the West Coast, and which may be fairly expected to accrue within the next three years, based on the present consumption of the various articles, viz.:—

	£
Timber, 12,000,000 feet at 4s. per 100 feet	24,000
Coal, 75,000 tons, at 12s. 6d. per ton...	46,875
Building stone...	3,000
Merchandise and agricultural produce, 20,000 tons, at average rate of 30s ..	30,000
Parcels	1,500
Sheep and pigs...	2,000
Cattle	2,000
Passengers	25,000
	£134,375

This estimate is based on an average distance of 176 miles. The whole of the traffic specified would result directly from communication with the West Coast, and in the opinion of the Committee the above-estimated earnings would amply justify an extension of the main trunk line as far west as Reefton, or to some point further south, if such were thought desirable; although such a deviation would render the so-called trunk line less direct, the Committee is convinced that the interests of the colony would be best served by such an extension as would connect the East and West Coasts.

Timber.—Annexed hereto is an extract from a report prepared by a Committee at Greymouth, giving detailed information as to the vast forests of various descriptions of useful timber existing on the West Coast, which information has been practically confirmed by a Commission that was appointed

by the Canterbury Chamber of Commerce to travel over the districts referred to. Timber from Invercargill and Winton is now being laid down at places as far north as Ashburton (a distance of 324 miles) at lower figures than imports from Pelorus Sound can be laid down at the same place. It is estimated that, if railway communication were opened with the West Coast, consumers of timber in Canterbury would be able to obtain their supplies at an average reduction of about 1s. per 100 feet as compared with existing prices.

Coal.—The excellent quality for household, manufacturing, and steaming purposes of the extensive seams existing on the West Coast is so well known as to render any detailed information under this head unnecessary. The cost of Newcastle coal delivered in Christchurch is about 30s. per ton. From the West Coast coal of good quality could be laid down here by railway at 23s. per ton, which would show a saving to the consumer of about 7s. per ton. In view of the steady development of manufacturing industries in Canterbury, a rapid increase in the consumption of coal may be anticipated. Information has just been made public to the effect that the New Zealand Shipping Company is about to inaugurate a direct steam service with England, and the requirements of the steamers of this service will cause a large additional demand.

Building Stone.—On this subject an extract from the report of the Greymouth Committee is also annexed. The Committee of the League is of opinion that the receipts from the carriage of this article to Canterbury would probably be an important and steadily increasing item.

General Merchandise, Agricultural Produce, and Live Stock.—The estimated earnings in respect of these are based on the existing statistics of population on the West Coast, and, with the increase of population there that would be sure to follow the opening of railway communication with this district, a considerable augmentation of traffic under these several heads might be looked for.

The Committee of the League would further invite the attention of the Commission to the comparative statistics of land and stock, dated 30th September last, prepared by Mr. John Tinline. If a copy of this paper should not be already in the hands of the Commission, the Committee will be pleased to furnish one.

The Committee would also respectfully suggest to the Commission the advisableness of taking oral evidence from the following gentlemen regarding the respective characteristics of the various proposed routes going north, north-west, and west from Canterbury, viz.: Messrs. John Tinline, John Inglis, W. Atkinson, and Hossack. All of these gentlemen possess special personal knowledge of the features of the districts in question, and the Committee would regard their testimony as particularly trustworthy and valuable.

Having thus indicated reasons which, in the opinion of the Committee, show conclusively that the construction of a railway to connect the East and West Coasts is a colonial work that should take precedence over any work intended simply as an extension of a so-called trunk line northwards, the Committee would now beg to draw the attention of the Commission to some facts which prove that the proposed extension of the trunk line northwards by way of the East Coast, or the inland route *viâ* Tophouse to Blenheim, is not supported by any justifying condition either from a local or colonial point of view. Neither of these proposed routes touch country where minerals or timber exist in any quantity that could afford any traffic worthy of mention. The area of agricultural land, or any land affording encouragement for settlement, that would be opened up would be inconsiderable; and as agricultural produce could be carried by water at much lower rates from the convenient shipping places at Kaikoura and Gorse Bay, any revenue from the carriage of such produce would consequently be of the most trifling character. Moreover, as regards passenger traffic, in view of the well-appointed and yearly improving steam service now operating on the coast, it could not be reasonably expected that any considerable portion of that traffic as between Lyttelton and Wellington could ever be diverted to a railway connecting Christchurch and Picton. With railway communications completed to that point, there would still remain the sea voyage across Cook Strait, and persons travelling from Lyttelton to Wellington would, as a rule, prefer to make the voyage by steamer, as at present.

In the opinion of the Committee it is only necessary to peruse the Government Engineer's reports in order to find reasons amply sufficient to condemn this proposal of the Government to extend the Middle Island trunk line northwards by the East Coast, the Amuri coast, or the Tophouse routes. Speaking of these alternative routes, Mr. Blair says, in his report embodied in the last Public Works Statement: "My previous report shows that the resources of the country traversed, and the importance of the districts immediately connected, do not alone warrant the construction of a through line in any direction. Its main object must therefore be to connect the two ends of the colony, and, that being the case, the shortest and quickest route is obviously the best." The Committee firmly believes that railway works which would have merely for their object the connection of the two ends of the colony are entirely premature, and would, at least at this stage of the colony's progress, be productive of no public benefit commensurate to the cost.

In conclusion, the Committee, feeling confident as it does that it represents the views of the public of Canterbury as well as those of the majority of the people on the West Coast and in Nelson, cannot refrain from taking this opportunity of expressing its surprise and disappointment at the whole action of the Government in connection with this question. While considering the matter of extending the Middle Island trunk line, the Government has apparently ignored the possibilities for promoting settlement and for increasing the wealth of the colony that could be made available by the connection of the East and West Coasts by railway; and the Committee cannot help viewing with concern the existing danger that the certain prospect of the considerable traffic that would be developed by an extension of the trunk line by way of the West Coast may be sacrificed by the Government in order to give effect to the mere sentiment of completing the Middle Island trunk line by a more direct route, but by one that could not possibly yield any traffic or serve any public interest worthy of any consideration from a colonial point of view.

By order of the Committee.

W. CHRYSTALL, Chairman.

Note.—The distance of 176 miles is taken as the distance between Reefton and Christchurch. When the line from Greymouth to Nelson is completed, the whole of the traffic mentioned would pass over the line from Reefton to Canterbury if that were constructed.—W. C.

Extract from the Greymouth Committee's Report, December, 1881.

"2. *Durable Timber.*—Though there are eight different classes of durable timber within the country, each having its own peculiar advantages for different works, &c., we only propose to treat on black birch, it being the most plentiful, and existing in more defined belts, therefore its area can be more correctly arrived at than the other classes, which are generally very much scattered throughout the average bush. The most extensive black-birch forests are situated between the southern and eastern slopes of the Paparoa Range and the Grey River on the one side and between the Greymouth and Reefton Road and the head waters of the creeks and rivers intersecting same, on the other. In the locality first named there is an almost continuous belt of black-birch forest extending about twenty miles—viz., from the head of Coal Creek (a tributary of the Grey River near Cobden) to a point near the River Otututu, a tributary of the Grey River on the boundary of the Grey and Inangahua Counties. The average width is about one mile, equal to 12,800 acres. The black-birch forest on the east side of the main road before alluded to, may be said to commence at a point about two miles south of Brunnerton, and extend in sundry devious belts to the northern boundary of the country, distance about twenty-five miles. It is rather difficult to arrive at anything like a correct average width for the following reasons: The country between the points last named consists of three classes: (1.) Creek and river beds with adjoining low flats best suited and most generally taken up for agricultural purposes. This class of country is generally clothed with light scrub, and, where deep soil, with heavy white-pine forests. It is in this class of country that black pine (mata), kawaka (cedar), and totara, are most plentiful. (2.) That terraces and hill-sides lying from 20 to 250 feet above the first-named are generally clothed with black birch—*i.e.*, where heavy gravel deposits exist. (3.) The intervening ridges, hills, and spurs from 250 feet upwards are generally clothed with red pine, a class of stunted red birch, rata, and, where swampy ground occurs, with silver pine, the latter a most durable timber.

"After making all due allowance we conclude that within an area of twenty-five miles—*i.e.*, from the main road to a parallel line ten miles to the east—there are at least fifty square miles, or 32,000 acres, of durable timber, which would produce an average of 1,500 superficial feet of good timber to the acre; of course there are some acres which would produce fifteen or twenty thousand feet, but then allowance must be made for inaccessible places, &c. At 1s. 6d. per 100 feet, which is about the lowest price that landowners charge those who hew or saw it on their land, the two areas above described would be worth £1 2s. 6d. per acre, or a total of £50,400.

"The heart of red pine, though not classed among the durable timbers, is a very good lasting timber, especially if obtained from aged trees. It is well suited for house building and furniture. There is almost an inexhaustible quantity of this timber available, the class and quantity to be found in the regions situated immediately to the north and west of Lake Brunner is exceptionally good.

"3. *Building Stone.*—We direct your attention to the stone slabs now being quarried in the vicinity of Brunnerton, and which are being exported to Christchurch and other places. Good authorities have made the most favourable mention of it, but the most practical proof of its value is that the demand far exceeds the supply which the present promoters of the industry are able to bring into the market. The opening up of this class of industry has only very recently been started. We understand that it is contemplated to form a large company to systematically work the quarry on a large scale. There are other valuable classes of building stone in the district, which you will have an opportunity of inspecting. In the Black Ball Creek, hereinbefore mentioned, some very fair samples of blue slate are to be found, and an inexhaustible quantity of good granite is available in the Lake Brunner District. To answer your question by giving you the extent of building stone is a thing we could not do; we merely name some localities in which we know it lies, though yet dormant as to extent."

Mr. Richardson: I wish to supplement that statement by stating the reason why we take the 176 miles. That is the exact distance, according to the route at present laid down between Christchurch and Reefton; and supposing a line in that direction were recommended, all the West Coast traffic would avail itself of that portion of the line.

The Chairman: I consider that the statement just read affords us very valuable information.

Mr. Thomson: The information embodied in the statement will be exceedingly valuable to us. Of course we cannot consider anything but a trunk line towards Cook Strait, but we can lay before the Government information as to the desirability of branch lines to the West Coast.

The deputation then withdrew.

Mr. Frederick Back, Traffic Manager, Christchurch Railways, examined.

169. *The Chairman.*] Can you give us any idea of the quantity and value of the traffic which now goes over the constructed line from Christchurch to Waikari?—I am not prepared with full information at the present time, but I have a few notes here which may possibly be of service to the Commission. I find that during the past six months the daily bookings of passengers from Christchurch to Waikari have averaged 3½; Amberley to Waikari, 3½; Rangiora to Waikari, 1; Kaiapoi to Waikari, 1 passenger in two days; and from Waikari to Christchurch, 5⅝ passengers per diem.

170. What is the quantity of merchandise passing over the line from Christchurch to Waikari?—During the past six months 525 tons of merchandise, 43 tons of minerals, 2 tons of grain, and 61,500 feet of timber.

171. What proportion do the receipts bear to the expenditure—that is to say, does the line pay?—I can only furnish a portion of the information. The accountant in Wellington can supply the information.

172. Can you say whether the traffic is increasing on that line?—There is a general tendency to increase of tonnage all over the line.

173. Has the recent extension from Waipara to Waikari had the effect of increasing the traffic?—We have been very busy there, principally because we have been carrying up contractors' plant and material for the extension of the line. There is always a tendency to a rush of traffic when a new line

is opened for a short time, until the settlers have got up their fencing material and stores, which always follow fresh settlement.

174. Then, the number of passengers carried on the line makes a very small contribution to the general revenue?—Our passenger traffic forms about one-third of our revenue.

175. That is the general average?—Yes.

176. A special train runs from Christchurch to Dunedin, carrying passengers only?—Yes.

177. Do you know what are the financial or mercantile results of that traffic? Does the passenger traffic pay upon that line?—The passenger traffic by this train pays, as all passengers who are able to do so will travel by it, it being the fastest train we have. The average bookings from Christchurch to Dunedin by that train will amount to about £15 per diem. That is only from Christchurch, in addition to which we have bookings from other stations; a large through-parcel traffic, and we also have a wagon for urgent goods.

178. The inference is that a purely passenger line, carrying passengers only between Dunedin and Christchurch, would be a profitable line?—There is quite room for the one train that we run.

179. What is the whole length of the line from Christchurch to Dunedin?—230 miles.

180. Supposing that a line were extended from Christchurch North to Picton, or a point on Cook Strait, which would be purely a passenger line, what would be the probability of such a line as that paying its expenses—what would be the probable number of passengers travelling upon it?—In the present state of the country I should say that the traffic would be almost nominal. It would depend entirely upon the settlement that might spring up through increased railway facilities.

181. Have you any idea of the probable goods traffic upon such a line?—I do not know the country sufficiently well to give an opinion.

182. *Mr. Thomson.*] Have you taken into calculation the number of passengers per mile that would make a train pay?—It depends upon the distance the passengers are booked.

183. On 150 miles how many through passengers a day would pay for the train running?—Given 5s. as the cost per train mile, which is slightly above our average, the cost per train would be £37 10s. The fare, according to scale, would be £1 17s. 6d., first-class single. It would therefore take twenty through passengers per train, or more than three times the number booked daily from Christchurch to Dunedin.

184. Do you know how many passengers on an average go daily between Lyttelton and Wellington by sea at present?—The Collector of Customs has kindly given me the following return showing the number:—

Return showing the Total Number of Passengers to and from Wellington from 1st October, 1881, to 30th September, 1882, inclusive.

"Inwards" from Wellington.		"Outwards" to Wellington.	
Male adults	4,707	Male adults	2,985
Female adults	1,312	Female adults	746
Children	277	Children	217
Total ...	6,296	Total ...	3,948

There is considerable difficulty in arriving at a correct list of passengers coastwise. The discrepancy outwards is to be accounted for thus: Passengers with return tickets issued at Wellington and northern ports are often not reported on "outward" passenger list here, as the agents make out their lists from ticket-book blocks of tickets issued hence; further, the passengers arriving by last train from Christchurch rush on board and obtain tickets and pay fares on board the steamer, never going near the agent's office, and this after the vessel has cleared the Customs. There is also an excess of passengers who settle here from Australia, but, though through passengers from Australia, yet arrive coastwise as the steamers arrive here coastwise.

ALEX. ROSE,
Collector of Customs.

185. Can you tell us the tonnage of goods?—The tonnage of goods between Lyttelton and Wellington by steamer for last financial year was—Inwards, 2,609 tons; outwards, 2696.

186. Can you tell us the freight of coal between Westport or Greymouth and Lyttelton, or can you ascertain it?—Average rates, Westport to Lyttelton, 13s.; Greymouth to Lyttelton, 18s. per ton.

187. What would be the land freight by rail over the mountains from Westport or Greymouth for, say, 140 to 160 miles?—On coal per ton, 140 miles, 11s. 6d.; 150 miles, 11s. 10d.; 160 miles, 12s. 2d. I have here some figures showing the import of coal and timber at Lyttelton during the last financial year. The import of New Zealand timber was 18,900,586 superficial feet; Australian timber, 2,074,605 superficial feet; foreign timber, 62,300 superficial feet. The total import of timber into Lyttelton during the last year was 21,037,491 feet. The total quantity of timber received into Christchurch from Southland during the last six months was 76,800 feet. In a good many instances this timber is cut in sizes to special orders—I mean the Southland timber.

188. *Mr. Fulton.*] How far does it pay to carry timber along the railway line as against sea-borne? It depends so much upon cost of sea freight that I cannot say. There is one important factor that the Commission should not lose sight of in dealing with this question, and that is that one advantage in railway carriage against sea carriage is this: that the millowners load the trucks at their mill-sidings, and the timber is then taken straight to its destination. In shipping it from one port to another there would be double handling, besides the railage charges at the port of export and port of import, and wharfage dues.

189. Does any timber come by rail from other places than Southland?—Yes, we have had considerable trade with Waimate, in the south of Canterbury, and Oxford in the north; and there are other points at which we get small supplies.

190. Can you give us the quantities that come from other places?—Yes. During the past six months, Waimate, 325,200 feet, 668 trucks firewood, &c.; Oxford, 681,800 feet, 687 trucks firewood. The total quantity of coal imported into Lyttelton during the last financial year was—Foreign, 38,156 tons; native, 11,251 tons. The latter was mostly Westport coal.

191. *Mr. Thomson.*] With reference to a previous question, I find that the distance from Westport to Christchurch is 190 miles, and to Greymouth 150 miles. Can you give us any information regarding the cost of freight of coal from Westport and Greymouth to Christchurch?—The present tariff rate would be—150 miles, 11s. 10d. per ton; and 190 miles, 13s. 2d.

192. Supposing you could get from Wellington to Cape Campbell in three hours and then take express train from Cape Campbell to Christchurch, a distance of about 170 miles, do you think this would be preferred by passengers?—My experience as to travelling by sea and land is this: that business men will invariably take the steamer in preference to the train, because they save a day. They travel by steamer all night, and arrive at their destination in the morning ready for business. I think it is a moot question whether or not persons travelling with families would go through the trouble of transferring their families and luggage from the steamer into the train in order to save so short a time as would be saved under the circumstances, especially taking into consideration that the Union Company, with their usual enterprise, would have a boat running probably as fast as the combined service.

193. Are you aware that the train between Dunedin and Christchurch is largely availed of by the travelling public?—Yes, it is used to a large extent by local passengers.

194. But not by through-passengers?—Yes; there are a certain number of through-passengers. The total bookings from Christchurch, which is the principal station, average 6½ passengers a day to Dunedin.

195. But in the case of persons travelling with their families for pleasure, would they not prefer having only three hours of sickness to seventeen hours?—I think we should all prefer the three hours' sickness, but I would certainly prefer going by the steamer.

196. Are you acquainted with the route between Paris and London?—Yes.

197. Are you aware that generally the English public prefer the short route by Calais to the long route by Rouen or Southampton?—The shortest route is the favourite one I believe.

198. Would it not be much the same case in New Zealand were there a perfect railway system, such as we have between Christchurch and Dunedin?—That might alter the case.

199. Would not similar motives actuate the people of New Zealand as influence the public of England and France in preferring the shorter route?—Yes; to a great extent, but at the same time we have a different class of travelling public here from what there is in London and Paris. The question as to what the steamers would charge under the circumstances from Wellington to Lyttelton would have to be considered. The railway fare would be £2.

200. Then you are candidly of opinion that shortening the sea voyage across the strait would not much matter?—I think the number of people travelling would be so small that it would not be worth the expense. Those who could afford the time would no doubt travel by the pleasanter route.

201. Which is the pleasanter route?—If there was a comfortable railway service I should like to travel overland if I had not the trouble of transferring luggage and children, so as to see the country, but if travelling on business I expect the steamer would offer the greatest facilities.

202. Are you of opinion that the local traffic in goods and passengers between Blenheim, Kaikoura, and Christchurch would give an addition to the earnings of the railway?—I think the addition would be infinitesimal, because if you take timber from these you simply deprive some other portion of the railway of the revenue.

203. Have you been over the Amuri country at all?—No.

204. You do not know whether it is a fertile district or not?—Only by hearsay.

205. You cannot give any calculation of the produce of that district?—I think it is to be obtained from the agricultural statistics.

206. *Mr. Fulton.*] Can you tell us from what port Kaikoura is supplied principally?—I think it is principally supplied from Wellington.

207. Have you any means of comparing the passenger traffic between Christchurch and Dunedin by rail and by sea?—It is very difficult to ascertain. The passengers do not always book here; they go on board and book afterwards.

208. Do many people go by train from Dunedin to Christchurch, and then take the steamer?—There are generally one or two passengers in every boat.

Mr. John Inglis, Merchant, examined.

209. *The Chairman.*] We have been informed that you would be able to give us some information with respect to those lines about which we are inquiring?—Yes.

210. Which of the routes do you know best?—I do not know anything about the East Coast except from hearsay.

211. You are familiar with what is called the Central line?—I only know the Central route as far as the Clarence over Jollie's Pass, but no further; not up the River Acheron. I know the country up to the head waters of the Clarence and Waiau Rivers to the lower end of the Ada River, a little way up the Henry River, and thence down the Waiau. The Ada and Henry Rivers run into the Waiau.

212. What is the character of the country?—It is pastoral land. Of course there may be small patches of land here and there that could be cultivated, but it is of limited extent.

213. There is no large extent of what is called agricultural land?—No.

214. What is the character of the soil? is it limestone?—There is no limestone, as far as I am aware.

215. Have you any idea of the present production of wool in that district?—I can hardly venture to say from memory. From the Red Post towards the Hanmer Plains there would be wool from 180,000 sheep, or, say, 2,000 bales of wool yearly.

216. How does that wool find its way to market now?—The whole of it is carted to the Waikari by drays. The quantity named does not represent the whole of the wool from the Amuri District, but only that towards the Hanmer Plains.

217. Have you any idea of the population of the district?—I have no idea; it is certainly not large.

218. You can give us no idea of the probable traffic upon a railway carried up from the Red Post towards Hanmer Plains?—It could not be much, unless the facilities afforded by a railway would open the hot springs at Hanmer Plains as a sanatorium; a number of people go there now, but it is rather awkward of access from the present terminus of the railway; or unless it was carried on to Reefton.

219. It would be necessary, in order to get to the Hanmer Plains, to carry out the railway to Waiau?—Yes.

220. You would have to bridge the River Waiau?—Yes.

221. And the land which the railway would tap is in the hands of private persons?—Yes, for the most part.

222. And the Hanmer Plains also?—Yes; but there are some Government leases there.

223. Can you give us any idea of the disposition of landed proprietors to promote settlement in case they had railway facilities?—I do not know. Some of the land on Hanmer Plains would be fit for agricultural purposes.

224. You know nothing of the coast line?—Nothing whatever personally.

225. Which of the two lines is, in your opinion, preferable—the central line by the Hanmer Plains, or the East Coast line to Cook Strait?—I do not think either would be very desirable, but if one or other were chosen I should prefer the central route.

226. You know the country from the Cannibal Gorge westward?—Yes; I have not passed through the Cannibal Gorge. I was on a commission appointed by the East and West Coast Railway Company to consider whether it was likely to be a good commercial venture to construct a railway in that direction; and, in company with Mr. McIlraith, Mr. Beaumont, and Mr. Thornton, C.E., I proceeded to the West Coast, and ascended the line indicated from Brunnerton to Reefton, and from Reefton to the Cannibal Gorge.

227. You did not cross the saddle?—No, not the Ada Saddle. Knowing this side of the range we only went as far inland from Reefton as the Maruia Plains.

228. What is the character of the land on the Maruia Plains?—It is nothing but shingle covered with light soil. I speak of the part we went over two or three miles down the valley.

229. What is the character of the country between Maruia Plains and Reefton?—From the Maruia Plains the country rises to the saddle called Rahu. The assent is pretty sharp on both sides of the saddle, but there is no difficulty in the ascent. I rode the whole way, and, except for swamp and stony parts, we could trot or canter almost the whole way through. There is no practical difficulty in the track which is cut from Reefton to the Cannibal Gorge.

230. Are there any indications of coal or other minerals on that route?—We were informed by the guide that there was coal in the Cannibal Gorge. All down to Inangahua there were indications of coal, almost down to the river bed in one place. Towards Reefton, in the valley of the Inangahua, we visited several coal seams of about 15 feet in thickness. In some places you have to ascend the hill to reach the seams, but there is no practical difficulty in getting at the coal. Going towards Reefton you have to cross the dividing range from Maruia. It is a low saddle (the Rahu), and there is no difficulty in riding.

231. Supposing a line northwards were taken over the Cannibal Gorge and on to the Maruia Plains, what benefit, if any, would accrue to the West Coast?—Very little indeed if it diverged thence to the Buller instead of going on to Reefton.

232. Would any gold or other minerals be found in the Maruia River?—Gold has been found in parts of it. At Derbyshire Creek, which falls into the Maruia at Cannibal Gorge, there is gold being washed for now.

233. The gold fields on the Maruia are not worked to any extent in consequence of the difficulty of getting provisions?—Yes; that is the difficulty. One digger said he could obtain a great quantity of gold on the Maruia, but owing to the great cost of provisions it did not pay him. That is the practical difficulty in the way of working for gold in that part of the country. It is about forty miles from Derbyshire Creek to Reefton, and perhaps forty-five miles to any part of the Maruia where diggings would be available. It would of course only be by means of packing that provisions could be forwarded.

234. Is there any land fit for agriculture in the Maruia Valley, or in that neighbourhood?—There certainly is no good land at the upper part.

235. Is the country so high that the snow lies in the winter?—In the Maruia the snow apparently lies in the winter. The indication of that is the blue grass.

236. Do minerals abound everywhere on the West Coast?—Yes.

237. *Mr. Fulton.*] Can you tell us the extent of the Maruia Plains?—The part of the valley we saw was only about one and a half or two miles broad. It is stated to be about thirty miles in length.

238. What is its character?—The portion I traversed was open pastoral country, with clumps of trees here and there.

239. Is there a station there?—There is a cattle station about half-way down.

240. Did you go to it?—We did not.

241. You cannot give us any further information as to the capabilities of this plain?—It is certainly nothing more than pastoral land.

242. And it belongs to the Crown?—I believe it is a Government reserve set apart for settlement. On the higher ranges there is good birch, and on the lower levels there are all sorts of timber in abundance.

243. What population is there between Reefton and the Gorge?—None whatever, except that about half a dozen miles out of Reefton there are two or three small farms, and of course there is a digging population where the quartz-crushing mills are situated.

244. Is there any probability of settlement?—None in the valley. The soil is good enough, but it is mixed with shingle. When cleared it could be sown down in grasses and occupied for grazing purposes.

245. There is very little agriculture carried on in the whole district?—Hardly any. There is here and there a small farm.

246. *The Chairman.*] And where do they obtain vegetables?—The small gardens produce vegetables abundantly. The soil is good, but mixed with stones.

247. All the ordinary food is imported?—Yes.

248. Where does it chiefly come from?—Nearly all ordinary merchandise comes from Melbourne. Some of the flour finds its way from Canterbury by sailing vessels; the meat, of course, comes from Canterbury.

CHRISTCHURCH, FRIDAY, 24TH NOVEMBER, 1882.

The Commission met at 10 o'clock.

Mr. CHARLES Y. O'CONNOR, Inspecting Engineer, Middle Island, examined.

249. *The Chairman.*] Have you had time to prepare the returns which we asked you to furnish?—I produce tabulated statements showing the length, probable cost, distance already constructed, and the distance to be constructed, of the lines from Christchurch to Picton and from Christchurch to Nelson; also showing the length of these lines which go through agricultural, pastoral, or barren country, and also the length of the lines which go through Crown lands and private lands. With regard to the statistical information asked for as to the population along the different routes, and the consequent revenue which would be produced from the railways, I am collecting such information, and hope to be able to furnish the Commission with it shortly.

250. Have you been over the country through the Maruia Valley?—Yes; I have been over the Ada Saddle, through the Cannibal Gorge, and down the Maruia and the Matakitaki to Hampden, and thence to the Tophouse and Nelson. I have therefore been over the whole of what is known as the Maruia route.

251. Has it ever been explored as a possible line of railway?—Yes, the most of it has been surveyed in a sort of a way—a flying survey has been made.

252. *Mr. Fulton.*] Will you be good enough to report whether the divergence *viâ* Maruia would be advisable, taking into consideration the question of connecting the East and West Coasts by any other route?—Yes, I shall be very happy to do so.

The Commission met again at half-past 2 o'clock.

Mr. WILLIAM ATKINSON examined.

253. *The Chairman.*] In what district do you reside?—I reside at present at Rangiora.

254. Are you acquainted with the country?—I am acquainted with a good deal of it. I have passed through it.

255. To what distance from Rangiora?—I have been in the Wairau a good many years. About six years ago I came to Rangiora.

256. You know the country between Wairau and Hanmer Plains?—Yes, I have travelled it.

257. What is the general character of the land between Jollie's Pass and Waikari?—Some of the land is good, and some of a very middling description.

258. Is there a good deal of agricultural land?—Yes.

259. Would it grow wheat?—Yes.

260. You know that there are two projected lines of railway to the north—one of them going through the centre of the Island and the other by the East Coast?—Yes.

261. Do you know anything of the character of the country along these lines?—Along the inland route the land is anything but fertile after you pass the Hanmer Plains going northward. There is no land after you pass the Birchhill Station, Wairau Valley, that I would consider available for agriculture.

262. There is no country on either side that is fit for settlement?—No.

263. Then a line from Hanmer Plains to the Tophouse would open no country of any value?—I consider it would open no valuable land for agricultural purposes.

264. What do you know of the East Coast line—the line between the Red Post and Kaikoura?—The land between these two places is good. There is some very good land on Mr. Tinline's estate and at Mendip.

265. Do you know the general direction of the East Coast railway line?—No.

266. It runs from the railway (Waipara) station to Cheviot Hills, and then along the coast northward?—I have not been along that way. I came by the inland track. I have not travelled by the sea beach. I have gone along the sea beach to Blenheim.

267. It is a very rough country?—Yes; there is no land on this side of Flaxbourne worth mentioning for railway purposes. At Low Downs there are some flats.

268. Is the land good about that point?—It is fair land. It is good grazing land. I have seen very good barley grown in the Flaxbourne District. It is very good wheat land.

269. There are no settlers, excepting runholders, in that district?—None at all.

270. The whole of the land is in the hands of runholders?—Yes.

271. Do you know anything of the country towards the Cannibal Gorge?—It is fifteen years since I saw the country there. There were no tracks or openings then. It appeared to me to be very rough country with nothing but bush. There was no available land for cultivation. There is a good deal of talk about the quantity of timber and coal, but I should be sorry to spend money on a railway on that account.

272. Which would be the better way of getting the railway through to the north—by the Central line or the East Coast line?—I could not say; the distance I have gone has been from the lower part of the Clarence River to Kaikoura, and the land is of indifferent quality.

273. The land is very poor about there?—The land is of no good at all. It is a very rocky country.

274. You have not formed any opinion as to the proposed railway line?—No; I would not waste money upon the construction of a railway either way.

275. *Mr. Fulton.*] You have travelled several times from Amuri over to Wairau?—Yes.

276. Which way did you go?—I went over Jollie's Pass and on to Tarndale. I followed the Acheron branch. I went down the Awatere.

277. Have you travelled at various times of the year?—I have travelled at various times between October and July.

278. Did you ever find snow?—Yes, plenty of snow.

279. How deep?—It was 2 feet 6 inches deep at Jollie's Pass. It was lighter towards Tarndale.

280. How long does the snow lie?—That depends on the frost; in frosty weather the snow will lie a couple of months.

281. Did you find much snow between Acheron and Awatere?—No; there is not much snow at what is called Flaxbourne Pass.

282. Have you ever been stopped by the snow?—When on the Hanmer Plains, if there was too much snow, I waited until it cleared up; I took my chance, but you might be stopped several times during the winter.

283. How long would it be impassable during the winter?—It might be impassable for a couple of months. Persons have been stopped several times at Tarndale; they leave Tarndale in the winter time altogether.

284. You state that from your own knowledge?—Yes; I know parties who were stopped there for a long time; they could not do anything with their horses.

285. *The Chairman.*] It may be said generally that travelling over that country is sometimes impossible in winter on account of the snow?—Yes; if a railway were made the train would be stopped by the snow in winter; it could not push its way through the snow.

286. *Mr. Thomson.*] What height are the snow drifts there?—I have seen snow drifts ten feet high. I lost a large number of cattle one winter in the Clarence country.

287. *The Chairman.*] Is there any considerable destruction of cattle in the winter in consequence of the snow?—Yes; we have had some very heavy losses sometimes. I have seen the sheep sliding down the hills like a shower of stones.

288. Is the winter more destructive to cattle than sheep?—The sheep may get blocked up; the cattle can work their way out better.

289. You think generally that there is not much prospect of traffic for a railway through that country?—It would be very awkward in the winter-time.

290. In its present condition there is not much prospect?—I do not see much prospect. The runs will not carry more than a certain number of sheep. A railway might do very well as far as the Red Post or Rotherham, where there is good land, but I do not see how it would pay at any other place. The expense of keeping a railway in repair on the East Coast would be considerable.

KAIKOURA, TUESDAY, 28TH NOVEMBER, 1882.

The Commission met at 5 p.m.

Mr. Bullen and Mr. Inglis, who had been deputed to represent the interests of the inhabitants of Kaikoura, waited upon the Commissioners.

Mr. INGLIS examined.

291. The shortest route for continuing the Main Trunk Railway northward, and the best as far as easy gradients are concerned, is undoubtedly that one passing through Cheviot; but were that route adopted the seven years' work that has already been carried out in extending the railway from Amberley towards the Red Post would be entirely thrown away. Under the circumstances the best route that could be followed is from the Red Post down towards St. Leonards, leaving the Isolated Hills on the left. The line from the Red Post to the mouth of the Staunton is a dead level. The route then turns up the Staunton Creek and down the Leader, and joins Mr. Blair's line between Hawkeswood and Parnassus. It is possible that the formation of the country between the mouth of the Staunton and the Leader might not admit of the necessary maximum gradient of 1 in 50, but I am of opinion that this grade could be obtained. The distance, however, is so short that steeper gradients might be put up with. From Kaikoura northward the line is practically unsurveyed, no surveyor having been inland; but the runholders and shepherds know of several low passes, and there is a better route going inland by way of the Bui-Bui River and saddle than along the coast. [Mr. Inglis here pointed out the main direction of the route upon the map.] Along this inland route there is no doubt that gradients of 1 in 50 could be easily obtained. This route passes through about 10,000 acres of valuable bush land, and also land that might be settled. A great part of the bush is totara. The population of the Kaikoura district is 1,107, the bulk of which is composed of persons residing on 15,000 acres in the immediate neighbourhood of the town. The land round Kaikoura is good swamp land and level country. Within what may be called the Kaikoura suburban district there are 15,000 acres, whilst in the neighbouring country there are 40,000 acres at least of agricultural land, mostly in private hands. The bush land is still in possession of the Government. The agricultural land is divided about equally between the runholders and small farmers. The runs themselves are part freehold and part leasehold, the freehold land bearing a very small proportion to the leasehold. Should the line be made, many runholders who at present ship their wool from the small boat-harbours along the coast would use the railway, and also all the timber traffic from all the country between Waipara and Flaxbourne would go by rail. About two thousand bales of wool are annually shipped at Kaikoura from the immediate vicinity. There has been no project for the improvement of Kaikoura Harbour. A sum of money was at one time voted, but, as the local bodies presented no scheme, nothing was done.

Captain DAVIDSON examined.

Witness had been connected with the port of Kaikoura for a long time.

292. In answer to Mr. Thomson, witness stated that the harbour at Kaikoura is limited in extent. Vessels up to 100 tons can use it. Vessels drawing up to 7 feet can lie alongside the wharf except when it blows hard from the north-east. There are at present no plans for the improvement of the harbour. Witness has sounded all parts of the harbour which could be deepened very easily. By going out further, deeper water could be got. Inside the first reef of rocks there are from four to five fathoms of water. The harbour is large enough for the present traffic. Sailing vessels have been lost in the harbour from their inability to get out during a north-east gale, but no steamers have ever met with a mishap. There is good shelter from all winds except from the north-east, but north-east winds are hardly ever heavy; the prevailing winds are off the land. A better harbour could be made out of the present Kaikoura Harbour than is possible at Taranaki, Timaru, or Oamaru. The railway, should it be made, could hardly carry produce cheaper than it can be transported by sea.

293. In answer to Dr. Pollen, witness stated that produce is at present carried to Christchurch and Wellington by sea, and that it would still be so carried even if the rail were made, but the rail would bring it from either side to be shipped at Kaikoura. The present rates from Kaikoura to Wellington and Lyttelton are 5s. per bale of wool, and 15s. per ton goods. All the wool from Port Robinson up to the Clarence is sea-borne to port of shipment; if the rail were made this wool would be brought by rail to Kaikoura for shipment.

Mr. BULLEN examined.

294. Witness stated that he had been a runholder in the Kaikoura District for fifteen years. There are about two thousand bales of wool shipped in Kaikoura per annum. This does not include the wool shipped from Waipapa or Boat Harbour. The production is increasing as the country by improvement becomes capable of carrying more sheep. As the small farms do not at present carry sheep the increase will be considerable when circumstances admit of their doing so; they at present produce corn, potatoes, and dairy produce, which are exported from Kaikoura. The cultivation of wheat is not extensive; the runholders only grow wheat enough for their own consumption. Witness agreed with Mr. Inglis concerning the route from the Red Post. He had never traversed the country north of Kaikoura. The making of the railway from the Red Post to Blenheim would have the effect of opening up a considerable amount of agricultural land—possibly not so great an acreage as some of the other routes, but the land is of a better quality. Witness had never seen better land than there is in the Kaikoura District, which is too rich to grow corn, the result of an experiment being that the plant runs to straw.

295. In reply to a question, Mr. Inglis, the first witness, stated that as much as twenty-four tons of potatoes had been grown upon an acre of land in this district. About three thousand tons of potatoes were exported last year to Wellington, and sometimes they are sent to Sydney. Kaikoura is noted for fish, and is one of the best fishing-stations on the East Coast. There are two saw-mills in the district, the timber from which is shipped to Lyttelton.

296. In answer to Mr. Fulton, witness stated that a good many passengers come and go, but could not say how many, but that probably if the railway were made the number would increase.

296A. Mr. Inglis here stated that Kaikoura commands an extensive block of country suitable for raising stock for freezing, and he believes that all the sheep in the Marlborough Province would be shipped at Kaikoura. The lime at Amuri Bluff is superior to that at Kaikoura, and possesses the advantage of easy shipment: it can be shot at once into boats. Christchurch is entirely supplied with lime from the Amuri Bluff.

Mr. PASSEAU, Sheep Inspector, examined.

297. Witness has been Sheep Inspector for eleven years; his district extends from the Conway to the Awatere Range, and from the sea inland to the boundary of the province, and contains from 240,000 to 250,000 sheep. There are only five infected flocks in his district. The average wool clip is 6 lb. There are many very heavy-woolled sheep in the swamp land. Most of the sheep in witness's district are first-class merinoes, the average yearly increase being from 70 per cent. to 75 per cent.; last year it was somewhat higher than this. The surplus stock is boiled down, as there is no market for it and no other way of disposing of it. Should the railway be made, sheep would certainly be sent to market by it. The agricultural land is capable of carrying eight sheep to the acre. The average value of a sheep for boiling-down purposes is 4s. 6d. Amongst the flax the land will carry from three to four sheep to the acre. About 25,000 sheep per annum are boiled down between Kekerangu and the Conway. The witness stated that in his opinion there is a route for a railway from Kaikoura to Swyncombe, then deviating up the Kahautara behind the Greenhills, along the Monkey-Face Hill (by the base of it), then falling upon the terraces above the Charwell to its junction with the Conway; from there to the Gelt. From there two routes present themselves: one over the Mendip Range to the present dray road from Waiau to Hawkeswood; the other through Highfield to Waiau. Between Waiau and the Greenhills there is hardly any land fit for settlement, but by Mr. Dobson's line there is. There is a quantity of Crown land on Claverly, on the back of the Kahautara run, through the Conway Hills, and on a portion of Fernyhurst; and through Hawkeswood and Parnassus there is probably a quantity of Crown land also.

BLENHEIM, SATURDAY, 2ND DECEMBER, 1882.

The Commission met at 10 o'clock, in the Supreme Court Building.

298. *Mr. George Henderson*, Chairman of the Railway Committee, addressing the Commissioners, said: In opening this inquiry before you, I would take the opportunity of stating that the object of the Blenheim Committee has been rather to furnish you with facts relating to the character of the soil and climate along the two proposed railway routes—the East Coast route and the central route. We are inclined to depend on the resources which you have at your command as regards statistical information. With reference to the extent of agricultural land in the district, we shall call before you the Chief Surveyor and Commissioner of Crown Lands, who has taken some pains to ascertain

the quantity of agricultural land on the East Coast route. Before this inquiry closes, we will submit to you a statement of our views of the whole case. I need not now say anything further, but will call the witnesses in attendance for examination.

Mr. Henry J. Clark, Commissioner of Crown Lands and Chief Surveyor, examined.

299. *Mr. Henderson.*] Have you made any inquiry as to the quantity of agricultural land there is in the Province of Marlborough going by the East Coast from Blenheim?—In anticipation of being asked to give some information with regard to this matter, I made an approximate estimate of the area of agricultural land immediately along the East Coast, on the route of the proposed line.

300. What did you ascertain it to be?—The total amount of land suitable for agriculture is 107,050 acres. The following return shows the approximate area of land suitable for agriculture between the Dashwood Pass Saddle and the Conway River likely to be opened up by the construction of the East Coast railway line:—

Locality.	Acres.	Remarks.
Wakefield Downs	23,000	Company's sections.
Atkinson's, &c., at Blind River	2,500	Flat by repute.
Starborough	9,000	
Flaxbourne	25,000	Flat, and ploughable hills.
Pungare and middle portion of the Awatere Valley, on the north side, including Shearing Reserve ...	4,000	Flat.
Kaikoura Suburban	18,200	2,400 of this ploughable hills.
Swyncombe	5,100	620 of this ploughable hills.
Greenhills	11,000	
Kincaid	3,500	
Fernyhurst	850	
Kaikoura Shearing Reserve	1,850	
Amuri Bluff	850	Partly flat, partly undulating.
Woodbank	1,000	Flat.
Waipapa	1,200	Flat.

I may state that the return does not include any lands on the south side of the Awatere farther up the valley than the Starborough property, and on the north side than the Shearing Reserve. It does not include the land on this side of the Dashwood Pass, or any of the land on the Plains. I have gone over the maps with the surveyors who did the work. I cannot vouch for its absolute correctness, but I think the quantity of land is underrated in this return. I have no doubt there is more land suitable for agriculture than I have given. The return does not include agricultural land beyond seventeen miles of the line up the Awatere Valley on the north side of the river, and the Starborough property on the south side.

301. *The Chairman.*] What is the nature of the tenure of the land of which you speak?—Nine-tenths of the land is freehold. It is, I may say, all freehold land, with the exception of a few thousand acres.

302. There is a certain quantity of the land the property of the Crown?—Yes.

303. What is the nature of this land?—It is principally hilly land. There are some small valleys which are not shown on the maps. The return given does not include a number of small valleys throughout the country.

304. Is there any agricultural land or accessible forest land, the property of the Crown, in the vicinity of the line?—I do not know anything of the country south of Flaxbourne. The information furnished is what I gathered from the maps, supplemented by inquiries made of surveyors, who pointed out the land to me.

305. *Mr. Fulton.*] In giving us this estimate you have followed the line of railway?—Yes.

306. Have you calculated the quantity of agricultural land the produce of which would feed a railway?—I cannot say whether I may not have taken some land in which would not contribute to the railway. [Witness pointed out on the map the position of the land included in the return.]

307. Have you included land above Flaxbourne and above Starborough up the valley?—Only up as far as the Shearing Reserve. I cannot say the probable quantity of land in the tributary valleys.

308. In what sized holdings is the land held?—On the Plains the land is principally held in 150-acre sections. I cannot say from memory the size of the larger blocks.

309. There are no small holdings until you go down to Kaikoura?—No; the country is divided into large holdings.

310. Have you any idea of the population along the line?—No.

311. Have you included the land on the Wairau Plain?—I have not, but I have made up the quantity and it is about 75,000 acres of good land. There is, in addition, a very considerable area of inferior land which I have not included in this return.

Mr. Charles Elliott, Blenheim, examined.

312. *Mr. Henderson.*] Have you ever resided or travelled in any part of the country between Tophouse and the Amuri?—Yes; I resided in the Upper Awatere for several years. From January, 1855, to the early part of 1866 I travelled through the district continually.

313. Have you been up there in the winter-time?—Yes; I resided in the Upper Awatere for several winters.

314. What sort of weather did you experience?—Heavy snow and frost.

315. How deep have you seen snow lie on the level country?—Three or four feet where not drifted.

316. What depth have you seen the snow where drifted?—I have taken sheep out of 15 feet of snow.

317. Have you ever travelled in the winter-time?—Yes; I have travelled from the Awatere by Tarndale to Tophouse, and on to Nelson. I have travelled from the Awatere to Christchurch.

318. How often would the drifted snow occur on the road?—It depends on the ground. Along that country there are gullies and spurs. All the gullies would be filled with drifted snow, and the spurs would be comparatively shallow.

319. In the high country how long have you known the snow lie continuously?—The first heavy fall of snow we had was in the month of April, 1857 or 1858, and I do not think the country was clear of snow until the end of the following August.

320. Have you ever been stopped from travelling in that part of the country through the severity of the weather?—I never was stopped myself, but I had a party of men stopped. They were snowed up three weeks at the junction of the Acheron and Clarence with a mob of cattle.

321. Have you ever known the weather to be so severe that sheep and cattle were lost in consequence?—Yes, several times. It is not at all unusual for sheep and cattle to be smothered in the snow.

322. Have you ever used the thermometer to note the temperature?—No.

323. Do you know of any circumstance to show the severity of the frost?—I have seen the Awatere and Acheron frozen so as to render it impossible to get a horse across. I have seen the Awatere frozen right across, and the Acheron frozen for one-third the distance across.

324. As a general rule, how long do you find the snow last?—From May to September.

325. Did you ever notice the action of the weather upon the roads and hillsides?—I have seen the road through the Wairau Gorge blocked with ice so that it was impossible for a beast to walk upon it. I have seen the cutting on the side of the hill completely closed.

326. How did you get along then?—I followed the bed of the river.

327. At how many places on the route between Tophouse and Hanmer do people reside?—There are only four places: Tarndale, Clarence, Richmond Dale, and Rainbow.

328. Do you know the distance?—It is thirty miles from Tophouse to Tarndale; Rainbow is about nineteen or twenty-one miles from Tophouse; and Richmond Dale is about six or seven miles from Tarndale. The distance from Tarndale to Hanmer is between thirty and forty miles, and from Tophouse between sixty and seventy miles.

329. Do you know anything of the suitability of the soil and climate for agricultural purposes?—Yes; I have been a farmer for several years.

330. Do you think there is any land between Tophouse and Hanmer Plains suitable for agricultural purposes?—I consider there is little or no land fit for agricultural purposes.

331. Coming down the Wairau Valley from Tophouse, how far would it be necessary to travel before coming to land suitable for agriculture?—There is really no agricultural land, except a few small patches of twenty or thirty acres, before you get to Birchhill. From there to Renwicktown the land is very patchy. I doubt if you would get more than two or three farms in that district.

332. Do I understand you would not consider that a farming population could reside there?—No. There are only a few small blocks of land here and there. There is no great extent of land fit for agriculture.

333. Do you know if the people employed in the high country reside there during the winter, or do they go away?—When the Messrs. Saxton Brothers owned Tarndale they always left it at the commencement of the winter, and did not return before the end of September, and I believe Mr. Carter's men also left the Clarence Estate during the winter.

334. If a railway were made from Hanmer to the Tophouse, do you think it would cause any more population to settle there?—Very little; there is nothing to induce settlement.

335. Have you any knowledge of the East Coast route?—Only as far as Kaikoura. I have never been over the route between Kaikoura and Amuri.

336. You are familiar with the character of the land in the Awatere Valley?—I am. There is a great quantity of first-class land there. I could not give the acreage, but it is something very considerable. I may state that I have known people to suffer from frost-bites when travelling between Hanmer Plains and the Tophouse.

337. Do you know the Upton Downs?—Yes.

338. Is there any good land there?—I think there are 4,000 acres of good agricultural land in the Upton Downs.

339. How far is this place from the railway route?—About twelve or thirteen miles.

340. How far would the railway be from Richmond Brook?—About six miles. There are about 3,000 acres of agricultural land on the Weld's Hill Run.

341. *The Chairman.*] What is the character of the soil in the Tarndale country generally?—The soil is very poor. There are large patches perfectly bare of vegetation, showing nothing but cold clay and gravel.

342. What is the character of the summer in the Tarndale country?—It was impossible to grow potatoes there.

343. Have any attempts been made to grow agricultural produce?—Messrs. Saxton found it impossible to grow potatoes there. I have put a pannikin of tea alongside of me at night, and in the morning it was a ball of ice.

344. Have any attempts been made to grow oats or wheat?—Not while I lived in the district.

345. Has all the level land in the district been disposed of?—There is very little freehold in the Tarndale district in proportion to the extent of the runs.

346. *Mr. Thomson.*] At what altitude were the persons when frost-bitten?—I do not know.

347. Do you know any other instances of persons having been frost-bitten?—Not that I recollect. Few people travel the district in the winter.

348. What distance are the snow-drifts from each other?—About a mile.

349. What width are they?—It varies according to the nature of the ground. I have seen them 40 feet wide.

350. What is the height?—They would average 8 or 10 feet.
351. How deep is the snow between the drifts?—I have seen it 3 or 4 feet deep.
352. How long does the snow lie?—I don't think the snow disappears until the end of August or September.
353. Have you any experience as to the stoppage of railway trains by snow?—No; I have only heard of railway trains being stopped by snow.

Mr. Vincent Hewitt, Blenheim, examined.

354. *Mr. Henderson.*] You are familiar, I understand, with the country on the Hanmer Plains and the high country between there and the Tophouse?—I lived on the Hanmer Plains for six years, and I travelled the district regularly.
355. Have you ever travelled there in the winter?—Yes. I have been caught in the snow more than once, and have been obliged to turn back.
356. What average depth did you know snow to lie on the Hanmer Plains?—I have never known snow to lie on the Hanmer Plains a depth of more than from 1 foot to 18 inches. I have been stopped between Hanmer and Tarndale, and have had to go along by the ranges. The depth of snow on the drifted places would be 12 or 15 feet. On the side-cuttings of the road the snow would be 8 or 10 feet deep.
357. How long have you known the snow to lie on the Hanmer Plains?—About a month or six weeks.
358. How long does it lie in the up-country?—About four or five months. When there was a heavy fall of snow I do not think it would melt until the spring.
359. Have you been stopped from travelling?—I have been detained six days at the junction of the Guide and Acheron before I could get away with the cattle.
360. Have you ever known flocks of sheep to be snowed up, also cattle?—I have known Mr. Atkinson and Mr. Carter to lose a great number of sheep and cattle one winter. After the thaw I saw the remains of hundreds of sheep and cattle.
361. Did you ever use a thermometer to note the temperature?—No. It was intensely cold.
362. How long do you consider winter lasts continuously?—I should say the winter lasts fully four months.
363. Do you know whether the land is suitable for agriculture?—There is some land of ordinary quality on the Hanmer Plains, but it would not pay to farm it.
364. What is the character of the land on the high country between Tarndale and the heads of the Wairau Valley?—I do not think they could grow six or eight bushels to the acre of any kind of grain if they cultivated the land between the Tophouse and the Hanmer Plains.
365. Have you ever known any one try to grow any?—Mr. Saxton put in a peck of oats, but I do not think it ever sprouted.
366. Have you ever travelled by the coast route?—I have started to go by the inland route on horseback, and in two days I managed to get a distance of four or five miles. I was glad to go back and take the coast way on account of the snow.
367. Where were you going to?—To Blenheim. I came by the coast route.
368. You know the country along the coast route?—I know it very well.
369. Which of the two routes would you consider the best for a railway?—I have not the slightest idea.
370. I mean as to convenience, and so on?—You could go the coast way in winter, but I question whether you could go by the Tophouse way, as there must be from 8 to 12 feet of snow lying there for months.
371. *The Chairman.*] How do you get out of Hanmer Plains, going northward?—By Jollie's Pass.
372. Is there any other route than Jollie's Pass?—The Lottery Pass is a better way than by Jollie's Pass.
373. You have been acquainted with the character of the country about Tarndale in the early times?—Yes.
374. There was a time when it was rich in blue-grass?—Yes.
375. What has been the cause of the change?—It would not stand stocking.
376. I understand you to say that at Tarndale the flocks do not increase?—Yes, that is the case. They have to buy wethers to keep up the stock.
377. The natural increase of the flocks is small?—Yes, very small.
378. What percentage?—From Tarndale to Hanmer Plains, if you got 40 or 45 per cent. you would be very fortunate.

Mr. John Murphy, Blenheim, examined.

379. *Mr. Henderson.*] Have you ever resided or travelled in any part of the country between Tophouse and the Amuri?—I lived at Molesworth, at the head of the Awatere.
380. How long were you living there?—I formed the Molesworth Station on the 1st January, 1866.
381. How long did you stay there?—I resided there until April, 1869. I am the first who lived in that locality in the winter.
382. Did you travel about there much?—Yes.
383. Where were you travelling to?—I travelled to the West Coast and Christchurch with cattle several times a year.
384. How did you get on in the winter-time?—It was a sort of Esquimaux's life: we were shut up sometimes for four or five weeks. On one or two occasions I had a narrow escape of losing my life when attempting to travel through the snow.
385. As a rule communication was stopped in the winter?—I never expected any communication, except there was a chance of a little fine weather.
386. How deep have you known the snow lie on the flat country?—The severest snow-storm I

experienced was in August, 1867. I could not say how deep the snow lay. I have seen the stone fence round the sheep-yard, which was 5 or 6 feet high, covered with snow. This was on the level flat twenty miles lower down than the railway line. I have seen cattle in 25 feet of drifted snow, and I worked to get them out.

387. How long have you known the snow to lie after a heavy snow-storm?—I have known it to lie from March to the middle of October. For five or six weeks I could not go out of doors.

388. You were manager of the Molesworth Run?—Yes.

389. Did you ever lose any stock through the severity of the weather?—I lost 100 head of cattle in 1867.

390. Can you state any circumstance that would indicate the severity of the weather?—I have ridden across the Awatere and Acheron Rivers and driven loaded pack-horses before me on the ice.

391. How long does the winter weather generally last?—The frost commences in May, and there is no spring weather until the end of October.

392. Did you ever lose any horses?—I lost two horses in 1867 through the inclemency of the weather.

393. How far is the Molesworth Station from Tarndale?—Fifteen miles.

394. What is the character of the vegetation there?—I should say, from the vegetation, that Tarndale is higher than Molesworth. On the high country there are patches of land quite bare.

395. Did you try any cultivation?—I tried grass seed and clover on these bare patches, but it would not grow. I have often tried to grow oats, but without any success. I also tried potatoes, and grew some in sheltered spots.

396. Do you know the East Coast at all?—I have travelled there, but am not acquainted with it.

397. *The Chairman.*] You have driven cattle from the station to Christchurch and the West Coast?—Yes.

398. By what route did you get to the West Coast?—I went up the Hurunui; I went over the Teremakau Saddle. I have gone more than once over the Grey Saddle. [Witness described the route on the map.]

Mr. JOHN MCKENZIE, Blenheim, examined.

399. *Mr. Henderson.*] Do you know all the high country between Tophouse and the Hanmer?—Yes.

400. Have you ever lived there?—I have never lived at Tarndale, but I have travelled the district. I have lived at the Molesworth Station.

401. How many years were you acquainted with that country?—Some fourteen or fifteen years.

402. Have you experienced falls of snow?—Yes; I have been stopped with the snow in the month of February, at Barefells Pass. I was then with Mr. A. D. Wilson on a survey.

403. How deep have you known the snow to lie on the level country?—About 2 feet 6 inches deep on the flat. In November, 1867, I rode through a place called the Tone, where the snow was 10 feet above me when on horseback.

404. That would be drifted snow?—Yes; the snow bridged the whole creek. The valley was filled with snow. There were the remains of a number of sheep embedded in the snow. I should think the snow in the gully would be about 100 feet deep in 1867. The snow fell in August, and I saw it in November.

405. Have you ever been stopped from travelling or carrying on your work in consequence of the snow?—Yes, frequently. Work was generally stopped from the 1st June to the 1st September.

406. What experience have you had of the snowing-up of flocks, and the mischief arising from it?—In 1867 I saw the remains of 500 sheep and 50 head of cattle in one place. I have seen horses snowed up on the flat for fourteen days.

407. Do you recollect any circumstances tending to show the severity of the weather in that country?—I always reckoned upon losing a great number of sheep every winter. I have known the fowls to die from the severe cold. At the end of August, when walking through the snow, it would be frozen on my trousers. We lived in whares built of clay, with roofs of toi. They are the warmest houses in the winter and the coldest in the summer. We did not keep the fire burning later than bed-time owing to the scarcity of firewood.

408. How long have you known the winter weather to last?—About three months. I have known of heavy falls of snow in May, and I have known 2 feet of snow on the ground in October. I was snowed up about the 20th December, and had to put back with 14,000 sheep. This was on the way to the Kaikoura—a lower country than the Tarndale.

409. Do you know how the flocks of sheep were kept up at Tarndale?—Generally by purchases from other flocks. There are purchased between three and four thousand sheep every year to keep up the flocks.

410. What is your experience of the effect of the weather upon the roads or traffic?—The heavy frost seems to rip up the road as if it were deeply harrowed.

411. What is the character of the soil?—There are some favourable patches of soil where you could grow a little. From the head of the Awatere to Tarndale you could not grow vegetables. In sheltered patches you could grow a little stunted oats. I have seen potatoes grown at Molesworth, but they were very small.

412. Have you been over the East Coast route?—Yes. I have travelled and camped on that route.

413. At what time of the year have you been there?—I have camped out at all times of the year on my way to Christchurch. I was never detained through bad weather. I have not seen any snow on the East Coast route while there was snow on the central route.

414. *The Chairman.*] Do you think the Tarndale country suitable for settlement?—I do not think it is suitable for settlement.

415. *Mr. Fulton.*] Do you know the altitude of Molesworth Station?—No. I do not know the relative heights of Tarndale and Molesworth.

Mr. Alfred Dobson, Surveyor, Blenheim, examined.

416. *Mr. Henderson.*] Do you know the country along the central route?—I have known most of the country since 1854. I had charge of all the roads in the Nelson Province. I had charge of the whole country between Nelson, the Amuri, and the Hurunui.

417. Are you acquainted with the East Coast?—I have been two or three times by the East Coast. I did not keep the coast further south than the Kahautara River.

418. Did you go by way of the Greenhills?—I came that way from the Amuri. In 1858 I went down through the Gorge to the Waiau country. I was unable to return by the inland route, and that was the first time I came by the coast.

419. Why were you unable to return by the inland route?—On account of the lateness of the season. I did not care to go through the Gorge alone.

420. You have been a good deal in the high country between Tophouse and the Hanmer?—Yes. I went through there twice in 1856. In 1857 I surveyed Tarndale run. In 1858 I went through the Gorge, down the Clarence, over Jollie's Pass, and up the Waiau. In 1859 I was engaged surveying a good deal of the Amuri country.

421. I suppose you have a fair knowledge of the character of the country?—I saw a good deal of it then. I have not seen it since 1869.

422. Do you think it is a country likely to be settled should a railway be constructed through it?—No, not northward of Jollie's Pass.

423. There are very few people living on the line?—I do not know what people may be living there now. There were no persons living there at the time I speak of.

424. How far would you go down the Wairau Valley before coming to land suitable for agriculture?—You would have to go as low as Birchhill at least.

425. Then how many miles is it from such a point to Hanmer?—About seventy miles.

426. You are acquainted with the coast route?—I do not know the route which has since been opened by the telegraph line.

427. Supposing a railway were constructed on both routes, which line would be most used by the public?—The coast line would be the one used for all business purposes. Tourists might go the other way on account of the grand scenery.

428. *Mr. Thomson.*] Are you acquainted with the route from Conway to Kaikoura *viâ* Spey and Keene Rivers?—No.

429. Are you acquainted with the route *viâ* Bui-Bui from Kaikoura into Clarence?—No.

430. Are you acquainted with the country between the bend of the Clarence and Flaxbourne?—No.

431. Can you give us an idea of the comparative advantage of a route by Awatere or Wairau valleys for railway purposes?—The Upper Awatere is extremely rough.

432. Can you tell us anything of the basin of the Buller for railway divergence?—No.

433. *The Chairman.*] You are acquainted with both the projected lines of railway?—I am not acquainted with the coast line south of Kaikoura.

434. Can you give us any information as to the relative merits of the two routes so far as you know them?—I think the line through the Wairau Gorge would be expensive to construct. There would be a considerable amount of severe gradients on that route. I do not see how the line could be constructed through the Wairau Gorge without tunnelling and heavy embankments.

435. Which line do you consider the best as a means of opening up country for settlement?—I think the coast line would be much better than the other. On the coast line there is a good deal of suitable country at Flaxbourne, Wakefield Downs, and at Kaikoura.

Mr. Sutherland Macalister, Inspector of Telegraphs, Blenheim, examined.

436. *The Chairman.*] Do you know anything of the Bui-Bui Pass north of the Kaikoura Peninsula?—Yes. In 1878 I was instructed by the Telegraph Department to explore this country for telegraph purposes. I started at the Clarence and followed what is known as the Bui-Bui. After travelling some three miles from the Clarence I reached a low saddle about seven hundred feet above the level of the sea, between Mount Alexander and the Kaikoura Range. From the saddle I followed a creek known as Inglis's, Bui-Bui, for a distance of about thirteen or fourteen miles, to the junction of that river with the Hapuka, some three or four miles from the coast. The country from the Clarence to the saddle is very broken, and the river is confined to narrow gorges for perhaps two miles from the Clarence. From the saddle into the Hapuka River it is low undulating country, well timbered throughout. There is a variety of good timber. From my knowledge of the coast line as compared with the Bui line, I should consider that it would be no more expensive to run a line of railway by the coast than it would be to take it inland, as the engineering difficulties which would present themselves on the inland route for two miles from the Clarence River are considerable. The country along the Bui route is not adapted for settlement. The land is too steep; there is no level land. The coast line would be the shortest by two or three miles. In my opinion the line from Blenheim, the line from Christchurch, the line from Nelson, and the line from the West Coast should, in the interest of the colony, have their junction at the Tophouse.

437. What is the character of the country between Kaikoura and the Waiau Township by the Greenhills?—It is low, undulating country. Much of it is fit for cropping at an elevation of, say, 900 feet above the sea-level. It is good grazing country.

438. *Mr. Thomson.*] You recommend the route by the Greenhills?—Yes.

439. Have you followed up the Spey River and down the Keene River to Kaikoura?—No; I do not know anything of them.

440. Do you know if there is a low saddle between the Clarence and the Ure?—I think not; I never heard of it.

441. Is it generally level country about the Buller basin?—It has a steady descending gradient from where it takes its rise to the junction of the Inangahua and the Buller.

442. Do you know the country between Blenheim and Nelson?—Yes; the country between Tophouse and Foxhill is somewhat broken. From Blenheim to Havelock and from Havelock to Nelson by the Rai Valley the country is comparatively level.

443. How would the line you suggest suit Christchurch people going to Hokitika?—It would not suit them, unless a branch line was run from the Hanmer Plains.

Mr. A. P. Seymour, Picton, examined.

444. *Mr. Henderson.*] Are you acquainted with the country on the inland route?—Yes; I have been through it.

445. You have not had any winter experience?—No; I only travelled through it in summer many years ago.

446. Do you consider there is any country there suitable for agriculture?—No; there is some very nice sheep country.

447. Have you been on the Hanmer Plains?—Yes.

448. Do you consider that part of the country suitable for agriculture?—From my recollection the Hanmer Plains consisted of hungry, cold land. There was no good land.

449. Do you know the Wairau Valley?—Yes.

450. How far would you have to descend from the Tophouse before you came to good agricultural land?—There is no good agricultural land in the valley. There is a little fair land about Hillsden.

451. You would have to go to the eastward of the Waihopai before you came to agricultural land?—Yes.

452. Beginning at the Hanmer, how many miles is it to the Waihopai?—It would be over ninety miles.

453. Is there any land suitable for an agricultural population over those ninety miles?—No; there is none.

454. Do you know the coast route?—Yes; I have been along the coast often, and know it very well.

455. Did you find the people as sparsely settled along that route as on the other route?—There is a larger population on that route. A good many years ago nobody lived between Tophouse and Hanmer Plains. There are very few people living there now. There are a good many people living on the coast route. The coast route is capable of supporting more people.

456. Will you read the second and third paragraphs of Mr. Foy's report on the route of railway lines in the northern districts of the South Island?—[Witness read the paragraphs as follows: (2.) "In noticing this subject (main trunk lines), I can but reiterate what I have already recorded in a former report as my opinion, and that is that, of all the routes that have been examined in connection with this work, the line by way of the Waiau and Kaikoura Townships, the coast, and Flaxbourne to Blenheim, is the best and only one that can ever be expected to pay for its construction. (3.) None of the other examined routes for the extension of the main trunk line northwards can enter into comparison with this one as regards its adaptability for a line of railway when viewed in the light of containing land fit for cultivation, or in any other way as possessing the means whereby a population can be supported along it."] Do you agree with those statements?—Yes; I agree especially with the statement contained in the third paragraph.

457. Would it cause people to settle on the land if there was a railway constructed from Hanmer to Tophouse, or could any industry be carried on other than that which is going on now?—No, not to any considerable extent. It is sheep country now, and will never be anything else. It takes a great deal of sheep country to produce any quantity of goods for a railway to carry.

458. Have you looked at Mr. Tinline's pamphlet and map?—Yes. The part coloured yellow on Mr. Tinline's map is twice too large; that is, one-half more yellow than it should be.

459. *Mr. Fulton.*] Have you any idea of the quantity of agricultural land between Blenheim and the Clarence?—I should say there are about 120,000 acres of agricultural land.

460. Would all this land be opened up by the construction of a line by the East Coast?—Yes.

461. *Mr. Henderson.*] Will you look at this statement in Mr. Blair's report?—[Witness read the following statement: "Eighty miles out of the 150 miles between Amberley and Blenheim pass through good agricultural country, capable of supporting a large population."] Is that statement correct?—The statement would be substantially correct.

Mr. Joseph Ward, Wairau, examined.

462. *Mr. Henderson.*] Have you been over the inland country?—No; I do not know the country between the Acheron and Tophouse. I know the coast route and the inland line as far as Barefells, and from Blenheim to the Tophouse.

463. Where does the agricultural country begin in the Wairau Valley?—There is practically none. There is a very little land, of second-rate quality, about Mr. Carter's place. There is very little even of second-class agricultural land between Tophouse and Renwicktown.

464. Do you think people would settle on the inland route if a railway were constructed?—I should think not.

465. You know the coast route?—I know it well. Wherever there is a patch of good land it is desirable for settlement.

466. You have seen Mr. Tinline's map?—Yes; I own some of the country coloured yellow. Even if the inland railway were made I would still continue to work my sheep to the coast. I would not bring my wool up the country to the inland line, to have it brought by rail some 100 miles to a shipping port. I think one-third of the part of the map coloured yellow ought to be included in the portion coloured pink.

467. Which of the two routes would have the most population immediately connected with it?—The coast line, most decidedly. In Cheviot, Kaikoura, and Awatere there would be more people settled than by the Amuri and inland route. The present population of these three counties is 1,530. On the central line there are the Amuri and the Wairau Ridings, and the upper part of the Awatere. The

population of these three places is 1,129. There is now more population on the coast than along the central line.

468. Which of the two lines would best support a population?—The coast line. In a few years there would be a considerable population along that line, while on the central route the population would not be materially increased.

Mr. Henderson read and handed in the following statement of the Blenheim Railway Route Committee:—

To the Honourable the Royal Commissioners appointed for the purpose of making inquiry into the probable cost and economical value of the several lines proposed for the extension of the Main Trunk Line through the Middle Island northwards from Canterbury; and also to inquire further whether any other line would be less costly and more advantageous to the colony than any one of the lines hereinbefore proposed.

We, the Blenheim Committee, beg respectfully to submit as follows:—

That the proposed inland route for the extension of the Main Trunk Line northwards is far inferior to the line from Waipara *viâ* Cheviot, Parnassus, Kaikoura, and the coast to Blenheim, as regards smallness of cost, economy of working, or general advantage to the colony.

As to probable cost: The coast route, being thirty miles shorter than the inland line between Waipara and Blenheim, must cost proportionately less to construct, say at the average cost of £8,000 per mile, equal to a saving to the colony of £240,000.

As to economical value: The coast route costing £240,000 less than the inland route, represents, at 5 per cent., a saving of £12,000 per annum. But there is the further economy of avoiding the cost of working the additional thirty miles, which, taken at an average ordinary cost of £300 per mile per annum for working, represents a further annual saving of £9,000. But, that being an estimate for comparatively level country, there would be a further loss on each journey of the train having to be raised nearly 3,000 feet higher by the inland than by the coast route, which must cause heavier and more costly machinery to be used and more fuel to be burnt than on the coast route, which rises no higher than 500 feet. Another economic consideration which presents itself to the Committee is that, as the engines would want coaling in the high country on the inland route, these coals would have to be dragged up there at considerable cost, whereas on the coast route coal could be landed from ship at Kaikoura and taken up by train at lowest possible rates. Another element of economy would be the saving of passengers' time and means, as it would take at least one and a half hours more to travel the inland than the coast route—more probably two hours, on account of the higher altitude having to be attained,—and the distance being greater the fare would be more. Another element of economic value is that for the distance of upwards of 100 miles from the Hanmer to Renwicktown, in the Wairau Valley, there is scarcely any land suitable for sustaining an agricultural population, whereas by the coast route 80 miles out of the 150 between Waipara and Blenheim pass through good agricultural country capable of supporting a large population. See Mr. Blair's Report, 21st June, 1879, page 11; see also Mr. Foy's Report of 26th July, 1878, page 10, where he says, referring to the coast route, "None of the other examined routes for the extension of the main trunk line northwards can enter into comparison with this one as regards adaptability for a line of railway when viewed in the light of containing land fit for cultivation, or in any way as possessing the means whereby a population can be supported along it." The Committee attaches great weight to these statements of unbiassed professional men, who pronounce thus after having devoted several years to the investigation of the merits of the two respective routes, and trust that they will have due weight with the Commission as against evidence which has been obtained acknowledgedly for the special purpose of trying to set up an inland route.

The Committee further submits that as regards people living on the actual line of either route the advantage is in favour of the coast route. Between the Hanmer and the Tophouse, a distance of 66 miles, there are but three places where people reside, viz., Carter's, Tarndale, and the Rainbow. There is a far larger population in the township and suburban districts of Kaikoura alone, with its 15,000 acres of arable land, than on 100 miles of the inland line; besides, all the way along the coast route there are people settled at short intervals even between Kaikoura and the Clarence, which is the worst part. Having regard to Mr. Tinline's pamphlet, the Committee submit that the population and resources of the Ashley country will be equally well served by the coast route as by the inland, and that even the Amuri country should equally count to the coast route working down to the junction of Waipara. And while on this point the Committee would say that in adopting such a plan as that of Mr. Tinline's of including remote populations not on the line in question, but who, he assumes, may be affected beneficially by the inland line, this Committee submits that it is entitled to include all the population of the North Island and all the population of the Middle Island from and including Ashley country southward as affected beneficially by the coast line, as the travelling portions of the population of these islands would make use of the coast line, but would scarcely use the inland line even if made.

The Committee also beg to point out that a considerable portion of the country coloured yellow in Mr. Tinline's map embraces portions of the Clarence and Awatere Valleys, which would not be worked up country to the inland line, but down to the coast as heretofore; and, with regard to population actually on the lines of the two proposed routes, that the coast route has the advantage over the inland line even now.

The Committee does not dispute Mr. Tinline's figures, but only accepts the following as being actually on the lines:—

Coast.		*Inland.*	
Cheviot	102	Amuri	513
Kaikoura	1,105	Awatere	56
Awatere	323	Wairau	735
	1,530		1,304

Again, the Committee submits that if a line were carried by way of Upper Clarence, Tarndale, or Tophouse, it would do little or nothing towards settling a population along it, and would not materially alter the country from what it is now, for the simple reason that the poverty of the soil and severity of the climate make it impossible for any industries to be carried on in those parts other than the grazing which is now done. Whereas the coast route, owing to its many thousands of acres of good land and its delightful climate, is capable of supporting a numerous population, which would of itself contribute a large and augmenting traffic to the railway.

This Committee further submits that the severity of the winter in the high altitude of the inland line would present considerable difficulty in the working of the trains, often involving extreme danger from snow-drifts and from hill-sides slipping down from frost and thaw, and these dangers of themselves, besides involving great expense and loss, would prevent travellers from using the line.

This Committee therefore respectfully submits that the advantages to the colony to be derived from a coast line far transcend those to be derived from an inland line; and they are convinced that, if an inland line were made, the working of it would be so great a loss to the colony that it would ultimately be abandoned, and the line by the coast would be constructed after all.

On behalf of the Committee of Blenheim on Railway Route Matters.

Blenheim, 2nd December, 1882. GEORGE HENDERSON, Chairman.

Mr. Henderson also submitted the two following affidavits:—

I, George Edward Kinsey, butcher, of the Tua Marina, Marlborough, do solemnly and sincerely declare that I was residing at the Muller Run for over six years, and have travelled from the Wairau to the Tophouse, to the Amuri, through the Wairau Gorge to Tarndale, thence to the Acheron, on to the Clarence, up the Clarence to Jollie's Pass, over to the Hanmer Plains. That I have travelled occasionally with sheep and horses. Have often experienced falls of snow in the winter months, being from May to August in every year during 1856 to 1862—the time of my residence. Have known the snow lie 3 feet deep on the flat in July, 1867. At the Muller Run I have seen snow-drifts more than 20 feet deep, and have rescued sheep out of drifts 12 or even 14 feet in depth. Have seen drifts of snow a mile long on the Barefells Pass, and impossible for horses or stock to travel. Have seen the snow lie for more than two months in 1857 or 1858, and in the years after. Have seen a mob of cattle stopped from travelling for three weeks, at the junction of the Acheron and Clarence, in September, 1860 or 1861; but as a rule no one travelled in the winter, it being considered unsafe to travel at that time of year. I have known flocks to be snowed up, and should estimate the loss occasioned thereby to be one-third of the flock. This occurred about July, 1867. The Messrs. Carter Brothers lost fully 200 head of cattle at the same time at the Clarence and Acheron Runs. That I have known travellers in this district referred to suffer personal injury by reason of the severity of the weather. In August, 1857 or 1858, Messrs. T. Wilson, Augarde, and Capper suffered the loss of limbs, and the Hon. W. Robinson suffered severely from other injuries. That the coldness of the atmosphere was such that, having left a billy of tea in the fire-place when retiring to bed, the said liquid would be frozen to a lump of solid ice during the period of rest at night—this occurrence happening almost every winter. That as a rule the winter in the district referred to above commences at the latter end of April, terminating about the beginning of September in every year, some years being more severe than others. I have seen slips of land very often in the cutting whilst travelling down the Acheron, being caused by the excessive snow-fall and extreme frosts; but did not notice the effect of same causes in the Wairau Gorge, as it was impossible to travel in the last-mentioned place in the winter-time. Whilst travelling in spring-time in this locality we used to keep the bed of the river.

That I am acquainted with the conditions necessary for the conduct of profitable agriculture, and state that there is not any land fit for profitable agricultural occupation in the district from the Tophouse to Hanmer Plains, the flats being very small and liable to be snowed up very deep in winter.

That I have travelled through the Hanmer Plains with stock, and have camped there for three weeks at a time. That I consider there is some land on the Hanmer Plains which may be devoted to agriculture, but cannot state to what extent. The persons employed in the high country always left that locality at the commencement of winter, returning at the recurrence of spring.

And I make this solemn declaration knowing the same to be true.

Made and subscribed at Tua Marina, in the Provincial District of Marlborough, in the Colony of New Zealand, this 1st day of December, 1882.

Before me—John M. Hutcheson, J.P. GEORGE EDWARD KINSEY.

I, Henry Alexander MacShane, Sheep Inspector, Balclutha, Otago, do solemnly and sincerely declare that I was residing at the head of the Awatere River for about twelve years, and in the habit of travelling from there to Nelson *viâ* Tarndale and Tophouse, also travelling to Canterbury *viâ* Barefells Pass, through the Clarence and Acheron country, and over Jollie's Pass on to the Hanmer Plains.

In the year 1860 myself and the late Frank Nicholas (Mrs. N. Edwards's brother, of Nelson) were travelling to Canterbury with cattle, and after very great difficulty we managed to force our way through the snow as far as the junction of the Acheron and Clarence, where we were completely jammed, and had to remain there for about a fortnight, neither cattle, horse, nor man able to make another mile. We lost several head of cattle and one horse, and had a very narrow escape of losing either our own lives or some of our limbs being frostbitten. Fortunately for ourselves, we managed to kill a lame heifer, which was all we had to live upon, all our stock of provisions being exhausted. Upon our return from Canterbury, Mr. Charles Elliott, senior, made us each a present for the hardship we had endured, the news having reached him in Nelson before we reached Canterbury.

I was residing at the Muller (Messrs. Stafford and Hodson's station) in the year 1867, when there was a very heavy fall of snow, either the last day of July or 1st August (I am not positive from memory which), all the sheep-yard fences were completely covered, and we estimated the loss of sheep at about two thousand, and fourteen head of cattle, through the snow-fall. I cannot say for certain the number of stock that perished in the Clarence country, but I believe the loss was considerably heavier than in the

Awatere. I may here state that the two winters I have named were exceptionally heavy ones, but such storms are liable to occur in any winter. I consider that in this high country snow may fall and does from May (yearly) up to the end of August, and I have seen it very much later, but not very often.

I have travelled frequently from the Awatere to Nelson *viâ* Tarndale and Tophouse, through the Wairau Gorge, and have always found the frost much more severe in this locality than at the Muller, especially at Tarndale, which is considerably higher than the Muller. With regard to the quality of the land at the head of the Awatere and Clarence and Tarndale, I certainly consider it is useless, other than for grazing purposes, being a light shingly mixture; a good portion of it is without a particle of grass or even tussock growing upon it. I have seen the ice so thick on the still pools of water that several men could slide upon it, and the road down a stream called the Gray nearly impassable on account of the thickness of the ice, making it most dangerous for a horse to travel. (The stream I mention leads from the Avon saddle into the Awatere.) Mr. George Monro lost a valuable horse upon one occasion, and a dealer from the West Coast five head of cattle through slipping over the ice.

And I make this solemn declaration, knowing the same to be true.

Made and subscribed at Balclutha, in the Colony of New Zealand, this 30th day of October, 1882.

HENRY ALEXANDER MACSHANE.

Before me—J. Smythe Fleming, J.P.

Mr. Henderson subsequently forwarded the following Return, showing (No. 1) the number of bales of wool, rabbitskins, &c., exported from the district (Blenheim to Clarence River), including the Awatere Valley, for 1881–82; (No. 2) the number of bales of wool exported from the Wairau for the season 1881–82; (No. 3) the quantity of produce exported from the Wairau District for the year 1881–82; (No. 4) the amount of produce exported from Wairau and Awatere for the year 1881–82:—

(No. 1.)

Name.	Station.	Bales of Wool.	Bales of Rabbitskins.	Casks of Tallow.	Bales of Sheepskins.
	Vernon	350	1	...	8
S. Watson and Aroa ...	...	35	4	...	...
R. Beaumont	Starborough ...	526	16	4	15
J. D. Busby	Upton Downs ...	280	2	30	33
— Mowat	Altermarlock ...	16	9	...	9
P. R. McRae	Blairich and Weld's Hill	400	3	47	64
	Mount Gladstone ...	100	...	...	...
— Green	Upcot	175	...	...	...
	Molesworth ...	180	...	...	...
G. H. B. Monro ...	Langridge ...	170	...	...	...
M. Mowat	Middlehurst ...	200	...	...	10
T. Cawthron	Fairfield	105	...	...	...
— Buck	Muller	75	...	...	...
	Flaxbourne ...	700	14	...	2
	Richmond Brook ...	180	25	...	...
— Renwick	Dumgree	200	35	...	...
— Symons	Kekerangu ...	750	50	...	...
	Shades	55	6	...	...
	Woodbank ...	135	20	...	...
Farmers between Blenheim and Vernon ...	...	90	...	...	...
		4,722	185	81	141

(No. 2.)

Station.	Bales of Wool.	Bales of Sheep-skins.	Bales of Rabbit-skins.	Station.	Bales of Wool.	Bales of Sheep-skins.	Bales of Rabbit-skins.
Bank House ...	121	...	1	Langley Dale ...	30	...	...
Erina (north bank) ...	115	...	...	Valleyfield ...	30	...	...
Lansdowne ...	120	...	...	Delta ...	70	...	4
Hillensden, Stronvar, Te Arowhenua	472	...	...	Avondale ...	220	...	...
				Summerlands ...	60	...	...
Wantwood ...	80	...	...	Benopai ...	185	...	...
Birch Hill ...	238	9	...	Leafield ...	160	...	...
Tyntesfield, Meadow-Bank	130	...	...	Hawkesbury ...	100	6	...
				Brookley ...	30	1	...
Farmers on Plain ...	2,410	...	...	Wrekin ...	13	...	...
					4,584	16	5

(No. 3.)

Name.	Bales of Wool.	Bales of Sheepskins.	Casks of Tallow.	Casks of Pelts.	Bales Rabbitskins.	Hides.	Bushels Oats.	Bushels Barley.	Bushels Wheat.	Bushels Peas.	Bales Flax.	Sacks Potatoes.	Sacks Bran.	Bushels Malt.	Bushels Grass Seed.	Bales Fungus.	Lb. Hops.	Tons Bacon.	Tons Carrots.	Bales Tow.
Loan and Mercantile	...	16	86	56	74	48	13,116	16,764	24,256	2,164	1,591	3,452	490	...	120	5	...	...	...	243
Fell Brothers and Co.	...	...	...	...	...	...	21,532	39,108	23,952	2,064	3,700	1,440	3,861	4,072	2,432	...	...	...	35	...
Sharp and Pickering	...	...	...	...	...	...	5,292	7,516	12,616	5,464	1,045	...	...	...	...	...	...	...	...	250
H. Ball	...	...	...	...	...	...	...	...	...	...	...	...	...	8,000	...	...	...	...	...	...
H. Dodson	...	...	...	...	...	...	...	...	...	...	...	...	...	400	...	...	5,000	...	...	...
— Lorie	...	...	...	...	...	...	...	...	500	...	...	...	...	...	...	...	...	...	...	...
E. Paul	...	...	...	...	...	...	...	2,000	...	...	...	...	...	...	...	...	...	...	...	...
— Stenhouse	...	...	...	...	...	...	1,000	1,000	...	...	...	...	...	...	...	...	...	...	...	...
— Evans	186	...	...	...	...	...	1,000	...	60	...	50	960	...	...	...	...	...	1½	...	18
George Dodson	...	...	...	...	...	...	...	1,000	...	...	...	...	...	...	...	...	...	...	...	...
Parker Brothers	...	...	...	...	...	50	1,000	...	...	500	...	360	...	...	...	...	...	5	...	...
	186	16	86	56	74	98	42,940	67,388	61,384	10,192	6,386	6,212	4,351	12,472	2,552	5	5,000	6½	35	511

(No. 4.)

—	Bales of Wool.	Bales of Sheepskins.	Casks of Tallow.	Casks of Pelts.	Bales of Rabbitskins.	Hides.	Bushels Oats.	Bushels Barley.	Bushels Wheat.	Bushels Peas.	Bales Flax.	Bales Tow.	Sacks Potatoes.	Sacks Bran.	Bushels Malt.	Bushels Grass Seed.	Bales Fungus.	Lb. Hops.	Tons Bacon.	Tons Carrots.
Schedule 1 ...	4,622	141	81	...	185	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
„ 2 ...	4,584	16	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
„ 3 ...	186	16	86	56	74	98	42,940	67,388	61,384	10192	6,386	643	6,212	4,351	12,472	2,552	5	5,000	6½	35
	9,392	173	167	56	264	98	42,940	67,388	61,384	10192	6,386	643	6,212	4,351	12,472	2,552	5	5,000	6½	35

NELSON, TUESDAY, 5TH DECEMBER, 1882.

The Commission met at 3 o'clock, in the City Council Chambers.

Mr. C. Y. Fell, solicitor, addressing the Commissioners, said: I have been desired by the Committee to examine the witnesses we propose to bring before you. I purpose making a statement of the position the Nelson people take in regard to the railway question, and I should prefer doing so after you have heard the evidence of facts, if such a course would be convenient to you.

The Chairman: The course you propose to adopt will be quite convenient to the Commissioners.

Mr. ROBERT DISHER, Waimea West, examined.

469. *Mr. Fell.*] Do you know the Tarndale country?—Yes, well.

470. When did you first visit Tarndale?—About 1866.

471. What did you go there for?—I went there to work as a labouring man for Messrs. Saxton.

472. Who were they?—They were runholders.

473. At that time I believe they were the holders of Tarndale Station?—Yes.

474. You were employed by them in the year 1866?—Yes.

475. How long did you stay in their service?—I remained with them for about two years. Mr. Pike had the station after them. I still stayed there.

476. For how long continuously?—A year.

477. Messrs. Edwards and Kerr afterwards took the station?—Yes. I stayed with them for eight or ten years. I was there thirteen years altogether continuously. I was their manager during the last six years.

478. Were you there winter and summer?—Yes.

479. Of those winters which was the worst?—The first winter I was there was the worst.

480. Do you remember the winter of 1867?—Yes.

481. Is that what has been commonly called the "bad winter"?—Yes.

482. Why has it been called the "bad winter"?—Because there was more snow all over the country that winter. All the country both north and south of the Amuri suffered more or less that winter. They lost a lot of sheep in the Amuri.

483. Was there a fall of snow at Tarndale?—Yes.

484. Since the year 1867 do you recollect what you would call a serious fall of snow?—No.

485. Has there ever been since then such a fall of snow as would in any way obstruct traffic?—Not to my knowledge.

486. You must have known it, as you were there?—Yes, I would have known it.

487. During those years were you able to go about your work in the winter season?—Yes.

488. In the general management of the sheep station?—Yes, I used to muster the sheep every month.

489. Do you remember the winter of 1870?—Yes.

490. You were then managing for Messrs. Edwards and Kerr?—Yes.
491. Did you regularly muster the sheep that winter?—Every month that winter I mustered fat sheep for the butcher.
492. Why did you muster them every month?—The dealer came every month to take sheep away.
493. Was that mustering ever interrupted by the weather?—No.
494. Was that winter less severe or more severe, or was it a fair general average winter?—It was a fair average winter.
495. I suppose in every winter there is some snow?—Yes, more or less.
496. As a rule, when does the snow begin to fall?—Generally in July and August.
497. Are the falls of snow continuous? Do they lie on the ground, or do they disappear and leave the ground clear until there is another fall?—The snow generally disappears if there is any rain.
498. Is there usually rain?—There is generally rain after the snow, which clears it away.
499. How long, as a rule, do you find the snow to lie on the ground?—A heavy fall of snow would lie three or four days.
500. That is, before it is all gone?—Yes, on the flat land.
501. What do you call a heavy fall?—A foot or eighteen inches.
502. When was the last heavy fall of snow?—Five or six years ago.
503. There has not been a heavy fall since that time?—I have not been up there these last two or three years. They say that during the last winter there was very little snow.
504. Whilst you were there, had you what you term a heavy fall of snow every year?—It was generally a foot deep. We would have a snowfall, which would, perhaps, last two or three days.
505. I suppose you know the country all round there thoroughly well?—Yes.
506. You know the Rainbow?—Yes.
507. Was the Rainbow a part of Mr. Kerr's country?—Yes.
508. Also down the Wairau Valley?—Yes.
509. How far from the Tarndale Lake is the Rainbow Station?—About eight miles.
510. Do you know the Acheron?—Yes.
511. And all the other valleys in that part of the country?—Yes.
512. What sort of country is it for grass?—It is splendid country for grass.
513. Do you know whether English grasses grow there well?—I tried them at the Rainbow, and they grew well there.
514. You have not tried them at Tarndale?—No.
515. Why not?—I had not an opportunity then.
516. Is there good native grass at Tarndale?—Yes.
517. I believe the Tarndale stock are somewhat celebrated for their goodness, and the country for its fattening capacity?—Yes.
518. Are you speaking of the whole country as being good grass country?—Yes, the whole of Tarndale.
519. I suppose you have no reason to suppose that English grass would not grow there as well as at the Rainbow?—I think it would.
520. Are the bottoms of the valleys in the tributaries of the Acheron fertile?—Yes, they are all good grass country, the same as Tarndale.
521. Have you tried any cultivations at Tarndale, or in any of the valleys?—Only at the Rainbow.
522. Will you state the result of your trials in cultivating land? What did you try to grow?—I only grew oats for horse feed in winter.
523. Did you grow much or little of it?—About ten acres.
524. As much as you wanted?—Yes, as much as I wanted for the use of the station.
525. Did you find the crop good?—Quite as good as down at the Waimea West, where I am now farming.
526. Have you any reason to suppose that oats would not succeed as well at Tarndale, or in the valleys there?—I think they would grow just as well.
527. Have you tried to grow any other cereals than oats?—No.
528. You have not tried wheat or barley?—No.
529. Had you a garden there?—Yes, we had a vegetable garden. We grew carrots, swedes, &c.
530. You did not try anything more?—No; I did not devote much of my time to gardening. I only grew what I wanted for our own use.
531. Did they grow well?—Splendidly.
532. Do you mean splendidly for that place, or would you have thought them a good crop down here?—I have never seen anything like them down here for goodness.
533. How do you account for that?—The climate was suitable, and also the soil.
534. Do I understand that the soil is particularly good there?—The soil was good where my garden was.
535. Is there any more soil of the same character in that district?—Any quantity of it.
536. From what you say, am I to gather that the bottoms of the valleys in that district would be suitable for settlement—that agriculturists could grow oats, have gardens, and supply dairy produce?—Yes, I should think so.
537. Do you consider the climate there such as would make life unbearable to people, if they tried to live there?—They could live there.
538. Had you a family when you lived there?—No.
539. Would their gardens and cultivations thrive as well as yours did?—Yes, certainly.
540. Have you had any experience in hop-growing?—No.
541. You know the sort of soil suitable for hops?—Yes.
542. Can you say whether there is any quantity of ground in that district suitable for such a crop?—I think the soil there would be suitable for growing hops.
543. Is there much of such soil?—There is a good deal of swamp—the kind of ground desired for hop-growing.

544. Is there plenty of it?—I cannot say the extent, but there is a lot of it in patches.
545. Do you think the climate would be a hindrance to the growth of hops there?—I think not.
546. What is the summer weather like?—It is very hot—hotter than it is down here.
547. What time does the cold weather set in?—About April.
548. How does the weather, in the month of March, compare with the weather in Nelson?—It is about the same.
549. Is the climate up there healthy?—Very healthy.
550. Can you give any instance that convinces you that such is a fact?—Yes.
551. Have you ever known it to be a resort for invalids?—Mr. Pilkington can give evidence as to that.
552. You remember Mr. Newton coming up?—Yes.
553. He was in a delicate state of health?—Yes.
554. Did he get any better?—Yes; he had been very ill of consumption.
555. Generally speaking, do you think the winters there are such as would be any obstruction to traffic?—No, I do not.
556. *The Chairman.*] You said you never knew a winter sufficiently severe to obstruct traffic in the Tarndale district?—Yes.
557. What do you understand by the word "traffic"? Is it traffic carried on by carts or other wheeled vehicles, or is it the driving of stock from place to place?—The traffic is only on horseback, and there is the driving of cattle and sheep.
558. Suppose the traffic to be carried on by drays or carrriages, or by means of a railway, what would be the condition of affairs in the winter then?—I do not think there would be anything to stop a railway.
559. In the early times, when you first went there, the blue-grass was abundant?—Yes.
560. What has become of it?—There is still plenty of feed for sheep.
561. How long is it since you have been there?—I have not been there for three years.
562. You think there is still abundance of blue-grass in the Tarndale district?—Yes.
563. Do you remember what was the increase of the stock on the run while it was in your charge—what was the annual percentage of increase?—We never bred on the run.
564. Why?—We could buy the sheep cheaper than we could breed them.
565. In all your experience of that country have you ever heard of any person losing his fingers or toes through frost-bites?—No.
566. *Mr. Thomson.*] What was the depth of the snow-drifts in the gullies?—I could not tell you the depth there.
567. Did you see any drifts at all?—Oh, yes; in the gullies.
568. Can you give us any idea as to the depth of the drifts?—There might be five or six feet of snow in the gullies.
569. No more than that?—No; I think not.
570. Do you know the acreage of the Tarndale run?—Seventy thousand acres.
571. How many sheep does it carry?—When I was there it carried 22,000 sheep.
572. Could it not carry more than one sheep to the three acres?—I should think so.
573. All the year round?—Yes.
574. How many more would it carry?—I think it would carry another 5,000.
575. Not more than that?—No.
576. *Mr. Fulton.*] Where are the cultivations you speak of on the Tarndale run?—At the Rainbow Station.
577. Have you any idea of the difference in altitude between the Rainbow and Tarndale?—No, I have not.
578. Where is the land you have mentioned as being similar to that on which you grew crops at the Rainbow?—At Tarndale and about the Rainbow.
579. How much of that land is there at the Rainbow?—Three or four hundred acres.
580. Does the road go by the gullies or the mountains?—It goes round the mountain sides.
581. Does the road keep the river?—Yes.
582. You have never seen the drifts any deeper than six feet?—No.
583. How late do frosts occur there?—In April we get the first heavy frosts, and it continues up to October.
584. Have you not known the frosts to be later than that?—Yes, very slight frost.
585. Did you ever try to grow any crops at Tarndale?—No.
586. Do you know of anybody who has grown crops there?—They are growing crops there now, I believe.
587. To any extent?—To the extent of ten acres.
588. Better than they can grow them on the Waimea Plains?—They say they are very good crops. I heard they had a splendid crop of oats last year.
589. *Mr. Fell.*] When you speak of the drifts in the gullies I suppose you refer to the drifts in the deep transverse gullies running into the main stream?—Yes.
590. In the event of a road being made such places would be bridged over?—Yes, certainly.

Mr. Adolph Wiesenhavern, Brightwater, examined.

591. *Mr. Fell.*] You were formerly an occupant of the Tophouse Run, and manager of the accommodation-house there?—Yes.
592. I believe you were there between the years 1859 and 1882?—Yes, I was twenty-three years there.
593. Did you live there the whole time?—All the time.
594. I suppose you know the Wairau Valley and the gorge well?—Yes, I know them well.
595. You have been up the Wairau Gorge?—I have been up that gorge frequently, and also to Tarndale.

596. How do you know the Wairau Gorge so well?—Because my cattle grazed there.
597. What is the height of your place, at the Tophouse, above the sea?—I believe over 1,800 feet.
598. That is about the same level as the Big Bush?—Yes.
599. Which is the more difficult to travel in the winter-time—the Wairau Gorge or the Big Bush?—I should say the Big Bush.
600. Although its level is 1,800 feet?—Yes.
601. And the gorge is higher?—Yes.
602. How do you account for that?—Because the Big Bush is dense forest. The road runs east and west, and the road at the Wairau Gorge runs north and south.
603. You mean the sun has access to the one and not to the other?—Yes; I have frequently observed the snow lying on the Big Bush road, when the road through the Tarndale was perfectly clear of it.
604. You kept a diary during your years there?—I did.
605. You took a note of the passengers to and fro?—Yes.
606. Can you say whether or not there was constantly traffic upon the road between your place and Tarndale during the winters of those years?—During the early days the Tarndale high road was shut up, owing to the severeness of winter; nevertheless travellers did go.
607. What do you mean by "shut up"?—There were no men at the accommodation-house; it used to be shut in the old days.
608. In what condition was the road in those days?—It was a mere rough bridle-track.
609. I believe it was necessary then to cross the river a good many times?—Yes, something like thirty times.
610. Was that road then difficult or impracticable?—Yes.
611. When was the road made?—I do not know. It was improved.
612. After that, was the traffic as interrupted as it used to be?—No.
613. Of late years is the traffic ever interrupted?—No, not to my knowledge. It may be that a foot traveller would wait a day or two, owing to the high river or snow showers, but he would not be altogether delayed in his journey. A horse traffic would never be interrupted. The snow very soon disappears.
614. Did the snow clear so that man and beast could get on more easily through the gorge than going north through the Big Bush?—I cannot say.
615. I mean up at the gorge?—For the first ten miles from Tophouse southward the snow clears away more quickly. The climate is warmer.
616. Have you ever lost any sheep during the snow?—Not to my knowledge.
617. How deep does the snow fall at Tophouse?—We have more or less of a snowfall every year.
618. What would you call a heavy snowfall?—The severest snowstorm on the level land was 2 ft. 1½ inches.
619. That was at the Tophouse?—Yes, in front of my house. But even this heavy snow disappeared within a very few days. Persons could go along the road.
620. Of course there would be snow still in the drifts?—Yes.
621. Do you know the Rainbow?—I have been there several times.
622. Do you know whether fruit can be grown there?—I certainly ate splendid strawberries there.
623. Is there any other fruit you have seen growing there?—I did not take any notice.
624. Does fruit grow about your place?—Yes, very well.
625. And at the Big Bush?—The soil and climate are suitable for growing apples.
626. Of course the Big Bush is dense forest?—Yes; there are wild apple-trees growing there now.
627. Is the ground at the Rainbow also suitable?—Yes; shrub fruit, such as strawberries, raspberries, and currants, grow very excellently there.
628. You say that since the road has been made traffic to and fro from Tarndale is practically uninterrupted?—Absolutely uninterrupted.
629. *The Chairman.*] Where is the Big Bush?—It lies between the Tophouse Reserve and Nelson.
630. It is not part of the bush of the gorge?—No; it is on the road from Tophouse to Nelson.
631. Did you cultivate the land while it was in your occupation?—Very little, except for house consumption.
632. How did you get your knowledge of the capabilities of the country? Has anybody else cultivated land at the Tophouse or near it?—I was living there alone all the time with my family.
633. *Mr. Thomson.*] You say the drifts lay for weeks?—Yes; in some places at the Tophouse.
634. In which part?—In the deep gully opposite my house.
635. What was the depth of that drift?—In the severe winter of 1867 I should say the snow was eight or ten feet deep.
636. Have you seen the drifts at Tarndale?—No; I have never been to Tarndale in the winter.
637. *Mr. Fell.*] When you say you did not cultivate, had you not an orchard?—Yes.
638. When you spoke of the fruits that grew, you did so from your own knowledge?—Yes. The fruit grown in the old garden was excellent, lasting until the next apple season.
639. In speaking of crops, and the capacity of the soil for producing crops, you spoke from your own knowledge?—Yes; although I did not make a profit from my farming. About a mile or two from Tophouse there is very good land, which I might have cultivated if I had cared to do so. I did not go in for farming.
640. The gully of which you speak has almost perpendicular sides?—Yes.
641. It is quite smooth, and open to the wind?—Yes.
642. Therefore the snow is easily blown into this gully?—Yes; that is the place where I saw the snow lie so deep. That was during the winter of 1867, when there was the heavy snow-storm.

Mr. William White, Brightwater, Chairman of the Waimea Road Board, examined.

643. *Mr. Fell.*] I believe you held a run at Tarndale between the years 1860 and 1867?—Yes; I held the Tarndale reserve and about 10,000 acres of leasehold for seven years.

644. You kept the old accommodation-house there?—I built it.

645. In what direction did your country extend?—It extended towards Lake Tennyson, and included the highest part of the country in that district. It included what is known as the Highland Saddle.

646. At that time Saxton Brothers held the rest of the Tarndale country?—Yes.

647. Do you know the whole of that country?—I know it well.

648. The block of country lying between the Wairau, Acheron, and Waiau Rivers?—Yes.

649. What stock had you upon your country?—Cattle.

650. And the Saxtons?—Cattle and sheep.

651. Where was your house?—About three miles from Saxton's station. My house was close to what is called Fish Lake, in Tarndale proper, on the road to Christchurch.

652. Had you any garden there?—I kept a vegetable garden.

653. What did you grow in it?—Cabbages, carrots, parsnips, &c.

654. An ordinary stock of vegetables?—Yes, vegetables for the use of the house.

655. Did you find them grow well?—They grew splendidly.

656. You have been for some time a brewer at Brightwater?—Yes.

657. You have a garden there?—Yes.

658. Would the produce of your garden at Tarndale compare favourably with that of your garden at Spring Grove?—Certainly, so far as the vegetables are concerned.

659. You did not grow any fruit?—No; we did not try to grow fruit.

660. Did you grow any crops of any kind?—No. We tried English grass and it grew splendidly.

661. Did you try oats?—No. Messrs. Saxton grew oats at the Rainbow. I have seen oats there between five and six feet high, and a very thick crop.

662. There were no roads?—No; only horse-tracks.

663. You could not have got your crops to market had you grown any?—No.

664. How did your stock thrive upon the grass country?—I would like my stock down below to thrive as well now.

665. You know the Lakes?—Yes.

666. They are mostly shallow?—Yes; there is one deep lake, and the rest are shallow pools.

667. Have you ever seen the deep one frozen over?—Yes, on one occasion.

668. You have seen ice across it?—Yes, thin ice.

669. Have you ever seen it frozen over so that you could walk over it?—Only on one occasion.

670. Did you cross it then?—Yes; I drove some cattle over it.

671. What winter was that?—About 1863 or 1864.

672. I presume that must have been an exceptionally severe winter?—Yes, it was.

673. You have not seen it frozen so that you could walk over it on any other occasion?—Only on the one occasion.

674. Hampshire is your native county?—Yes.

675. Is there more snow-fall in the country you speak of than in Hampshire?—No; there is not. There is more storm, but not so great an average snow-fall as in Hampshire.

676. Is the cold as severe in Hampshire as it is at Tarndale?—At times the cold is very cutting at Tarndale; the winds are very cutting.

677. Can you say that you have the same persistent frost at Tarndale as in Hampshire?—No.

678. When the snow falls does it lie?—It sometimes lies for several days. In the winter the higher land has usually some snow upon it, but it only lies on the flats for two or three days.

679. On the flat surface what would you call a heavy fall of snow?—I should say from 15 to 20 inches.

680. Have you ever seen a deeper fall of undrifted snow?—No; I have seen it deeper in the gullies.

681. From your knowledge of the country do you consider if there were a road to get produce to market a population would be able to sustain itself in that district?—Readily, I should say. The ground is very fertile.

682. The country, generally speaking, is undulating?—Yes.

683. There are one or two main ranges?—Yes.

684. What is the character of the intervening country of which you speak?—Low hills.

685. Do you see the low hills going down the Acheron?—Yes.

686. Can you name some valleys which you would consider suitable for settlement?—The Alma Valley, the Sedgmere Flat, and the Upper Alma valleys and flats. The land appears to be of first-class quality.

687. Do you know Leaderdale?—Yes. If you go over the Highland Saddle, you drop down to Lake Tennyson, from which the Clarence River takes its rise. The whole of that country, except the very high hills, appears to me to be first-class land. In that neighbourhood, a few miles down from the lake, I have seen the indigenous grasses sufficiently thick that, if the detached pieces of rock had been got together, you could have made thousands of tons of hay, although the country was supposed to be fully stocked at the time.

688. There was still such a growth of grass upon it that you could have cut it for hay?—Yes.

689. Is there any quantity of land in the district, up and down the valleys, of that character?—Many thousands of acres.

690. Capable of carrying quite a considerable population?—Yes.

691. If that country were rendered accessible by a railway, do you think it would support such a population?—Yes, that is my honest conviction. Country of a similar character extends to the Hanmer Plains.

692. Supposing a railway were constructed, is the fall of snow in the winter such as would be

likely to cause any serious obstruction to traffic upon the line?—No, certainly not, on a railway line. In America and England there are railways running through country where there is more snow to contend with.

693. If an ordinary open line were constructed with due care, and the deep gullies bridged, are you of opinion that the line would be obstructed by the snow-storm of an ordinary winter?—No.

694. *The Chairman.*] Do you know the position of the present station at Tarndale?—I have not been there for some years. It changed hands since I was in Tarndale. I believe the station is now several miles further south than it was when I lived there. The present station is about four miles from Fish Lake.

695. If any one were to state that the snow lies as high as the tops of the fences, for three months of the year, on Tarndale Plains, would that statement be incorrect?—I have never seen it. My experience only extends for a period of six or seven years. During that time, with the exception of one year, I found it more profitable to muster my cattle in the winter, and take them north and south, than at any other time of the year. The snow never lay more than three or four days on the flat. I never saw the snow on the top of the middle rail of a three-rail fence.

696. *Mr. Thomson.*] You say you have seen oats grow six feet high?—Yes, at the Rainbow, eight miles lower down.

697. Would they grow equally high at the Tarndale Station?—Judging from the few experiments I made with the English grasses, I should say they would.

698. What extent of run had you?—I had about 37,000 acres.

699. What extent was the Tarndale Run?—I do not know the extent; it was a very large area of land. The Tarndale Station was held under several applications.

700. The present Tarndale Station, and your station, would be 87,000 acres in extent?—I should say that would be the area.

701. You say that area would be fit for agricultural settlement?—A great portion of it, on the flats. The Sedgmere Flat, and all the level land, would be available.

702. Would it be as fit for settlement as the land on the Waimea Plains?—It would not be farmed under such favourable conditions.

703. Would a farmer be content with fifty acres?—That would depend very much upon his wants. A poor man, coming from England to better his condition, with fifty acres of land, and a few weeks' work, would vastly improve his position. Of course he would not make a fortune out of fifty or a hundred acres.

704. I presume there are many Nelson farmers who are content with fifty acres on the Waimea Plain?—I do not say they are content, but they do with it.

705. Would they equally do with it at Tarndale?—No.

706. How many more acres would they require to be comfortable?—It would not be worth more than half as much. I would rather live at a low altitude than in a mountainous country.

707. How many acres of the 87,000 acres would be suitable for small farmers?—A great quantity of it. The farmers would seek sheltered nooks, and settle down.

708. Could a farmer exist on twenty-five acres?—He would grow sufficient vegetables on half an acre. He would require to get occasional work during the year.

709. Is it not a fact that all that country is now open to the public for sale?—I do not know.

710. Is it closed from sale?—I do not know that it is. What would prevent them from purchasing is its present inaccessibility.

711. Is there a good coach road from Tarndale down to Hanmer?—I do not know.

712. How is it that there is no settlement there?—I think most people are ignorant of the existence of a coach road. I was not aware that it had advanced so far in civilization as to have a coach road up to Tarndale.

713. Seeing that there is a coach road, why is it not settled?—There are not sufficient public works going on to induce people to go there and settle. The towns and villages absorb the present labour.

714. There is not sufficient inducement for labourers or farmers to go up there?—No.

715. Would the existence of a railway make it different?—I believe a railway would make all the difference between its being tolerably well peopled and its present desolate condition.

716. I suppose you think it is necessary to have a railway in order to induce people to go there?—I think so.

717. Do you know any districts in the Middle Island that are thickly populated without a railway?—I do not know.

718. Is the soil on the Tarndale Run as good as on the Waimea Plain?—I would not say acre for acre.

719. How many acres?—The most of the land on the flats appeared to be of the most fertile description.

720. What is the acreage on the flats?—I do not know. There are many thousands of acres.

721. What is the width of the flat at the Rainbow?—It is very narrow; it runs a long way up.

722. How many hundred feet wide is the valley?—It would not be more than ten chains.

723. Is the ground steep on each side of the Rainbow?—Very steep.

724. Could they cultivate upon those steeps?—No.

725. Do you know the altitude of the mountains behind—Mount Franklin for instance?—I do not know.

726. Would you think it 10,000 feet high?—I would think so if you told me.

727. You say the land in the Alma Valley is excellent?—It is excellent.

728. Do you know the altitude?—I believe it is 4,000 feet.

729. What extent of agricultural population would the 87,000 acres carry, if the land were opened by a railway?—It would carry a very considerable population. You would be surprised to see the area of land in some of the valleys that run from the main road. I used to go to such places for our fattest cattle, because there was the best land and grass.

730. Have you noticed the depth of the snow-drifts that close up the valleys?—No. On one occasion one of these narrow places was completely shut up for a long time.

731. At what date have you noticed the latest frost in the Tarndale country?—You are liable to light frost early and late. It never affected our vegetables. I do not think you would get any frost later than October.

732. Are you sure there is no frost later than October?—I would not say there is no frost later than October.

733. *Mr. Fulton.*] Did you ever try to grow any potatoes there?—Yes.

734. Did you succeed?—I got them nipped off several times at Tarndale.

735. Have you heard of anybody succeeding in growing potatoes?—Mr. Saxton grew very nice potatoes at the Rainbow, but not at Tarndale, where we were generally unfortunate.

736. You sowed grass upon some of the bare places?—Yes. We had nice patches of grass at the back of the old accommodation-house.

737. You state that some of the people in Waimea are not content with fifty acres, but they have to do with it?—Yes.

738. Is it not surprising that some of them should not have taken up some of the splendid land on the heights of which you speak?—I do not think it is surprising when you consider that there are no means of getting their produce to market.

739. Even with a coach road down?—If it was a good metalled road it would be too far to successfully carry goods unless by rail.

740. *Mr. Fell.*] Do you know how far it would pay to carry produce. Would it pay to cart it more than twenty miles?—It would not.

Mr. Nathaniel Fowler, Stoke, examined.

741. *Mr. Fell.*] I believe you know the Tarndale country well?—Yes. I was there in 1863.

742. What were you doing there. I was with my brother on a station on a branch of the Waiau—on the Stanley.

743. Do you know the country about the Upper Waiau, Tarndale, and Alma?—Yes; I know it well.

744. What is your opinion of it as a stock-grazing country?—I think it is the best part of Nelson Province as far as stock-grazing country is concerned.

745. Is it better than the Amuri?—It is the same class of land as the Amuri.

746. You call all this country good sheep and cattle country?—Yes; it is very good sheep country and better cattle country.

747. Were you in the habit of going through that district often?—Yes; at all times of the year.

748. Was the climate such as would hinder you from travelling in the winter?—The greatest difficulty I had was in the bad winter of 1867. I then experienced no difficulty in getting along except in a few places. The first difficulty was in the gorge. The road is now altogether different. It was then simply a track cut round the rock.

749. The snow did not then interfere with your travelling in the gorge?—No; we were troubled with the ice formed from the spring.

750. Had you any difficulty in travelling as you wished?—Very slight, except at a few narrow gullies. The wind sweeps the snow into the gullies.

751. There is no difficulty in travelling over the whole country at any time of the year?—No.

752. Supposing a railway were made, would there be any obstruction to traffic?—No, not any.

753. Were that country made accessible by a railway, would a considerable part of it be suitable for settlement by small farmers?—Yes, in fifty-acre farms. At present it would not pay the small farmer to send his produce to market, a distance of some one hundred miles.

754. Would the land be suitable for cultivation?—Yes; it will grow crops.

755. If it were made accessible to market, would the country be settled?—Yes, more than it is now. At present there are no means whatever of getting the produce to market.

756. Is it the habit of people to travel by coach?—I do not think the coach goes further than Tarndale from Canterbury.

757. Does it go regularly?—I do not know. It does not go to Nelson.

758. How long has that road been at all accessible for wool traffic?—Within the last three or four years.

759. The whole of the land is at present in the hands of private individuals?—It is leasehold. I believe there is a Government reserve at Tarndale consisting of 20,000 acres.

760. Is the land along the coach road open for settlement?—I believe it is not.

761. Is the land in the valleys good?—Unless the valleys were explored it would be impossible for any one to say of what they consisted. You may find a small opening into the main valley, which spreads into a large valley three-quarters of a mile wide and nine miles long. There are more than one of these gullies, and the land in each can be cultivated.

762. Did Mr. White, in his evidence, exaggerate when he stated that there was a large part of the 87,000 acres of land fit for cultivation?—No, he did not.

763. Is it impossible to settle the land without the means of access to it, and of getting goods to market?—The great drawback is the want of means of taking goods to market or bringing them out. The people who have lived there in years gone by have grown enough for their own consumption and no more.

764. What can you grow there?—I believe you can grow any kind of grain. At Mr. Carter's station they grow potatoes for their own use. There are no means of getting them away. They grow oats at this station.

765. Is the climate similar to that at Tarndale?—Yes; the snow is no worse and no better. All that is wanted to make the country perfectly accessible to traffic either by carts or railway is the construction of roads and bridges over the gullies.

766. *Mr. Thomson.*] How many acres of good agricultural land can a man work?—If there are the means of getting the produce to market, one man can work a hundred acres.

767. If he has not got access it is of no use his working?—Not a bit.

768. You consider that a necessity for the working of the land at Tarndale is a railway?—Yes; dray traffic is too expensive to pay.

769. In fact a railway is an absolute necessity to getting this land cultivated?—Yes.

770. Have you seen the present Tarndale Station?—No; I know where it is.

771. You have not seen the crops grow there?—No.

772. You have no experience of them?—No; not at that place.

773. *Mr. Fulton.*] Can you give us the names of those gullies which are three-quarters of a mile wide and nine miles long?—There are the Yarrow, Five-Mile Creek, Cat Gully, Guide Valley, Molesworth, Wairau. There are many more, but I cannot remember their names.

774. Do you know the difference of the altitude between Mr. Carter's place and Tarndale?—It is not a great deal of difference.

775. Is it 1,000 feet?—I could hardly tell you. It is considered thirty miles from one place to the other.

776. *Mr. Fell.*] I understand you to say generally that that which hinders settlement is the want of a market?—The want of access to a market.

777. Supposing a market were brought to it, would that answer well?—Yes.

778. At present the only market is at a distance?—There is no market within a hundred miles.

779. If a payable gold field were discovered there, would the country be settled then?—Yes.

780. That would be as good as bringing it within reach of Nelson by rail?—Yes.

NELSON, WEDNESDAY, 6TH DECEMBER.

The Commission met at 10 o'clock a.m.

Mr. W. T. L. TRAVERS, Wellington, examined.

Witness made the following statement: I have been for many years intimately acquainted with the country lying between the Tophouse and Christchurch. I may say that I was the first European who ever passed through the gorge of the Wairau. Mr. Weld, who preceded me by a few days in exploring this country, had crossed the hills, so as to establish the connection between Tarndale and the country at the head of the Awatere. It will be observed that the valley of the Wairau, from the Tophouse to the gorge, lies very nearly north and south. I think there is a slight trend to the eastward, the effect being that that valley receives the sun on each side. As you have gone over the ground, it is unnecessary for me to say that there is no rise to overcome between the Tophouse and Tarndale. The whole line presents merely the average rise of a New Zealand river, which I estimated, at the time I first explored it, as about 30 feet to the mile, giving an altitude to Tarndale of from 2,800 to 3,000 feet. The surveyed line, I understand, passes into and down the valley of the Acheron to its junction with the Clarence. There is another line of route which I think has not been examined, but which I believe to be more advantageous than the one indicated in the reports. The line I refer to would run up the Wairau River after it passed through the gorge, to a small valley called the Island Valley, about four miles from Tarndale; it would pass up the Island Valley, cross a low saddle into the Clarence, and then pass down the Clarence River to some point from which it could descend into the Hanmer Plains; whether at the Hossack Saddle or higher up the valley of the Clarence would have to be determined by engineering examination. My own belief is that the line would be considerably shortened by being taken by that route. [Witness pointed out on the map the direction of the route referred to.] It would avoid a large amount of side-cutting in the Acheron Valley, and the construction of a heavy bridge across the Clarence River. I do not think that line has ever been examined, but I feel satisfied that it would prove a better line than the one already laid off; and, moreover, would enable a projected line to the West Coast, up the Hope branch of the Waiau, to be brought into more direct communication with the main line. I had a station at Lake Guyon, on the Waiau River, which I occupied for several years. Lake Guyon is about 800 feet below Tarndale. We cultivated at Lake Guyon a large variety of European fruits of various kinds, and every description of vegetable which is ordinarily cultivated in gardens here; and they all grew not merely in profusion, but with a luxuriance which you do not find in warmer situations. Wheat, oats, and barley, and English grasses, especially the red clover, grew with very great luxuriance. I may state also that a Mr. Fowler, who occupied land within a mile and a half of my own station, but nearly 200 feet higher, had, and I believe still has, a garden which grows fruits and vegetables of all kinds with the greatest possible luxuriance. I have no knowledge that any attempts have been made to cultivate at Tarndale; but, from my knowledge of the climate of the whole of the district between the Tophouse and the Hanmer Plains, I have no doubt that all kinds of fruits and cereals would grow luxuriantly. I believe the climate to be similar to that of a large part of England, and that it has no more snow than is to be found usually in many of the eastern parts of England, the climate indeed being such as might be expected from its altitude in the latitude in which it is situated. It is some 10 or 11 degrees lower in latitude than the corresponding situation in England, and in my opinion the climate is affected by the altitude of the country only to the same extent as that of the eastern counties of England by reason of their latitude of from 52 to 54 degrees. I have travelled through that country for nine or ten years in all seasons of the year, and have never found any obstruction whatsoever from the snow, although I have travelled through snow there. Nor is there anything, in my opinion, to deter people from settling in the district. The area of land available for actual culture is not large, but the area available for pastoral purposes is very extensive. The valley of the Waiau, to the westward of the Clarence, contains a considerable area—several thousands of acres of excellent land available for culture, and the hills intervening between it and the Clarence, and the block of hills to the eastward of the Clarence, are capable of carrying, and do carry, a very large quantity of sheep and cattle. I have travelled recently through the West Coast, and I made special inquiries with regard to the character of the country to the eastward of the line of road from Hokitika to Reefton. From personal observation I am satisfied that there is a very large area of land

in the valleys of the Grey and Ahaura available for settlement. All along the line of route there are excellent farms, and I was informed by Mr. Galway, a surveyor stationed at Ahaura, that the country between that township and the Tutaekuri, one of the branches of the Ahaura, some thirty miles up the river from the township, was all practically level and available for culture, and moreover that the ascent from the head waters of the Ahaura to the Hope Saddle would not present any serious engineering difficulties. The country from the Hope Saddle down to the Hanmer Plains is mountainous, and the valley itself is narrow, but nearly the whole, both to the north of the Hope and that intervening between it and the Hurunui River, is available and is used for sheep farms, Count De Lapasture and others having stations in that district on which there are considerable numbers of sheep. I am personally satisfied that a line of railway leading up the Hope and through the Ahaura into the basin of the Grey would open up a large area of excellent country, besides very great mineral resources, and more especially coal. During my last journey I went over the whole of the open coal mines at Brunnerton, and I learned from the manager of the Brunner mine and others there that the mines would, even now, yield from 2,000 to 2,500 tons of coal per day, the only difficulty being the carriage to other parts of the colony. Owing to the long continuance of dry weather the bar at Hokitika was absolutely closed, and that of the Grey was somewhat shallowed. There were then several hundreds of truckloads of coal waiting export without shipping to carry it. Of course I am not prepared to say whether the expense of carrying coal by rail from the West Coast into Canterbury would prevent the West Coast coal from competing with that of Australia, or would enable the coal to be so carried as to compete with water-carriage; but I am satisfied that the coal-mines alone on the Grey are of very great importance to the colony, and must lead to the settlement of a large population in the Grey Valley. The wages paid at the Brunner mine alone, with a present output of only 200 tons per day, is £700 a fortnight. The Westport Colliery Company contemplate raising 1,500 tons per day, and the wages will be in the same proportion as those paid at the Brunner mines. There appears, as far as one can judge in travelling over the line of route, to be no engineering difficulty whatever in constructing a railway from Greymouth to Reefton. I believe the line has been actually surveyed, but I am not in a position to say that such is the case. It seems to present no difficulties at all. There are level plateaux to be crossed, very similar to those found between Marton and Wanganui, with deep valleys between, but they appear to present no difficulty whatsoever. I do not say anything about the line from the Tophouse to Blenheim, because there is nothing but the ordinary descent of the river. The Waihopai and Branch Rivers, as well as the Wairau, would have to be bridged, but I presume that would offer no obstacle whatsoever. With respect to connection with Nelson, there is a pass within fifteen or sixteen miles of Nelson at a place called the Wairoa River; it is called Ward's Pass. If that pass be practicable for the purposes of a railway—and Mr. Tertius Mackay wrote to me informing me that there was no difficulty whatsoever—then the connection between Nelson and the line of railway through the Wairau Valley would be established without the necessity of passing over the range which separates the valley of the Wai-iti from a part of the Motueka River. [Witness pointed out the locality on the map.] There would be no difficulty, as I am informed, in connecting the Waimea Valley with the Wairau Valley by Ward's Pass, and at all events that line deserves examination, because, if practicable, it would shorten the route very much, and would save the construction of a line to the Tophouse across the high range lying between the Wai-iti and the Motueka Valleys. If a line be carried down the Buller Valley the connection between Nelson and the West Coast would be established in that way. Personally I have always considered that the central line would be the most advantageous to the colony, in consequence of the possibility of connecting it with the country to the westward—a connection which is absolutely out of the question if the coast line be adopted, inasmuch as you have the physical obstacle of the Kaikoura Mountains and the rough districts between the Conway and the Waiau to overcome before you could attempt to reach any portion of the western country from that line. In point of fact the only argument in favour of the East Coast line is that it is somewhat shorter than the other. I have not the slightest personal interest in the question at issue. It is a matter in which the interests of the colony alone are concerned. I have had these alternative routes in my mind for many years. I suggested them in 1873 for the consideration of Mr. Henderson, who then contemplated the possibility of constructing the railways of the colony by private capital, and he, after a careful consideration of both routes, conceived that the central line, both from a commercial and political point of view, would be far more advantageous than the coast line. There is a large extent of country available between the Wairau River and Nelson. There are a great many available tracts of country in all the lateral valleys. On the eastern slopes of the range between Pelorus and the Wairau Township there is a considerable extent of rich and available land. All this land would be brought into connection with a line running up the valley of the Wairau, but to which any line passing into the Awatere would be of no use whatsoever. Indeed, there would seem to be no object whatever in any attempt to connect this district with the coast line, for the simple reason that it would lead to no market.

781. *Mr. Fell.*] Have you been down the coast line?—I have been through part of it beyond the Awatere, nearly as far as Flaxbourne.

782. Can you form any opinion of the extent of country that would be served by the coast line?—There is a considerable area of land in the Flaxbourne country. The Awatere Valley is absolutely impracticable. They have been unable to make a dray road more than a couple of miles beyond Mr. McCrea's station. The country there is exposed to extremely violent winds. Until you get into Flaxbourne, the intervening country is useless for anything except pasturage. In sheltered spots you could have gardens, and no doubt fruit trees would grow very well. It is good soil. There is a considerable quantity of lime in the soil, and I have no doubt it would yield excellent grass, but it did not strike me as being a country likely to be settled. I believe there is a large area of good land around Grassmere, but, after crossing the river at Flaxbourne, I cannot conceive that there can be anything in the slopes of the Kaikoura Mountains. The area of level land must necessarily be exceedingly small. No part of it has been laid out by the Marlborough Government as land for cultivation. The small area which has been acquired by runholders, between there and Kaikoura, is either alongside the crossings of the rivers or close to the sea coast. The rest of it must be exceedingly abrupt. I have been very close to

it in steamers, and it must be exceedingly abrupt at all events as far as the Kaikoura Peninsula. The line from Blenheim to the saddle at Dashwood's Pass I should describe as simply a howling desolation. I know of no other term to apply to it. You must spend a great many thousands to reach the land to be had round Grassmere. That line was selected simply because the height of the pass was less than that of Maxwell's Pass. Although Blenheim has been settled for a great number of years, and there are many beautiful farms and a great deal of excellent cultivation in that neighbourhood, there is scarcely to be found a shepherd's hut along the proposed line of railway; and that circumstance tends to show that there is not an acre of land there which is considered fit for cultivation. Of course a large proportion of land going up the valley of the Wairau, after passing the Waihopai, is what would be called stony and rough land. Nevertheless there is a very considerable extent of it available for settlement, especially on the western side. I believe that every portion of that valley is capable of producing human food.

783. *Mr. Fulton.*] What is the price of coal at the pit's mouth at Brunnerton?—11s. or 11s. 6d. per ton, but that is owing practically to the small consumption. Were there a possibility of exporting the coal in the quantity in which it could be produced, the price would be considerably reduced, because the same number of men who are necessarily kept at the mine would produce a very much larger quantity of coal. They are obliged to keep the men on wages, but, there being no sufficient facilities for export from the Grey, the cost of producing the coal at the mines is proportionately much increased. My own belief is that the coal could be put out at the pit's mouth, if there were proper facilities for export, at 7s. 6d. a ton. The Brunner coal gives about 6¼ tons to what is called an ordinary railway coal truck. The Wallsend, which belongs to the Westport Colliery Company, is said to give 6¾ tons. It is a denser coal, taken from a greater depth. The Coalpit Heath Mine is not very satisfactorily worked, but it yields a coal similar to that of the Brunner. Some few miles from the north of the mouth of the Grey, is a place called Port Elizabeth, which it is said could be converted into a good shipping place without any great difficulty; and, if that were so, it would enable the Coal Creek mines to be worked also, so that the output from the whole of the mines might reach over a million of tons per annum; but that would, as you see at once, necessitate a very large amount of shipping. I am satisfied, from what I saw there, and what I heard from the managers, who had no interest in giving me false information on the point, that the yield of coal from the Grey mines alone is a matter of very great importance indeed to the colony.

784. Can you tell the price free on board?—I cannot say. I did not ask. It would be made up of several elements. After undergoing two screenings, the coal passes direct, by shoots, into the trucks, and I take it that the cost, free on board, would be compounded of the cost at the pit's mouth, the railway freight, and whatever charge there might be in delivering it into the holds of the ships, which lie alongside the wharf. The coal, I believe, passes directly from the trucks into the holds of the vessels. Mr. Bishop, the manager at the Brunner mines, led me to understand that they could increase their output threefold without any difficulty, and at a very great reduction in the cost of production, if there were shipping facilities and sufficient bottoms to carry the coal.

785. Do you know at what price it could be delivered at the various ports?—I do not. Independent of other considerations, the importance of providing for the carriage by rail of the productions of the West Coast to the East has always weighed with me very strongly in connection with any projected trunk line between the North and South. I am quite satisfied that the area of land from the Teremakau north to the line of the Buller would afford the means of settling a very large population. The country changes immediately you pass out of the valley of the Grey, from the place called Marsden to Hokitika. To the south of the watershed between these rivers there are not a thousand acres upon which you could grow a cabbage. The whole area seems to consist entirely of gravel, valueless for any purpose except the extraction of gold. The change in the vegetation is palpable immediately on crossing the watershed between the Teremakau and the Grey. All up the Grey you see very nice farms, and great capacity for improvement.

Mr John Kerr, Lake Run, examined.

786. *Mr. Fell:* You were for some years the joint-owner, with the late Mr. Nathaniel Edwards, of Tarndale and the Rainbow?—Yes.

787. You had the sole management of the country?—Yes.

788. And you are thoroughly familiar with the whole of it?—Yes.

789. For how many years did you own that country with Mr. Edwards.—Ten or eleven.

790. What was its extent, freehold and leasehold?—I had only about 100 or 200 acres of freehold at Tarndale; the rest was all leasehold. The leasehold land would be 70,000 or 75,000 acres.

791. What stock had you upon it?—When I sold it I had from 20,000 to 25,000 sheep, and about 600 head of cattle. It was not then fully stocked. There are a great many more on it now. They have 1,600 head of cattle and 26,000 or 27,000 sheep.

792. You think it will carry these?—Yes.

793. What is your opinion of it as a stock-carrying country?—It is as good country as I know of. It is not quite so good as down lower. It is the best fattening country I know of in the country.

794. Did you breed there?—Not much.

795. Why not?—Because we could buy cheaper, and it is essentially a fattening country. If I bred lambs I had to keep them till they grew. If I bought sheep they were already grown, and all I had to do was to fatten them and sell them.

796. Were your operations ever interrupted by the severity of the weather?—Of course I had to stop in the house when it rained or snowed, but when it cleared up I went to work. The snowfall was never such as to hinder me in my work.

797. Besides its capacity as a stock-growing country what else would it grow besides grass?—In places it would grow anything—wheat, barley, or anything of that sort. I never grew better vegetables. I cannot grow vegetables to equal them, even in Nelson.

798. Where were these fine vegetables grown?—At the Rainbow. We had a small garden at Tarndale, where they grew equally well.

799. What fruit trees grew there?—There were fruit trees at the Rainbow which grew very well. They were only three or four years old when I left. I believe they are growing there now. I never protected or sheltered them.

800. Of the 70,000 or 80,000 acres, how much would be suitable for the growth of cereals and vegetables?—There is not a very great deal of what I should call agricultural land. There are open valleys, such as Mr. Fowler describes, but they are not of very great extent. You could get farms here and there in each of them.

801. Supposing there were road or railway communication, would the country be suitable for settlement by small farmers?—I think so; and they would make a very good living in those valleys.

802. Have you tried English grass?—No. There are scores of acres of English grass there. At Saxton's old station there is English grass growing well; in fact we mowed it for hay.

803. Does clover grow there?—Yes; it grows well and luxuriantly on good land. It would not be seen at this season of the year. The spring only begins on 1st November.

804. Supposing there were railway communication, and the country thrown open for settlement, do you think it would be settled?—I think these good valleys would be taken up.

805. Why have they not been taken up already?—They cannot take them up, as they are all under lease.

806. Supposing they were not under lease, would they be taken up without a railway or better communication?—No, unless you could get 2,000 or 3,000 acres; then it would readily be taken up.

807. Supposing a considerable market were to spring up in the neighbourhood, or a gold field were found at the Rainbow, would the country be settled?—The country would then be taken up fast enough. There is some really good land up the Rainbow River in patches. From the want of roads settlement would be impossible.

808. *The Chairman.*] How long is it since you have seen the Tarndale country?—Two years.

809. Does it still preserve its character as a fattening country?—I have not been there. There was never a year I did not sell fat sheep and cattle; I always kept them till the spring of the year.

810. Is there anything in the regulations of the Nelson Province which prevents land being taken up for settlement notwithstanding its being held under lease?—No one can get it. We leased the land for fourteen years with the right to renew the lease for fourteen more years. Only the man who had the lease could purchase. He can only purchase the land in blocks,

811. Then the country is practically closed?—Practically closed to everybody but sheep-farmers.

812. *Mr. Fulton.*] Has there been any agitation to have it thrown open for settlement?—I never heard of any agitation.

813. *Mr. Fell.*] Would there be the slightest use in its being thrown open for settlement unless there were a readier means of access than now exists?—No, it would be good for nothing except for stock. If you grew wheat you would have to send it a long distance to the mill. Through the want of an accessible market it would be no advantage to the grower.

Mr. Donald McGregor, Upper Buller, examined.

814. *Mr. Fell.*] You now reside at the Upper Buller?—I have a small cattle run there.

815. I believe for three different years you worked for the Provincial Government on road contracts between the Hanmer Plains and Tophouse?—Yes, some twenty years ago. I was four years there altogether, when the country was very rough and unopened. I lived in a calico tent all the time and during the winter.

816. You did not get frost-bitten?—No; I was not afraid of being frost-bitten.

817. What is your native place?—I came from Caithness, the northernmost county in Scotland.

818. I suppose you are tolerably well acquainted with the country about the Acheron?—Yes, I confined my operations mainly to the valleys near the road. I crossed the lateral valleys.

819. Is the climate and soil such as would render it reasonable to suppose that a population could exist there?—I think it is a very good climate. We had to pack all our goods and provisions from the Nelson side of the Big Bush. The packers were sometimes stopped by bad weather, whilst on the Acheron and the Clarence we had no rain whatever. The climate in the Acheron is better than lower down; there is less rain.

820. Supposing it were opened up by railway, are the conditions of climate and country such as would make it possible for a population to thrive there?—It would depend partly on what they attempted to grow. I do not think it would be suitable for fruit-growing on account of the altitude. The seasons are very uncertain in those high altitudes.

821. What would you grow?—I should try grass if I got enough ground.

822. What would the valleys be capable of growing?—You could get a living out of them; it would depend on the quantity of land you got. I do not think small farms would do well there. Taking the country generally, as a whole, I think it is a pastoral country. It is a magnificent grazing country. I have not seen the country of late years. The only vegetable we could get to eat was a large kind of spear-grass. I did not attempt to grow strawberries and currants. I was there in 1858, 1859, and 1860—the early days of the district.

823. *The Chairman.*] Have you seen as much winter in this country as in Caithness? Which is the better climate, the one you left at Home or the one here?—This is a vastly superior climate in the winter. The climate in the winter at Tarndale is nearly as good as the summer in Caithness.

Mr. Jonathan Brough, Nelson, examined.

824. *Mr. Fell.*] I believe you have been engaged at Tarndale on road contracts since April, 1881?—Yes.

825. You have lived there in tents ever since?—Yes.

826. You know the country about Tarndale and the Rainbow?—Yes.

827. What crops or cultivations are there at the Rainbow?—There are some cultivations at the Rainbow in the shape of vegetable and fruit gardens. They grow black and red currants, strawberries, apples, raspberries, peas, ordinary vegetables, and potatoes. I have potatoes growing in the gorge, and

they were looking very well when I left. I was brought up as a gardener. Considering the treatment the fruit trees and vegetables receive they do remarkably well. Although they have not been well treated, I have never known trees bear better in England. The soil and climate are favourable for the growth of a great many British fruits. Currants grow remarkably well.

828. Do you know Tarndale?—Yes. I have not seen the gardens there, but the country is fit for similar cultivations. Some of the table land is very good. The low lands are dried-up lakes, and the sediment or deposits are very rich.

829. Do you know the Leaderdale and Acheron Valleys?—I crossed the mouth of them, and the description given of them is correct.

830. Do you think it is possible for them to support families there?—Yes; I am quite satisfied that they would.

831. Supposing the land were open for settlement, and a means of communication to it existed, is it the sort of place where you would settle down, cultivate, and make a living?—Yes. I came from Cumberland, and the land at Tarndale is equally as good as the land in Cumberland. At Coldwater Creek the country is deceptive; unless you follow up the valleys you do not see what they contain. People passing through know comparatively nothing about the country unless they explore the valleys. For instance, Coldwater Creek has a narrow exit, and runs through a wild narrow gorge, and then opens up into a sort of plain with very good land.

832. Can you form an idea of how many acres of that sort of land there might be in Coldwater Creek?—I believe there are 1,000 acres of land in this valley suitable for cattle, and 500 acres for cultivation. Judge's Creek passes out of a wild ravine; when you go up the ravines there are grassy plains and flats. There are a great many cattle in that creek.

833. Would a settler be able to rear his cattle and have a comfortable homestead in Judge's Creek?—There would be room for comfortable homesteads for one or two men in Judge's Creek. There are other valleys of a similar character in that district, and also down the Buller.

834. Why are these not already settled?—I believe it is through the difficulty of want of roads to a market.

Mr. J. C. Richmond, Secretary to the Railway Committee, examined.

835. *Mr. Fell.*] You are by profession an engineer?—Yes.

836. You have had experience in planning and constructing railways?—Yes, in England, Algeria, and Belgium. I was brought up to the profession in England, and served under Mr. Brunel on the western railways for some years. I am familiar with the art of laying out railways, and have assisted in a great many. I was at work in Belgium on the Luxemburg Railway. On my last visit to Europe I constructed a railway in Algeria.

837. Therefore you may be said to have had considerable experience in the laying-out and construction of railway lines?—Yes, sufficient to be able to criticise the facilities and suitability of a country for the formation of railways, and to criticise the various schemes that are before the Commission.

838. I believe in former years you held the office of Commissioner of Crown Lands for this province?—Yes, for about three years. I also held at the same time the office of Provincial Secretary.

839. You also held office under the Crown as a Minister?—Yes.

840. In your capacity as Provincial Secretary and Crown Lands Commissioner, I believe you had occasion more than once to visit the land lying in the neighbourhood of Tarndale, from the Clarence and Waiau?—Yes; I thought it was part of the business of the Commissioner to become acquainted as soon as possible with the whole estate of which he was the chief officer. At the time I entered on the office, the cream of the land in the Amuri had been sold, and it was my business to endeavour to learn if there was any more colonizable land. I visited the southern district for the further purpose of advising the Land Board in the assessment of other lands likely to be purchased under the regulations. Some of the second-class runs in the Hurunui and Hanmer Plains were not entirely purchased, but they were about to be purchased.

841. Will you state generally your opinion of the character of the land round about that district with regard to its capacity for carrying a population, if it were accessible to a market?—I was twice over that part of the country to which the attention of the Commission has been directed. I made two almost bee-lines across the country on horseback, so as to form some general idea of the character of the land. I made notes at the time, but I am sorry to say that they were never embodied in any report, as it was not called for. I have not the notes at hand, and I can only give my general impressions of the country. I should certainly not say it is an agricultural country in any proper sense. I have no doubt of the correctness of the statements of several witnesses as to the existence of considerable areas of land capable of tillage. Not only on the flats but even on some parts of the hillsides the land could be ploughed. In some seasons of the year I think no one could cross that country and say that it has not a fertile soil. I have seen the Cheviot Hills, a good deal of the Canterbury Plains, and a large part of Otago, and I am sure that no better grass land exists in any part of the country. My own idea at the time was that, if the country could be rendered accessible, its fittest occupation was for either small grazing farms or dairy farms. I founded my opinion upon general observations as to the quality of the existing vegetation. There is certainly a large quantity of land that may fairly be called downs; it is closely grassed, with very little rock cropping out. Interspersed among these are rough hills; but I think, taking the line from Tarndale to the Waiau-uwha, a very large proportion —certainly more than one-half of the country—is good rolling grass hills, not much broken with rock, and which in many places could be ploughed. The valleys are narrow in general. Some of the valleys, the Waiau-uwha and its tributaries, lying under the Spenser Mountains, appeared to be very wet, so that one went very cautiously on horseback; the ground was mossy, and the moss held the water like a sponge. I have been informed, and I have no reason to doubt the statement, that the mere traffic of cattle on that land has since brought it into a condition of good grass land. The scheme which presented itself to my mind was to divide the country into blocks of, say, from 300 to 500 acres, each block with from 50 to 100 acres of arable land, as near as it could be got, and selling them for

dairy farms and small grazing farms; but I saw clearly that the country was not likely to be occupied without better communication than existed. Then there was but a bridle-track through the country. I observed that roads might be made with facility through a great part of the country. There were a number of those small valleys described by other witnesses, which admitted of roads with very little trouble or expense; but I thought then—as early as 1863—that the only way to open the country would be by a line of railway right through. I must say that my mind was led to this idea by the desire of binding the provinces together by iron bars. This brings me to the technical question. I looked at the country with a view to railway-making; and after thinking over the matter for twenty years nearly, and seeing many important railways throughout Europe, I now without hesitation affirm that there are no real engineering difficulties whatever upon the line; that the line through this country would be found as a whole exceptionally economical to make. I am now speaking of the central line which would traverse this country. The other, the coast line, would not in the slightest degree help it. The only part that impressed me at the time as likely to be costly was at what is called the Wairau Gorge; but as the extent of that is not long, even including the bare river-bed above the Wairau Gorge, which would no doubt involve some expense, the whole is insignificant in proportion to the total length of the easy parts of the line. At that time the only pass in use was Jollie's Pass. I did not examine the country with a view to the better descent of that pass. From what I observed of the country, I took it for granted that any engineer who had the duty of bringing a railway through it would find a way down from the Clarence Valley to the Waiau-uwha without accepting such a line as that down the present roadway passes at Jollie's Pass. At that time my impression was that a proper route would be found by way of the Hanmer River, which, as the Commission is aware, is one of the modes of approach to the Hossack Saddle. Perhaps I may be allowed so far to criticise the action of the engineering advisers of the Government as to say that I am full of astonishment that that country should have been passed through in the perfunctory manner it was, and that it should have been left till last year to examine the Hossack Saddle, which, I am informed, had been for many years previously known to stockmen and others upon the Lyndon and Highfield Runs and other runs adjoining, and had been brought to the notice of the department in 1875. I can account for it in no way except by the belief that there was a foregone conclusion that the summit at Tarndale was too high, and that a level line must be found. I do not know the East Coast line in detail at all. On one of my visits I passed up to the head of the Conway River, and I know the character of the country on both banks. It is very plain that it cannot be passed without exceedingly rough and expensive work, and that the outlay by that way must necessarily be very great, inasmuch as, instead of following the leading valleys, it has to cross all the rivers and streams descending from the Kaikoura Range, sometimes at their widest parts. My own opinion is that, notwithstanding the greater length which would be required for the central line, the total cost would be found to be considerably less than that of the coast line. I see by the reports that Mr. Blair does not claim superior economy for his line. He states, "I think that the central line would be constructed at no greater cost." I venture to think that it would cost considerably more to construct the coast line as proposed. I wish Mr. Blair had thought it within his duty to pay one quarter of the attention to the central which he has done to the Cheviot Hills and coast lines. Had he done so, I think he would have given a less unfavourable view of the matter; but the view he appears to have taken of the country and the route was that of one who runs but does not read. He describes the country as bad, but his hasty visit must have confined him almost entirely to the main road. Even in the valleys he passed through—the Acheron, the Severn, and Tarndale—I think he might have seen sufficient to enable him to avoid the statement that the country is wholly bad. His trip through the country was exceedingly hasty, as I am informed. Some of the valleys spoken of by previous witnesses are not visible from the main line, and there is nothing to lead you to suppose that good valleys would be found inside their narrow entrances. After passing the entrances they often open out, and some of them form little basins. With reference to the cost of working the line, I think that a very exaggerated idea may be possibly adopted of the importance of the summit merely in a mechanical sense. The explanation and argument as to the injurious effects of high summit cannot conveniently be given *vivâ voce*, and if I may be allowed I will put my views in writing on that subject before the Commission makes its report. I would say generally, it appears to me that the northern part of the line from Tarndale down to Blenheim will not impose any material extra cost in working, but even might cost less than the level line, inasmuch as whatever heavy traffic passes along the line will pass down hill. The same will be true of the southern side, but as there must be a considerable number of miles—probably twelve miles of a bad gradient down which a train could not possibly be allowed to run without the break—a great deal of the extra power absorbed in rising will be lost in descending. The rise of the Hossack Saddle will be undoubtedly some burden upon the working expenses of the line, but I think there will be practically no burden, but possibly even an advantage in the rise from the Wairau, inasmuch as no fuel whatever will be consumed, or barely enough to keep steam "weeping" at the safety-valve in going down from Tarndale to Blenheim, and the greater part of the way may be travelled without the use of the break. I may also say, with respect to the facilities of the central line for a railway, that in almost every part of it curves of unexceptionable character may be employed—curves I would say suited to express velocity. In my acquaintance with the South Devon Railway I had occasion to note that curves of 400 or 440 yards radius were passed daily at a speed of sixty miles an hour without accident, on the broad gauge of 7 feet, and I think with a gauge half the size we might safely say that 200-yards curves would be safe for express velocity. I merely make this observation to show that if requisite the full use and value of the gradients in descending might be obtained in the way of speed. There are a few places where probably we should have to submit to worse curves or a great expense in construction, as in the Wairau Gorge, and probably on the ascent of the Hossack Saddle, but in the latter we could never pretend, either mounting or descending, to go at express speed. I believe that the construction of the line from Blenheim to the Hanmer Plains will be done at an exceptionally low rate, almost below the average cost of the railways of New Zealand. There will be no bridges anything like the great constructions on the rivers of the Canterbury Plains, which to some extent counterbalance the general cheapness of the

line across a level country. There will be ballast always at hand in the river-beds, and a considerable quantity of timber available for the first construction without much haulage. I think the Commission will hardly find any difficulty in deciding the question from a colonial point of view, if only they can satisfy themselves that the inland country is not a howling wilderness. If the country is valueless, that may be a point in favour of the other line; but in any case it is almost too obvious to remark that the central line serves the whole, or nearly the whole, of the northern part of the island, either directly or indirectly, more or less. It opens communication with the West Coast by the Waiau-uwha and Ahaura from the Hanmer Plains, the best line to the West Coast; and it opens communication both with Marlborough and Nelson, with the valleys of the Motueka and the Buller; even before a line should be carried through the Buller Valley, it would be of very great importance in opening that part of the country and rendering it accessible as a place of settlement. I give my opinion for what it is worth, but it is politically and socially of real importance to have this trunk railway through from end to end of the Islands, and that the uses of the different parts of the country are not wholly limited to the very localities themselves. I think no little value ought to be attached to varieties of climate which would induce a good deal of traffic and settlement of easy classes during a part of the year in the mild regions around Nelson, Waimea, and Motueka. We have heard of invalids going up to Tarndale, and in Switzerland there are many alpine valleys nearly twice the height of Tarndale, where persons go to spend the five or six winter months. That leads me to add that part of my wanderings during the last seven years led me much about Switzerland and the Tyrol, countries inferior to our uplands, but comparatively densely peopled. Land is occupied in those countries at much higher elevations and of much poorer quality than the land to be found along the central line. In most respects I fancy Swiss or Tyrolese immigrants would find themselves transported with their advantage if placed at Tarndale. The population of Alpine Switzerland is about twenty-one to the square mile. The area of Alpine Switzerland is about equal to that of the northern districts, taking in the Waiau-uwha and Ahaura country. If we could plant people in proportion to the population of Alpine Switzerland, not including tourists, in the country under the consideration of the Commission, we should have a population of about a quarter of a million there, whereas there are now some 35,000 or 40,000, a population that lives in a luxurious climate near the beach. It appears to me that such a comparison as this ought not to be lost sight of. There is, I should think, three-fifths of this Southern Island of a character substantially the same as, and certainly not better than, this northern district. I leave it to others to speak of the mineral deposits that undoubtedly exist along one of the main ranges running north and south through the whole district under discussion. The gold deposits are everywhere apparent, and the total yield of the Nelson Province, though a rugged and little-occupied country, looks very respectable on the official returns. With respect to climate, I wish to say that all our general knowledge of physical geography, and our experience of the climate of New Zealand—under the lee of the Great Southern Alps, for instance—would lead us to the conclusion that the witnesses whom the Commissioners have heard in Nelson are right in the general statement that there is no great quantity of snow on that side of the mountains. The country there is under the lee of, and at some distance from, the three chains of mountains which intercept the great westerly moist currents of wind. It is well known that in Canterbury, and I suppose in Otago also, under the lee of the mountains, the climate is very much drier than it is on the West Coast. My own observation is that, passing from what may be called a sirocco on the Canterbury Plains over Arthur's Pass, you often arrive in what may be called a continuous shower-bath on the other side. The enormous glacier system of the Southern Alps depends upon its having denuded the westerly winds of their moisture. That is what makes the rainfall on the Canterbury Plains more moderate than the average of New Zealand, whereas on the western coast the rainfall is nearly double the average of New Zealand. I produce, for the information of the Commission, a diagram showing comparative heights of the Great Pacific Railway, United States of America, and the central line now projected. The Pacific line runs for 1,200 miles above 3,300 feet, the level of Tarndale, and rises at two points above 7,000 feet, and at one point to 8,240 feet. For ordinary falls of snow, in countries where railway management is prepared for such things, it is child's play. Many of the engines upon the present lines would carry a plough before them, and run through a snow-drift of five feet deep at a speed of twenty miles an hour if required. I hand in another diagram, showing comparative elevations upon the central route to Nelson, and the Brennerbahn (a trunk railway from Vienna through the Tyrol to the Plain of Lombardy, passing a saddle of 4,485 feet, without snow-sheds). I may state that, at an elevation not greater than Tarndale, I have ridden all day through snow on the upper plateau of Algeria, within sight of the Sahara, but you would not object to a railway in Algeria on account of the snowfall.

842. *The Chairman.*] Do you know whether the whole or a large proportion of the land in Nelson Province has been alienated from the Crown?—The greater part of it—the open land—is either sold or under lease. I think the maps in the Commissioners' hands do not give full particulars. No doubt a large part of the land affected is under lease, but the freehold and leasehold lands are marked in the same colour on the maps, so that there is no possibility, without assistance, of ascertaining precisely what there is actually the property of the Crown. Almost the whole of the land fit for present occupation is either freehold or leasehold.

843. It has been stated that the fact of the land being held under lease absolutely precludes its sale during the currency of the lease. Is that the case?—I presume so. The old leaseholds were under an Act which I had a hand in preparing and passing through the General Assembly. The occupants were in full possession during the term of the lease, and there was no possibility of removing them.

844. Not even by compensation?—What cannot be done by compensation! There was no stipulation for acquiring the land by compensation, except for road purposes.

845. Supposing a railway to be made, all the country, as far as settlement is concerned, would be actually locked up from all interference on the part of the Government?—Yes, except as regards the actual line, unless the Government could make terms with the leaseholders during the currency of the leases. In some of the leases there is a purchasing right, but at a price not yet assessed. It remains to be assessed when the tenant claims to exercise his purchasing right.

846. *Mr. Thomson.*] You passed over the Tarndale Run as well as over the Cheviot Run?—Yes.

847. Did you at that time, as Commissioner of Crown Lands, consider the respective value per acre of these runs?—The value of the Cheviot Run is very much greater.

848. How much greater?—I had no occasion to assess the Cheviot Run. Almost my first act as Commissioner was to sell the last section of it by auction, upon the assessment of my predecessor. I should certainly not have let Mr. Robinson have any of the land at a less price than the Canterbury fixed price—not less than £2 an acre.

849. For what would you have sold the Tarndale land at that time?—I would have sold it very willingly at 10s. an acre, but not for less.

850. Do you think the Tarndale land is about one-fourth the value of the Cheviot land?—No, I do not say that. It depends very much upon the means of communication with the outer world.

851. Taking things as they are, what would you consider the value of the Tarndale Run as compared with the Cheviot Run?—I should find a difficulty in making a comparison. Undoubtedly the Cheviot Run is very much better.

852. As Commissioner of Crown Lands you would naturally give your attention to such subjects?—Undoubtedly.

853. Did you not do so at the time?—As to the Cheviot property, I said, "Let the dead bury their dead." I felt enough mortification that this splendid property had gone out of the hands of the province. If it had remained with me to assess, it never would have gone on such terms.

854. Then you cannot make a comparison between the two soils?—No, I cannot. The soil is good enough in many places in Tarndale, and for aught I know it may grow quite as good corn. I am not competent to say that, but I know that a great deal of that country bears immense crops of hay, which are wasted every year—trodden down or dying down.

855. Are you aware that the blue grass is now entirely extirpated in Tarndale?—No, I am not. It was anything but extirpated in my days. I am satisfied it did not grow there as it did without something good to grow in.

Mr. John Kerr, re-called and examined.

856. *Mr. Fell.*] I understand it has been said that what is known as blue grass is extirpated at Tarndale. Is that so?—It was not gone when I left two years ago. It was as good as ever I saw it. When the blue grass is at its best is in the month of March. We mowed lots of the grass. It was as good when I left as when I went there. It showed no signs of decay, and I never heard of its having died out. In a part of Tarndale everybody's sheep went on it and ate it off, but in the fall of the year it would spring up again. I was there twelve years. Sheep were on it the whole time, and the grass did not disappear.

Mr. John George Blackett, Resident Engineer of Nelson and Marlborough District, examined.

857. *Mr. Fell.*] You have been over the proposed central route?—Yes; I have looked at it in regard to the practicability of making a railway along it.

858. Will you state generally your opinion of the feasibility of the line by what is known as the central route, from Blenheim up the Wairau Valley, and then across into the Hanmer Plains; which direction it should take, what would be the difficulty in making the line, and what it would be like when made?—Beginning at Blenheim, it would go up the Wairau Valley, pass Birch Hill and Top-house, then through the gorge to the head of the Alma, then down Alma and Acheron to its junction with the Clarence, then following the Clarence down to the Hossack Creek, then crossing the Hossack Saddle, and down the Hanmer.

859. Would that in your opinion be a line of difficult grade?—A grade of 1 in 50 could be got. That would be the worst grade at the Hossack Saddle. I have examined it and have reported upon it.

860. Would the line generally be one of difficult construction?—Not generally.

861. Having regard to the character of New Zealand railways and their construction generally, would you say that it would be of greater or less average difficulty than that of other lines in New Zealand?—It would, I think, be rather more costly right through than the average of the railways in New Zealand.

862. Would the difference be a substantial one or only a small one?—I think it would cost more than £1,000 a mile above the average cost of the New Zealand railways. This is a mere approximate estimate.

863. You think £1,000 per mile would cover the excess above the average?—Yes; about a £1,000 a mile.

864. *The Chairman.*] Do you know the average cost of the railways per mile over the whole of New Zealand?—About £7,000.

865. *Mr. Fell.*] When you say you consider it would cost £1,000 per mile in excess, how much of it are you referring to?—I refer to the whole length from Blenheim to the Waiau River.

Mr. Henry Percival Pilkington, Nelson, examined.

866. *Mr. Fell.*] I believe some years ago you were in very ill health?—Yes; my lungs were diseased, and Dr. Farrelle recommended me to go to Tarndale for the benefit of my health, and I took his advice. I took charge of the accommodation-house at the Rainbow for Mr. Kerr. I stopped six months there, and I have never been ill since. I could not walk without two sticks before I went there. This was about five years ago. The climate is good.

Mr. John Rochfort, Civil Engineer and Surveyor, examined.

867. *Mr. Fell.*] You have been carrying on your profession here for a good many years?—For the last thirty years.

868. You have had experience in the construction and laying-off of railway lines?—Yes, several in New Zealand and one in England.

869. I believe you have a minute acquaintance with the whole of this province?—I have been a great deal over this province.

870. You have lately been employed specially by the Nelson Railway Committee to explore and examine what I may term the Central line and the East Coast line?—Yes, also the Greenhills route. I have done so; have gone carefully over all these lines, have taken aneroid heights, and prepared plans of all the routes. I produce a plan showing the three routes, which are distinguished by colours —the central by red, the coast yellow, and the Greenhills green. I have made section plans of the three routes which I now produce. [Witness pointed out the routes on the plan.] With regard to the central route beginning at Blenheim, from Blenheim to the Tophouse there is a very easy grade; the only difficulty would be the one crossing of the Wairau River. There is no special difficulty in crossing that river by a bridge, as piles could easily be driven. I would cross somewhere near Manuka Island. There would be some little side cutting near Birchhill and Manuka Island. From the Island to the Tophouse there is very little difficulty. The grade of the last three or four miles going to the Tophouse is 1 in 69, which could be altered by making the junction further up the Wairau River to about 1 in 110. There is a descent of about 300 feet from the Tophouse Telegraph-station to the river level. A descending grade could be got from the telegraph-station to Westport or Reefton. There is one hill of about 300 feet between Reefton and Greymouth. Except that, it is a descending grade the whole way. From the telegraph-station at Tophouse towards Christchurch the line would go level for 13 or 14 miles along the side of the ranges, which are very favourable, having the spurs well rounded. It would then reach the Wairau at the river level, where the first large creek comes in, and so avoid a heavy bridge. Then the line would follow up the valley along or near the river level to the gorge crossing the Rainbow River, which is very easy to bridge. The grade up the gorge is very good; there is no difficulty at all in the way as to grades. About a quarter of a mile up there is a rocky bluff which would necessitate crossing the river by a bridge. The river is narrow, and the bridge would not be a long one. The banks there are rocky; it is a kind of trap-rock, and is sufficiently sound to give a secure footing for the bridge. Further on there are two rocky points which would require tunnelling —one 10 chains and the other 4 chains. The line would then pass over a shingle slip which could be made secure without much cost. You then re-cross the river with a bridge and get on to the table land. By doing this you avoid all the rocky cliffs on both sides of the river. The last bridge is just above the gorge. You travel on the west bank of the river to the saddle at Tarndale, when you cross the stream again. The greatest gradient up to this point is 1 in 71, and that only for a short distance. The river is very narrow and the bridges would be all small. Instead of going down the Alma I propose to go down Travellers Creek. By this course you get an even gradient of about 1 in 200, and the common point of the junction of the Severn and the Alma would be reached with a saving of about five miles. The valley is rougher, but the distance saved would more than compensate for extra formation. There are no special difficulties to contend with there, nor are there any down the Acheron. There are two places where it would be necessary to have either rock cuttings or to cross the river; I think crossing the river would be best. The crossing of the River Acheron is not difficult, as it has good high banks and rock in many places. It would be perfectly convenient for the construction of a bridge. You strike the Clarence at the accommodation-house, and cross above its junction; the river there is about eight chains wide, with a bed of small shingle, and would be easily bridged. No timber comes down the river. Along the whole distance from Tarndale the grade is descending. From the Clarence accommodation-house to the Hossack Saddle it is an ascending grade of 1 in 136. For two or three miles down the Clarence it would be light easy construction, but further on, approaching the Hossack Saddle, the formation would be heavy in many places, and there would be small gullies to bridge. The Hossack Saddle would only require a small cutting or tunnel of about a chain and a half long and some seventy feet deep. This is the only reverse grade in the whole line. From the Hossack Saddle you go to the Lottery Saddle, down the Hanmer River. This is the worst gradient on the line—1 in 48·6, but would probably be lessened to 1 in 50 when the curves are set out. The length is about six miles. That would be heavy construction. From the Lottery Saddle there are two ways of reaching the Red Post—one is down the Lottery on to the table-land of the Lottery, which is about eight miles from the Waiau Township. The work would be rather heavy for the first four miles, but I do not think there is any serious difficulty. From this point downwards I believe the terrace land could be kept until within such a distance of the Waiau Township that it would be necessary to grade down off the terraces, which are very high. The grade from the Lottery Saddle to the Waiau Township would be about 1 in 50. From the Waiau Township to the Red Post the line would cross the Waiau by a bridge, which is now being built. That ends the difficulties of the work, from the Waiau to the Red Post being a plain. The alternative route starts from the Lottery Saddle and follows down the Hanmer River to the Waiau Gorge. A part of the work would be heavy. There is one rather heavy slip in it, but a good deal of terrace land would be available for formation. The advantage of that line would be that you could keep any grade. If the line was fixed to reach the terrace-level at the ferry it could be done with a grade of 1 in 70. You cross the river at the gorge, probably by a short suspension-bridge. There might be an advantage in keeping low there, so as to communicate with the Hanmer Plains. There is no particular difficulty through the Waiau Gorge. It is flat land through there to the Red Post. Of the two routes I would recommend the one by way of the gorge rather than by the Waiau Township. I think it would be of more use to the people in the neighbourhood, and would make one line do for the West Coast line as well. It would join somewhere in the gorge. I think the best line would be up the Waiau, crossing into the Ahaura by the Doubtful. It would be a better track than the Hope. Both of the passes have a great drop on the west side, and would doubtless require special appliances for working. It would command a greater portion of the flat land on the west than by way of the Ada Saddle and Cannibal Gorge. The line would come out on the Ahaura. The grades throughout the central line are very good, with the exception of the one by the Hossack Saddle, which is 1 in 48·6. It would work out better on a survey. The grade on Jenkin's Hill is 1 in 37½. By far the steepest part of the whole line between Nelson and Christchurch would be within a couple of miles of Nelson. The country up the Wairau is very fair for railway formation. There are good side-cuttings, and plenty of ballast can be had, and the hills are not very sharp. This

description applies to the whole of the route as far as the gorge. Good curves could be got of about 8 chains. It runs moderately straight, and I think, on survey, good curves could be laid out in it. Over Tarndale and down the Acheron and Clarence almost any curves could be got. Over the Hossack Saddle and down to the Lottery the curves again would be limited to about 8 chains, and these curves could be got without any unusually heavy work. I do not think there would be any obstruction to railway traffic on account of the snow or climate. Most of the work would be on the side-cuttings, which are not very difficult to clear of snow, and if the engine ran twice a day the cuttings would never be blocked. No snow-sheds would be necessary. I made very careful inquiries about the depth of snow, and from what I could learn the average depth was 2 feet, and it did not remain any length of time. In some severe winters the snow has been known to be much deeper—as deep as 6 feet. This was the depth of snow in 1867, an unusually severe winter. About the Hossack and Hanmer some heavy earthworks would be required on the line, but not anywhere else. The cuttings would be heavy in the Wairau Gorge, but the distance is very short, and it would be almost the only place where rock cuttings of any extent would require to be carried out. The bridges are very light throughout the line, and there are no large rivers to cross.

871. Taking the whole line, what is your opinion as to its expense? Would it be an expensive line?—I do not think it would be so expensive as the Rimutaka line.

872. Can you form an idea of what this line would cost?—About £8,000 per mile along the whole line, including the portion between Bellgrove and Tophouse. That would include rolling-stock and everything necessary for starting the railway. As a hill line it would bear comparison with the best of the hill lines in New Zealand. The summit level is 3,230 feet, with a cutting of about 30 feet. The highest level is at the Tarndale Saddle. I think the one rise would have an advantage over a line with a number of hills in it, because the heavier bank engines could be kept in one place instead of at several. There is a steady grade down in each direction, except the one short reverse grade at the Hossack Saddle, and I think the haulage would not be increased. The grades are very light, and not much heavier than on ordinary flat lines in New Zealand.

873. Do you consider the line to be a fairly practicable line?—I believe it is perfectly practicable, and quite easy of construction. There are fewer difficulties in crossing the central range than any I have crossed. It is an advantage to have long leading valleys as you get terraces. There is very little bush.

874. *The Chairman.*] You prefer the deviation by the River Hanmer to that by the Lottery, because it would be a greater convenience to the people in the neighbourhood?—Yes.

875. Where are the people who would be convenienced?—The whole of the Hanmer Plains are occupied. There are very few people in the Waiau Township. I think there are as many people on the Hanmer Plains as in the Waiau Township. The line should be in such a position as to join the West Coast line in the most favourable position.

876. *Mr. Fulton.*] What length would the suspension bridge be at the Waiau, and what would be the cost of it?—About 200 feet, and the cost would be £3,000.

877. *Mr. Fell.*] Will you now take the East Coast line, marked yellow on the map. Will you go through this line, starting from Waipara?—This line goes up the flat valley of the Omihi and across the saddle. From there the grade is descending to the Hurunui. It is about twenty-three miles. The construction of that part is fairly easy. The principal difficulty is in getting to the Hurunui River. A bridge would be required at the Hurunui. There is another saddle by which this difficulty could be avoided. It leads into the Waikari, which falls into the Hurunui. Over the Hurunui a bridge would be required, 6 chains in length, but it would be quite easy of construction. The principal difficulty is getting down to it from the high ground. There is no difficulty from the Hurunui to the Waiau River, where a bridge about a quarter of a mile long would have to be constructed. The bed of the river consists of small shingle. Not much timber comes down the river. After crossing this river the only difficulty is the descent from Hawkeswood into the Conway. I did not take the grade there; it is rather short. The Conway River would require a bridge some 10 chains long. The line crosses the Conway River, and follows the northern bank down for some three or four miles to the Conway Hills Station. After that the line crosses a number of hills, which seem to run down in spurs to the coast, and can only be crossed transversely. There are a number of very deep gullies to bridge, from 100 to 150 feet deep. There would be three or four tunnels, amounting in all to about 157 chains. There does not seem to be any way of avoiding this broken ground. The hills all end in cliffs on the beach, and I know of no other means of avoiding them. This bad portion of the line is about seven miles long. After reaching the Orari River the line is graded uniformly down to the sea. From this river to the Kahautara the line follows the sea beach. There are cliffs for most of the way along the beach, and many of the points have to be tunnelled through. In many places the line goes so close along the sea beach that the survey pegs are washed away. The line could not be made without the protection of a sea-wall. There would be seven tunnels required on this piece of sea-beach road—one about 30 chains long. From the Kahautara to the Hapuka—the junction of the Greenhills line—there are no special difficulties.

878. Will you describe the Greenhills line?—Starting from the Waiau Township, this line runs up the Mason and Wandell Rivers, and follows up the Mason to the saddle of the Campbell River. There is one bad grade on this piece of the line—1 in 37—for two miles in length. From Campbell's Saddle there is a choice of two routes to reach the Conway—either by going over the Whale's Back near where the present road crosses it, or following partly down the Campbell Creek, and partly grading down round the Whale's Back, until the grade would reach the Conway. I have taken the grade on this part of the line from Mr. Foy's figures. His steepest grade down the Campbell portion of the line is 1 in 25; the steepest grade down the Whale's Back is 1 in 7. Neither of these lines could be worked without special appliances. The Conway River is a very difficult one to bridge, being some 5 chains wide and 150 feet deep, and it carries a cliffy character all the way down. It is composed mostly of limestone rock. From the Conway River the dividing ridge between it and the Charwell has to be crossed. I do not know very much about the grades there. Between the Conway and Charwell Rivers there will be a short tunnel; good grades can be got. The Charwell is another deep and difficult river

to cross; it is something like the Conway, only on a smaller scale. There are no difficulties from there on to the Greenhills Station. From the Greenhills Station the descent is very rapid. The first grade, according to Mr. Foy, is 1 in 34. The line would pass along very steep hill-sides to a high terrace. From there to Crib Creek the line crosses a succession of deep gullies, having creeks at the bottom, with high banks between. I presume this is the country described by Mr. Blair in his report, in which he says: "In the first five miles north of the Whale's Back the line crosses thirteen broad ravines, five of them being from 50 to 90 feet deep, and eight from 90 to 160 feet. Further on the same section has four banks from 50 to 70 feet deep, and four from 90 to 160 feet." There are no special difficulties from Crib Creek to the Hapuka.

879. Why do you prefer the Greenhills line to the Cheviot?—The length of the costly country is very short compared with the coast line. The difficulties in construction are very much less, however. When constructed the line would be more costly to work, for it would require special engines. There is hardly any rock cutting on the Greenhills route, and there is a good deal on the line by Cheviot. From Hapuka River north the grade is practically flat. About two miles north of the Hapuka the line is forced on to the coast again, and a good deal of costly work would have to be done in constructing the line. There would be 40 chains of timber framing, and four rocky points would have to be tunnelled. The rocky coast-line extends to within about four miles of the Clarence. There is no particular difficulty beyond this point to the Awatere, except the crossing of the Clarence, where a costly bridge would be required. I do not think a sea-wall would be required along the coast. I should consider the Greenhills route, and thence by the coast, a very difficult line to construct.

880. Why?—The cuttings and all the other work would be very heavy from the saddle of the Campbell to Crib Creek. The crossing of the rivers would be very difficult, and when constructed the line would have such grades as would render it unsuitable for a trunk line. The cost of constructing it would also be very great. The cost of either alternative route would be greater per mile than the inland route.

881. From a purely engineering point of view, which of the lines is the best to construct?—The central line most certainly. The works in the central line are of a much lighter character, and any heavy works are of very short distances. The difficult parts of the Greenhills route and the coast route extend over a great length of country.

882. Have you examined the reports made of the several lines?—Yes. From the reports accessible to the public, each line seems to have been most carefully examined.

883. Is there as much reliable evidence accessible relating to the central line as to the coast line?—Certainly not; the evidence concerning the central line is almost nil. Flying surveys have been made of both the other lines.

884. Do you know the country through which the central line passes?—Yes, I know most of it.

885. Is the climate and the land fit for settlement?—I think it would support a population, but not of the same kind as on the flat country, as it is a pastoral country. Persons travelling on the road would not see the various valleys without exploring them. There are long valleys, but there is not generally a large quantity of flat land in them. Coldwater Creek, for example, opens out in a valley five miles long and a mile wide. You would not see a trace of this valley passing up the gorge. The Yarrow, the Saxton, the Guide, and the Leader, are valleys of a similar kind. Several of the gullies run up for many miles.

886. How could the country be best settled?—The best way to settle it would be to divide it into blocks—200 acres of flat land, and from 500 to 1,000 acres of hills. People could grow what produce they required on the flats and keep their stock on the hills. The land is not equally good in all places, but there are many places where oats grow to an astonishing size. I believe a large population would be readily maintained in those districts.

887. What area of land would be capable of being so settled?—About 200,000 acres along the central route would be available for settlement; but there is more land available in the Waiau and Clarence Valleys—perhaps as much again, which would feed into the central line. Near Lake Guyon I saw a thriving homestead where there is a large family. Fruit trees were thriving, and a large crop of oats was obtained last year. The owner, Mr. Fowler, has lived there (near Lake Guyon) some fifteen or twenty years. The altitude is nearly 3,000 feet.

888. What is the difference in altitude between the Rainbow and Tarndale?—About 600 feet. The difference in altitude between Carter's Station, on the Acheron, and Tarndale is 900 feet.

889. At the request of the Railway Committee you have prepared a report?—Yes.

890. You put that report in as part of your evidence, together with the plans?—Yes. The following is the report:—

Mr. Rochfort to the Secretary, Trunk Line Committee.

Sir,— Nelson, 24th November, 1882.

In conformity with your instructions of the 1st October last, I have the honour to inform you that I have examined the several proposed lines of railway to connect the north and south ends of the Island, and now submit my report and plan and sections therewith.

Central Route.—As the central route has been surveyed as far as the telegraph-station, Tophouse, which is the summit level between Nelson and Wairau, I will commence my report there. This point being some 300 feet above the level of the Wairau River opposite, the line should be graded level till it meets the level of the Wairau Valley, which will be near the thirteenth mile at a creek, being the first creek having any considerable opening in the hills. The hills have well-rounded spurs, which would give good curves. From the thirteenth mile to near the twenty-third (Rainbow River) a grade of 1 in 101 can be obtained, with good sidling ground throughout, except near the seventeenth mile, where there is a short piece of steep rock-cutting, and a slip which is found to frequently fill up the present bridle-track cutting; but I believe, by diverting the drainage above it into the nearest creek, it could be quite stopped. There is only one other place in which the hills run out to the river. Good ballast can be obtained all the way.

The Rainbow has a fine shingly bottom, and can be cheaply crossed with about four chains of

low bridging. The country is then flat, or nearly so, to the beginning of the gorge, which is a mile and a quarter from the Rainbow.

It will be necessary to cross the Wairau River twice in the gorge, and once again at the Tarndale Saddle; the first crossing will be near Blacksmith's Creek. There will also be two small bridges over Coldwater and Judge's Creeks, and two tunnels will be required—one near Blacksmith's Gully, 10 chains long, to avoid a rocky point and a slip; the other near Coldwater Creek, 4 chains long. There are also about 12 chains of loose shingle just beyond the last-mentioned creek; but the solid rock crops out in many places, and would lessen the difficulty of retaining it. This plan will necessitate crossing the Wairau River three times in about seven miles, but the bridges would be short (about 14 chains altogether), and good curves would be obtained. The gorge ends at Judge's Creek, and is about two and a half miles long; but the eastern side of the Wairau River still continues steep and high to within about a mile of the Tarndale Saddle, whilst the western side is good terrace-ground, apparently without rock. The grade from the Rainbow to mid-gorge would be about 1 in 74, while the next grade to the Tarndale Saddle would be about 1 in 91, and the next five miles opposite the Tarndale Station would be practically level, excepting a short length of 1 in 71 at the summit. You will observe that the saddle can be crossed in an unusually favourable manner.

For the next thirty miles, to the junction of the Acheron and Clarence, the grades are excellent, and, with the exceptions detailed below, the ground consists of flat terrace-land. Between Tarndale Station and the confluence of the Alma Creek there are three rocky points, but, with these exceptions, it is flat. In rounding the point to the Severn a tunnel, 3 chains long, might be wanted to get a good curve. Between the confluences of the Alma and Saxton there are also three rocky points and a considerable length of sidling. For two miles above the Yarrow confluence there will be some rather heavy cuttings, 20 chains of which will be rocky, but running very straight; or this cutting could be avoided by two bridges over the Acheron of 5 or 6 chains each. A short distance above the Guide confluence there will be one short rocky point to cut through, which is about eight and a half miles above the confluence of the Acheron and Clarence. Here it will be found better to cross again and recross the river one and a half miles lower down to avoid some steep rocky ground. The ground is now favourable as far as the Clarence, where a bridge, about 7 chains long, will be necessary.

I should have mentioned, while describing the line down the Alma from Tarndale, that an alternative line, which may be adopted on survey, can be taken down Traveller's Valley from Tarndale Saddle, with an excellent grade. The ground is not so favourable for the formation, but, being five miles shorter, may have the preference.

From the confluence of the Acheron and Clarence towards the Hossack Saddle the line would keep the terraces of the Clarence about two miles, and then grade away up to the saddle, passing high up over the rocky bluffs which abut on the Clarence some two miles above the Hossack confluence, but it would in its course pass over three gullies. The saddle is attained by a very easy grade of 1 in 136, but the country, especially near the saddle, is rough, and will require great care and skill in laying out to best advantage to save cutting, which will be heavy in places. A cutting at the saddle, of some 75 feet deep and 2 chains long, will be preferable to a tunnel, on account of the narrowness of the top. Going down the Hanmer from the Hossack Saddle is also heavy cutting, and there are several small valleys entering which will improve the grade (which on the section shows as 1 in 48·6).

About the Lottery Saddle the country is flatter, and the hills down the Lottery are rounder, and will work into curves with lighter work than in the Hanmer. The high terrace opposite McDonnell's can be reached by a grade of 1 in 50, and then the terraces that stretch to the Waiau will most probably be found available for the railway to within a mile and a half of Waiau, where it will be necessary to grade down the terrace and bridge the Mason. The alternative inland line from the Lottery Saddle to the Waiau Gorge will make very little difference in distance, but would give a better grade. It would necessitate another railway bridge at the Waiau Gorge, but this is a mere matter of detail survey.

The climate at the Tophouse is mild; the land on and at the foot of the hills is good, but the flats are very poor. Higher up the Wairau River some of the flats improve, and are well grassed. There is a large flat up the Rainbow, and another at Coldwater Creek, which is a narrow mountain stream at its confluence with the gorge, but opens out higher up to a flat some five miles long by a mile wide: this is said to be the coldest part of the gorge. To instance the rarity of high floods in the gorge, Mr. Brough, the Gorge Road contractor, showed me a plank lying across this creek, which he had put there without any fastening twelve months ago; it was two feet above the creek level, and from memory I should say about eight feet above the Wairau River bed. Mr. Brough lived at this spot, in a tent, all the winter of 1881 and part of this year, and the following is his diary, which I copy to give an idea of the climate: "1881—April 17: Arrived in Wairau Gorge and camped; fine weather up to June 14; gale from S.E., with sleet and hail. June 15 to 25: Fine weather. June 26: Snow S.E.; frost and snow 6 inches deep to 29th. June 29: Strong S.E. winds, cold and frosty; Blacksmith's Creek frozen. July 9 to 12: Snowing, then fine weather with S.E. winds up to July 17, with snow on the flats 6 inches deep. July 17 to 25: Cold S.E. winds, with hard frost. July 25: Rain and sleet from N.E., fresh in river; after there was fine weather to August 4. August 4 to 8: Snowing and blowing; snow lay on the flats 2 feet deep up to August 20. August 20 to 22: Heavy rain from N.E.; flood in river, ice disappearing. August 22 to September 9: Fine weather, with cold S.E. winds. September 9 to 11: Sleet and rain; flood in river. September 11 to 28: Beautiful weather, with S.W. winds. September 28: Rain and flood. September 29 to November 1: Beautiful weather; left Gorge for Nelson. 1882—April 19: Arrived in Gorge, fine warm day. April 20 to 23: Fine weather, light S.W. winds. April 24 to 25, fine weather, strong S.W. winds. April 26: Squally, with storms from W. April 27: Much rain, wind N.W. April 28: Fine day, wind N.W. April 29: Fine day, wind S.W. April 30: Slight showers, wind N.W. May 1: Slight snow and sleet, wind S.W. May 2: Slight showers, wind S.W. May 3: Fine, wind S.W. May 4 to 6: Showers of rain, wind S.W. May 7: Showers of sleet, wind S.W. May 8: Heavy rain, strong wind S.W. May 9: Raining, wind N.W. May 10: Snow, wind S.W. May 11: Fine and warm, wind S.E. May 12: Cold sleet, wind S.E. May 13: Fine and frosty, wind S.W. May 14: Slight snow showers, wind S.W. May 15: Cold, with snow; wind S.W.

May 16 to 19: Fine, wind S.W. May 20: Cold snow showers, wind S.E. May 21 to 26: Fine and frosty, wind S.E. May 27: Fine, wind W. May 28: Fine and mild, wind N.W. May 29: Slight rain, wind W. May 30 and 31: Fine, wind W. and S.W. June 1 to 3: Slight rain showers, wind S.W. and W. June 4: Slight snow showers, wind S.E. June 5: Slight rain showers, wind S.W. June 6: Slight snow showers, wind S.E. June 7: Slight rain showers, wind S.W. June 8 and 9: Showery 8th, rain 9th; wind W. June 10 to 12: Fine weather; wind N.E, S.E., S.W. June 13 and 14: Slight rain, wind N.W. June 15: Rain all day, wind N.W. June 16: Slight showers, flood; wind W. June 17; Showery, river high; wind S.W. June 18: Fine, river very high; wind S.W. June 19: Rain, wind N.W. June 20: Rain, wind N.W. June 21: Showery, wind S.W. June 22 to 25: Fine, wind S.W. June 26: Fine, wind W. Left the Gorge for Nelson—absent till August 27; and I conclude that during my absence the weather must have been very moderate, as I found my tents standing just as I left them. There has been snow since my return, but not any heavy fall."

From conversations I had with Mr. Brough, Mr. Fowler, Mr. McArthur and others—the two last named being residents at about the same altitude as Tarndale—it appears that in the general average of years snow lies about 2 feet deep, but not for any length of time; this year has been most favourable, no snow having lain deeper than 4 inches, and Mr. Fowler drove a flock of 1,200 sheep through from the Upper Clarence to the Tophouse, arriving at the latter place on the 7th July. Of course there are exceptional years in which heavy falls do take place, but the last heavy fall remembered was in 1867, fifteen years ago, and then it lay 6 to 7 feet deep.

The climate of Tarndale and the Acheron Valleys is very healthy, and there are some good large patches of land about Tarndale and down the Acheron. In all the high country, the apple, currant, and gooseberry thrive more than in the lower lands; as also do oats, swedes, and turnips. If the railway is made there is little doubt that all the open country will some day be taken up in small holdings, which will support a prosperous population, producing wool, farm and dairy produce, and crops of various kinds.

The inland line would take all the traffic from the Upper Awatere, including the Upcott, Fairfield, Langridge, Muller, Middlehurst, and Molesworth Runs, all of which now send their wool down the Acheron *viâ* Saxton's Pass to Christchurch. Thus far I have been speaking of the inland route, and will now proceed to describe the East Coast route, from Waipara to Blenheim.

East Coast Line.—This line, from Waipara to the Conway River (fifty-seven and a half miles), presents few difficulties in the way of railway formation. From Waipara the line would traverse the flat valley of the Omihi, passing Glenmark Station at a distance of about four miles, and, rising gently, cross the saddle of the Omihi at twelve miles and a half. A mile or two further on it passes Cabbage-tree Flat, and follows down the valley of the Greta to the Hurunui. The Greta is a rough gorgy stream, and falls very quickly at last into the Hurunui. (I think with Mr. Foy that a better line might be got by going down the Waikari from the Omihi Saddle and following it down to the Hurunui.) From this point to the Conway the country is good for railway formation, except a rather steep fall into the Conway. The land is good all through from Waipara to the Conway, but it changes into rough hill ground from thence to the Kahautara.

I went over a line lately surveyed by Mr. Dobson from the Conway to the Kahautara; found pegs at every five chains, and took aneroid heights on each. From these I have plotted the section, and have put what appear to be the best grades in red, and these cannot be much improved owing to the ridges all running out coastwise across the line of direction. The section shows in five and a half miles 157 chains of tunnelling, besides four gullies over 100 feet deep, and as many more 50 or 70 feet; then the line follows down the Orari Valley with an even grade for the last four miles to the sea at William Gray's. From William Gray's the line is surveyed along the beach to the Kahautara about seven miles. In this length there will probably be seven more tunnels, aggregating to about 51 chains, and the line, by the steep nature of the coast, is forced so near the sea that a large amount of protection in the shape of seawalling will be necessary. The general section of the coastline is rising at an angle of 50 or 60 degrees for half a chain, with perpendicular rock cliffs above.

Mr. Foy, in his report, speaking of the country lying between the Conway and the Kahautara, says: "The hills at once become broken and irregular, and the further you proceed in this direction the worse they become, and when the telegraph line leaves the Conway River the physical aspect of the country presents a series of steep ascents and rugged declivities, until the top of Riley's Hill is reached, whose height is about the same as Greenhills—viz., 1,450 feet, and not far from the sea, with a rapid descent into the Kahautara River. A railway line over such a country could not possibly be made without doing so regardless of cost. . . . . A line by the coast is equally impossible. The hilly nature of the country may be inferred from the fact that, whether you take the direction of the coast or proceed up the river to the Campbell, there is no road for either horse or dray except the bed of the river. . . . . It is therefore demonstrably certain that the main trunk line can never pass through the Cheviot Hills District; and it may with truth be said of the two competing lines (East Coast and Greenhills) that whilst one is just practicable the other is undeniably impracticable." This opinion of Mr. Foy's I thoroughly endorse.

After passing the Kahautara the country is flat, or nearly so, to the Hapuka, which is a broad, rapid stream, flooding very high, and spreading over some 20 chains. The flat land extends another mile and a half, when it ends on the cliffs of the coast. At this part there will be considerable difficulty in forming the line, and Mr. Foy, in his report, says, "It will have to be constructed on timber framing for at least half a mile."

From this point, to within two or three miles of the Clarence (about eleven miles), is along the beach, with many rocky points and bluffs, and it would be probably necessary to have three short tunnels, 3 to 6 chains long, and one of about thirty.

The coast is now flat, with sandhills behind, from here to the Clarence, and is favourable for railway construction. The Clarence will require a bridge of about 8 chains long; the bottom is very rough, heavy boulders, and I do not think piles could be driven; iron cylinders would probably have to be used.

From the Clarence to the Awatere needs no special description, as there are no great engineering difficulties. The section sufficiently shows the line for the purposes of this report.

Between Motunau and Cape Campbell there are nine places at which wool is shipped, and stores brought by steamers, and at the Kaikouras there are two small steamers trading, one of which runs weekly. It is not likely that the railway, if made, could compete with the steamers on the coast, freight by water being so much lower.

Greenhills Line.—To avoid the bad ground between the Conway and Kahautara the Greenhills line has been proposed as an alternative. It commences at the Waiau Township, and falls into the East Coast line, at the Hapuka River. From the Waiau, the line follows up the Mason and Wandell Valleys to the Lottery Bush (Sherwood Forest), where a steep grade of 1 in 37 occurs. The Mason River beyond is favourable as far as the saddle of the Campbell, when the only feasible way is to follow partly down the Campbell, and grade round the Whale's Back to the Conway. I had no means of ascertaining this distance, so I cannot say what the grade would be, but Mr. Foy says of it, "Along Campbell's Creek the steepest grade is 1 in 25. No doubt this line could be somewhat improved in locality, but not sufficiently so to alter the general character of the work." The Conway is a river with cliffs 150 to 200 feet in height. This must be bridged somewhere, and at Mr. Foy's crossing it is 7 chains long and 150 feet high.

If, instead of bringing the line down Campbell's Creek, the Whale's Back is adopted, then the ruling gradients are worse, being 1 in 28 and 1 in 7, and this route Mr. Foy leans to in his report, advising the use of special machinery, in preference to going down Campbell's Creek. Mr. Foy sums up thus: "On the Whale's Back line, the 1 in 7 grade may be improved to 1 in 15, but could only be worked by special machinery; a better crossing of the Conway can be had with half the bridging;" but he says, "Campbell's Creek can be worked with easier grades (1 in 25) but more difficult ground, costly in construction, and difficult of maintenance, and more liability to accident in working."

After crossing the Conway, the high ground between it and the Charwell must be tunnelled. Leaving the Charwell, a valley lying to the east of Greenhills Station is the lowest ground available, but it can only be reached with very heavy formation. Beyond this, towards Kaikoura, the country falls very rapidly, and it seems difficult to get any less grade, in the first three miles, than 1 in 34, which Mr. Foy has put down, and then there are three creeks along the road line which I followed. All the creeks have high land between them. Crib Creek, which is nearly the last, is said to be more difficult to cross in a high flood than the larger rivers; it has a wide shingle-bank, and would take a long bridge. Higher up the range, where the railway grade would come, the small creek valleys would spread flatter, and subdivide into several branches; the larger ones continue without sensible diminution.

From Swincombe to the Hapuka no special difficulty appears to exist, but there will be a long bridge over the Kowai.

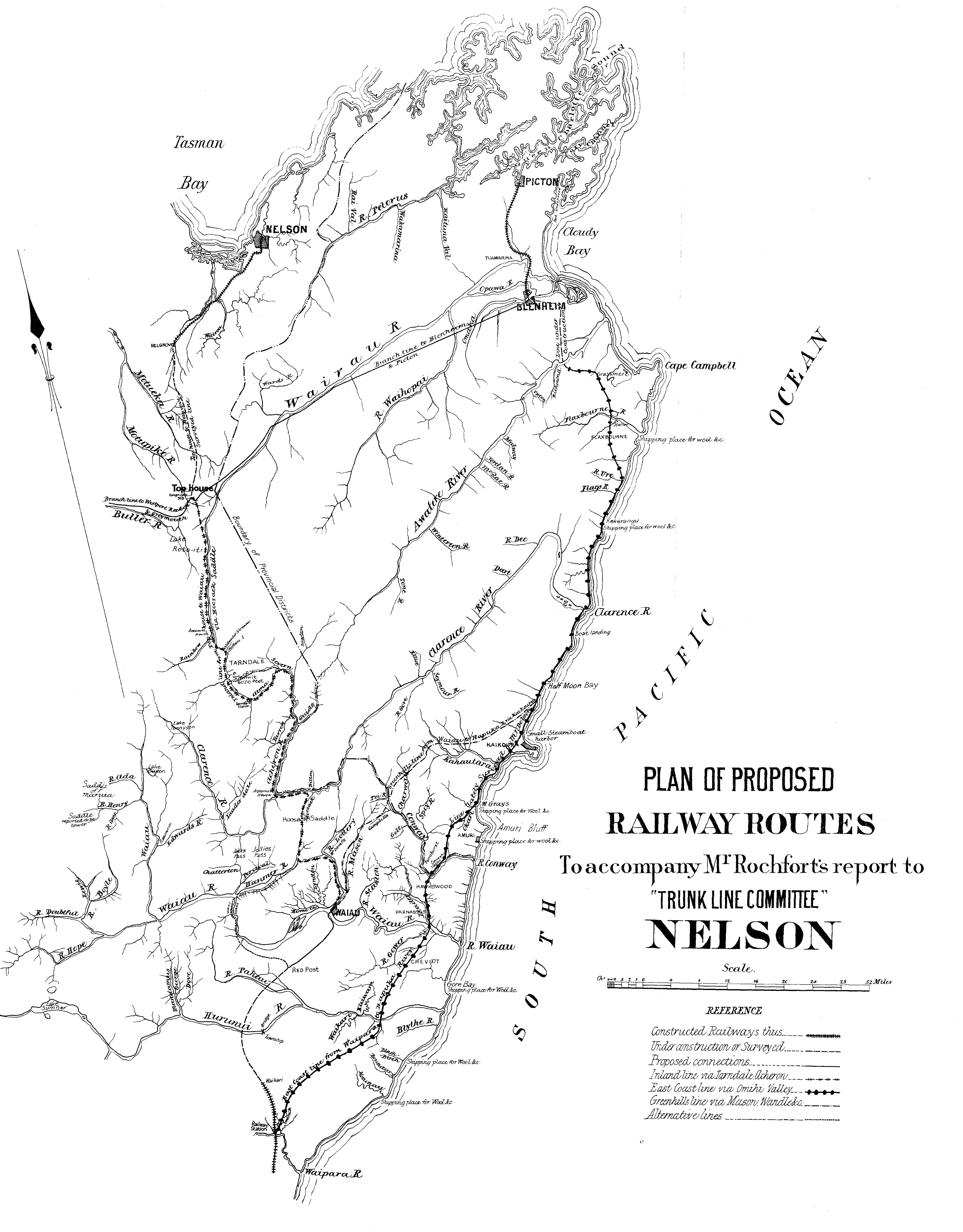
Of the Greenhills route, Mr. Blair says: "Notwithstanding the steepness of the gradients, the trial section of the Greenhills line shows a succession of cuttings and embankments far heavier than anything hitherto encountered in the railway works of New Zealand. In the first five miles north of the Whale's Back, the line crosses thirteen broad ravines, five of them being from 50 to 90 feet deep, and eight from 90 to 160 feet. Further on, the same section has four banks from 50 to 70 feet deep, and four from 90 to 160. The cuttings are all on the same gigantic scale, several being from 60 to 80 feet deep, and a quarter of a mile long. There is, however, very little tunnelling on the Greenhills route." This seems to apply to the portion lying between the Conway and Crib Creek.

Alternative Line to East Coast Line.—Another route has been talked of from the Waiau Township, and following down the Waiau River, and connecting with the East Coast line at Parnassus. This line, instead of going through the Waiau Township, would have to cross the river two miles lower down, necessitating another bridge. About five miles would be through a gorge with steep hillsides, and a tunnel of 20 chains; the remainder to Parnassus would be tolerably flat. The main difficulties would again be between the Conway and Kahautara.

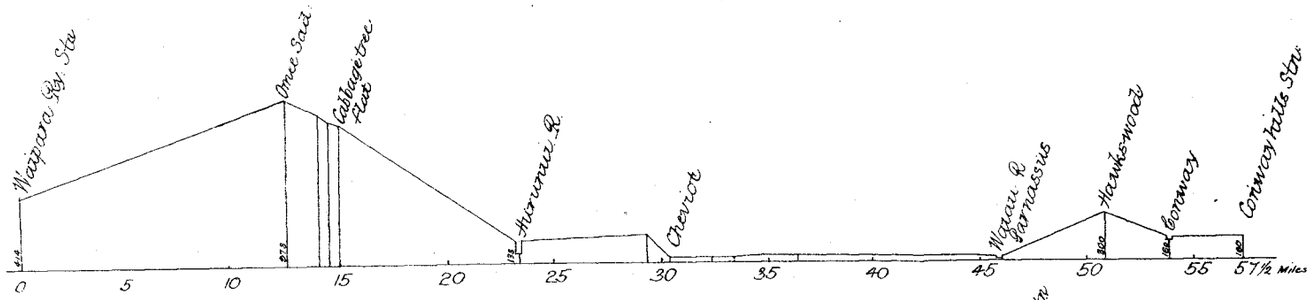
Edwards and Ada Saddles.—I also went *vid* Edwards Saddle to the Ada Saddle. The line up the Clarence from the Acheron is practicable, the general grades being as follow: Acheron to top Edwards Saddle, 1 in 119; Edwards (Peter's) Saddle to Racecourse, 1 in 144; Racecourse to confluence Waiau and Ada, 1 in 137; confluence Waiau and Ada to Ada Saddle, 1 in 51. The Edwards Saddle is a long, low ridge, which has two saddles, one falling towards the Clarence, which is slightly the lowest (perhaps 50 feet), the other (Peter's) leading to a long flat valley falling gently towards the Styx, which it reaches about a mile below St. James's Station. It being impossible to grade down to the valley level of the Edwards by reason of its great fall, the Racecourse being some 530 feet above the Waiau River bed, it would be necessary to grade down the side of the range, where there would be some heavy cutting on the shady side of the valley on to the Racecourse, and thence the line would follow up the Waiau River to the Ada. There would be some costly work between the Racecourse and the Ada. Up the Ada to the saddle is tolerably easy, but the last few miles before reaching the saddle run close under the Spencer Range, which towers up on the west side, and there are several distinct traces of avalanches having swept quite across the valley, shown by trees bent or thrown down. The ascent on to the actual saddle, and the descent for a short distance on the Maruia side, is hardly perceptible, but I think the snow at this saddle would be a difficulty, without some two or three miles of snow-sheds. The saddle lies very flat, and must have a through cutting, which is the worst railway formation for snow, because it is liable to wedge up.

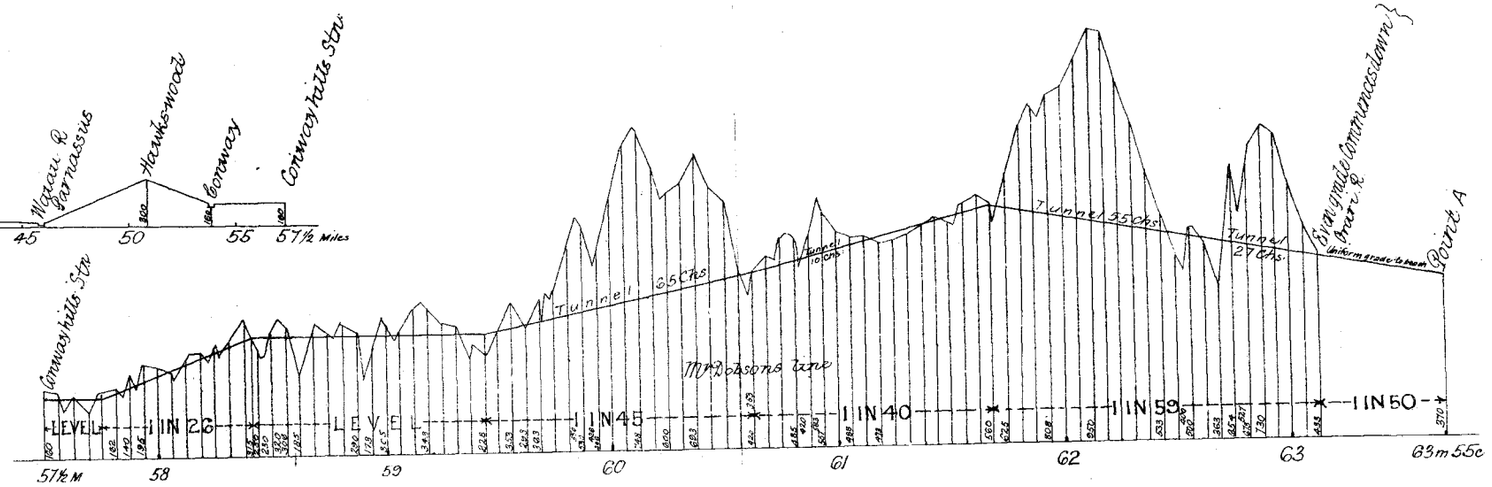
It is said that the Lewis Saddle is lower, and, being some miles away from the Spencer Range, would not be subject to such heavy snow, besides that route being shorter. I am not prepared to report on the West Coast side.

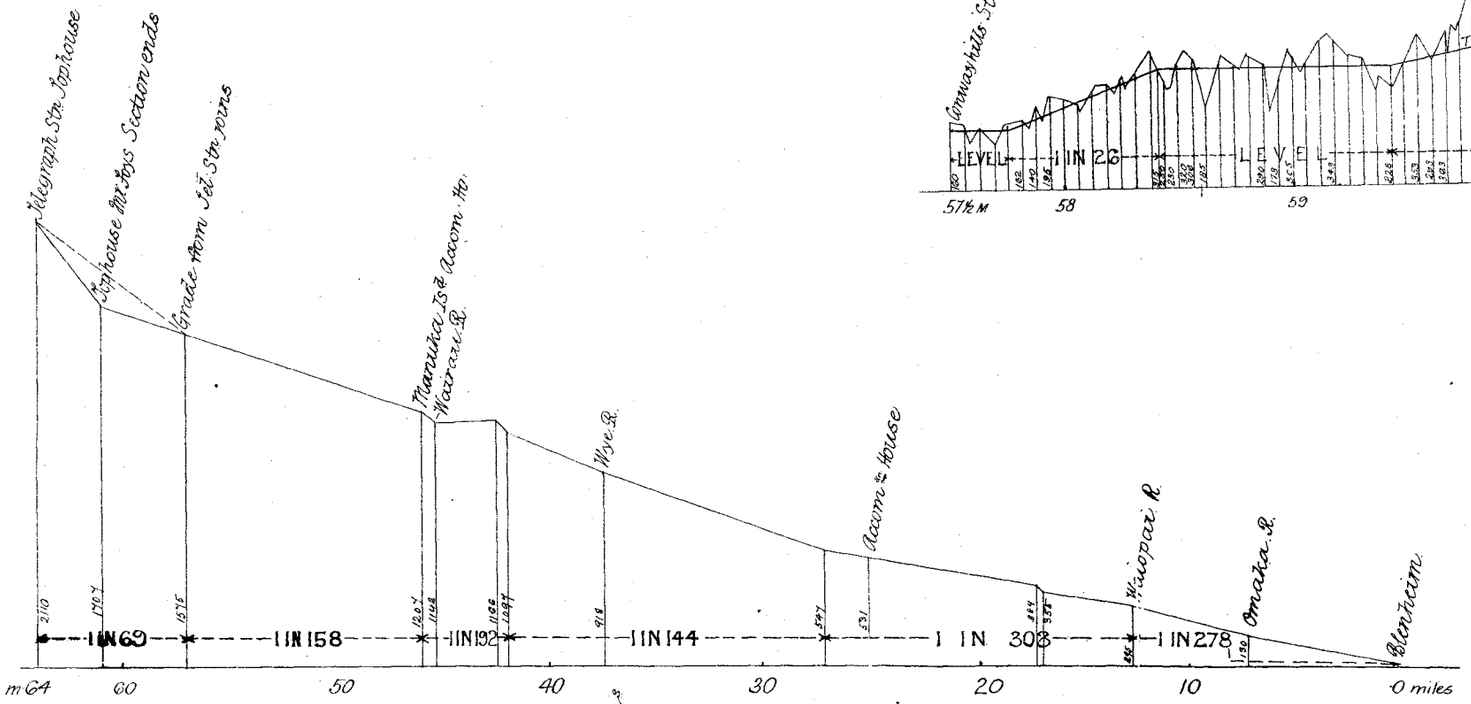
The following table will give a comparison between the various lines:—

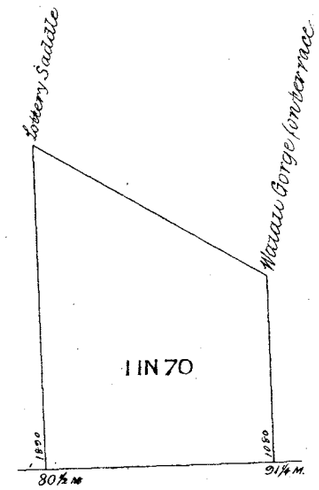


PLAN OF PROPOSED
RAILWAY ROUTES
To accompany Mr Rochfort's report to
"TRUNK LINE COMMITTEE"
NELSON
Scale.
Chs 0 4 8 12 16 20 24 28 32 Miles
REFERENCE
Constructed Railways thus
Under construction or Surveyed
Proposed connections
Inland line via Tarndale, Acheron
East Coast line via Omihi Valley
Greenhills line via Mason, Wandle &c.
Alternative lines
Tasman Bay
NELSON
PICTON
Charlotte Sound
Queen Charlotte Sound
Tory Channel
Cloudy Bay
TUAMARINA
BLENHEIM
Opawa R
R. Pelorus
Rai Val
Wakamarina
Kaituna Val
Wairau R
Branch line to Blenheim & Picton
Omaka
R. Waihopai
Wards R
Wairoa
BELGROVE
Motueka R
Motupiko R
Top House
Branch line to Westport Reefton & Greymouth
Buller R
Lake Roto-iti
Boundary of Provincial Districts
Awatere River
Winterton R
Line under Construction
Cape Campbell
Grassmere
Flaxbourne R
FLAXBOURNE
Shipping place for wool &c.
R. Ure
Flags R
Kekerangu
Shipping place for wool &c.
R. Dee
Dart
Clarence River
Clarence R
Boat landing
Half Moon Bay
Small Steamboat harbor
KAIKOURA
Kahautara
TARNDALE
Summit 3070 feet
Severn
Guide
Lake Tennyson
Lake Guyon
R. Ada
Saddle of Marwia
R. Henry
Saddle reported to be lower
Edwards R
Waiau
Hoosack Saddle
Jacks Pass
Jollies Pass
Chatterton
Percival
Hanmer R
Waiau R
R. Doubtful
R. Hope
Boyle
Lake Sumner
Hurunui R
Township
R. Pahau
Red Post
WAIAU
PARNASSUS
HAWKSWOOD
CHEVIOT
R. Gower
Hapuka River
R. Conway
Amuri Bluff
AMURI
W. Gray's Shipping place for Wool &c.
R. Waiau
Gore Bay Shipping place for Wool &c.
Blythe R
East Coast line from Waipara
Waikari
Railway Station
Waipara R
Shipping place for Wool &c.
PACIFIC OCEAN
SOUTH

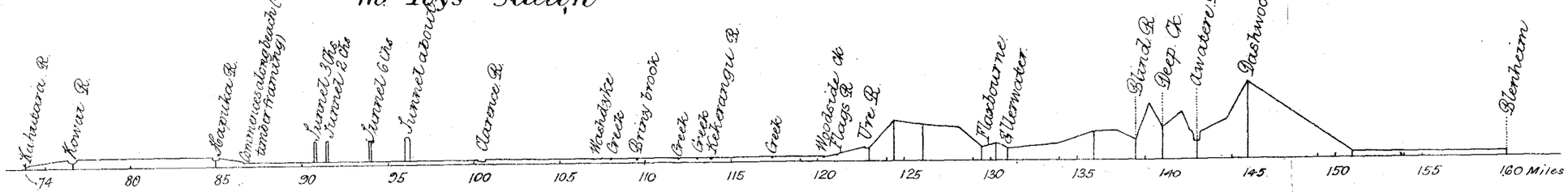


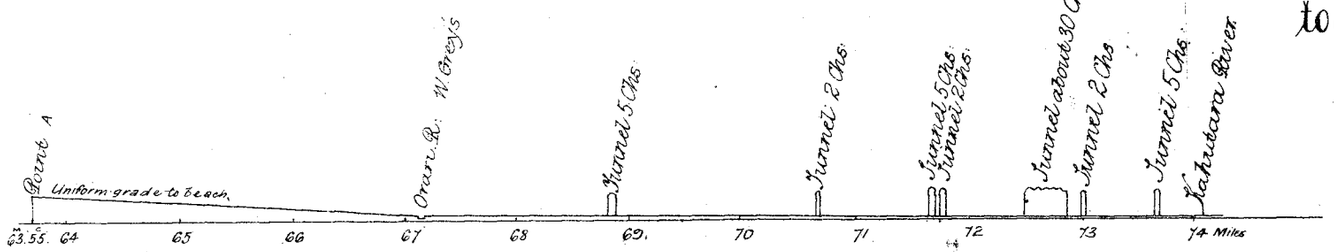






Tophouse to Blenheim
Mr Fox's Section

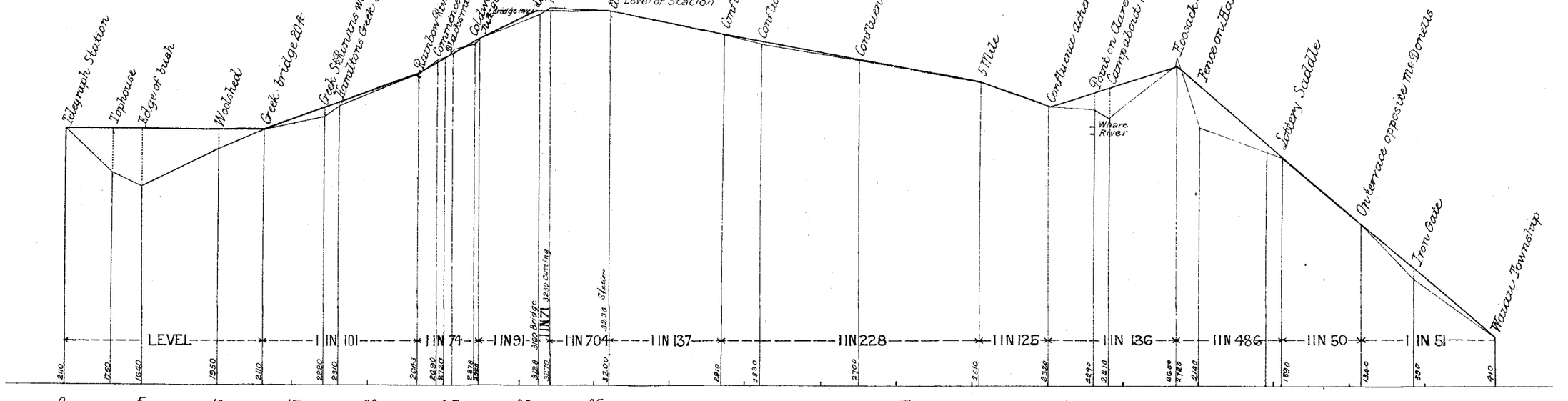




Section of proposed Railway routes South to accompany Mr Rochfort's report to Trunk line Committee.

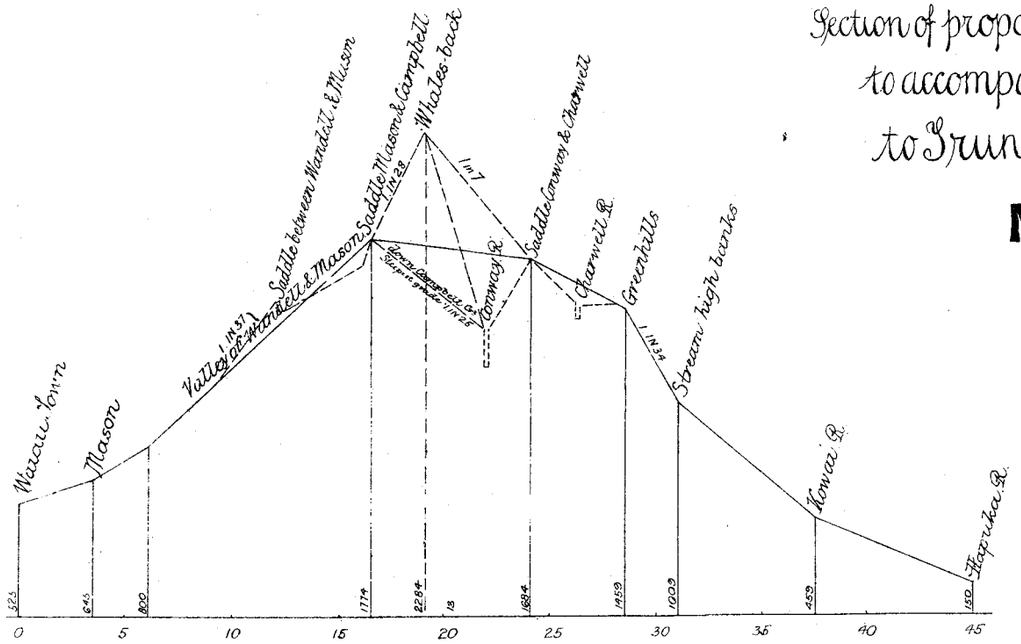
NELSON

Section Tophouse to Waiau inland line

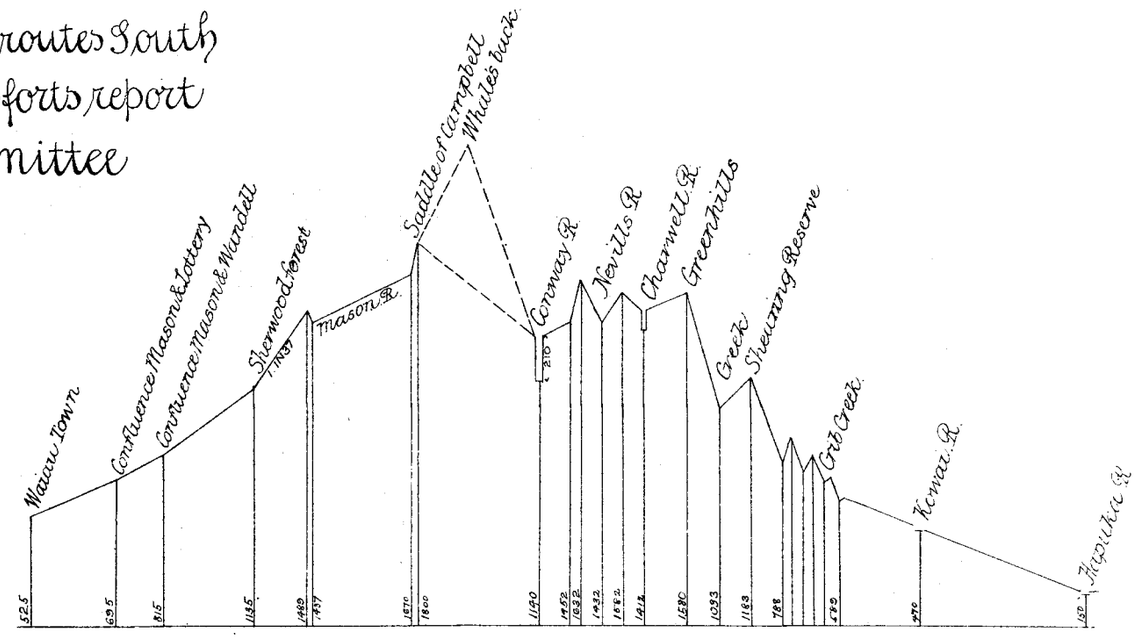


Section of proposed Railway routes South to accompany Mr. Rochforts report to Trunk line Committee

NELSON



"Greenhills" route Mr Foy's Section



Section along road by "Greenhills".

	Total length from existing Lines.*	Length of Line to be constructed.*	Length of Line already constructed in the direction.*	Length of Bridges, in chains.*	Length of Tunnels, in chains.*	Rock Cuttings.	General Character for Curves.	Steepest Grades.*
Inland Route—								
Nelson to Christchurch ...	208	141	67	50	20	Light	Good	1 in 48·6
Christchurch to Picton ...	215	182	63	70	20	Light	Good	...
Tophouse to Blenheim ...	64	...	...	20	...	Very light	Good	1 in 69
East Coast Routes—								
Christchurch to Picton *viâ* Cheviot	213	160	53	104	250	Heavy	Bad al'ng coast	1 in 26
Christchurch to Picton *viâ* Greenhills	211	148	63	103	70	Heavy	Bad al'ng coast	1 in 25

* Approximate.

Note.—On the line from Nelson to Christchurch the tunnels and bridging between Belgrove and Tophouse are not included, but the distance is under heading "to be constructed" and at the Christchurch end Waikari is taken as the end of constructed line. The distance from Waikari to the Red Post is about eighteen miles, and from Belgrove to Tophouse about twenty-three.

In conclusion I may say that for railway construction the central line is undoubtedly the best and the cheapest line to construct, also the shortest. The branch to Blenheim from the Tophouse will be mostly on level ground, and without costly works beyond one bridge over the Wairau.

The 182 chains of tunnelling on the East Coast line will probably cost near £1,000 a chain, and the protective works along the exposed parts of the coast will need a very heavy outlay.

The central line offers special advantages for extension through the Island east and west, commanding a connection with the West Coast at an elevation many hundred feet lower than can be obtained elsewhere.

I have, &c.,

The Secretary, Trunk Line Committee. JOHN ROCHFORT.

891. *Mr. Thomson.*] Have you considered what the expense per mile would be of the central line from Waikari to Blenheim or Nelson?—I have not made out any estimate of it; but from the character of the line I think it would be lighter than along the coast.

892. Have you made an actual estimate of the expense per mile?—No.

893. Have you calculated the interest per mile?—No.

894. Or the freight of goods per mile?—No.

895. Or for passengers per mile?—No.

896. Have you considered the line from the Hossack Creek *viâ* Clarence River to Kekerangu?—I have not. I have made inquiries of the people at the station, and they told me the gorge of the Clarence River was inaccessible, and that it would be impossible to get a line through there.

897. *The Chairman.*] What is the general character of the country in the valley of the Buller River?—There is a very great deal of land fit for settlement in the Buller. The line could be taken down the Buller Valley without any difficulty, and there is much available land for settlement, especially in the Matakitaki.

898. Do you know whether coal has been found in the Buller, high up in the valley?—Not higher than Owen.

899. Have any other minerals been found?—Yes; gold has been discovered in nearly all the rivers running into the Buller.

900. Do you know anything of the Maruia River?—Yes, a little.

901. What is the character of the country there?—There is very good open land at the top end of it. There is a large extent of bush land at the lower end. The greatest extent of flat land is up the valley.

902. Do you know the distance between the valley of that river and the valley of the Inangahua River?—I have never been across it, but the Maoris have told me they could travel across from Reefton to the Maruia in half a day. It is not very high.

903. There is some settlement in the Maruia?—Yes; some cattle stations.

904. *Mr. Fulton.*] What are the respective lengths of the lines you have been describing to the Commission?—From Nelson to Christchurch is 208 miles by the inland line; from Christchurch to Picton, by the coast line, 213 miles; and from Christchurch to Picton, by the Greenhills, 211 miles.

905. You gave us no approximate estimate of the cost of construction per mile, either by the Greenhills route or by the coast?—No; the coast line would cost at least £2,000 per mile more than the inland line, or about £10,000 per mile.

906. *The Chairman.*] The line is already constructed from Nelson as far as Belgrove?—Yes.

907. Would that form a portion of the best line for connecting with the central line at the Tophouse?—Yes.

908. Do you know the line by Ward's Pass?—I do not.

909. *Mr. Fell.*] You spoke of the line down the Buller as being easily constructed?—I referred to the whole line between the Tophouse and Reefton, which I am sure could be constructed without difficulty.

Note.—Near the end of my report to the Nelson Railway Committee, the table shows the approximate length of tunnelling by the coast line to be 230 chains in excess of the inland route; the additional cost of tunnelling, added to the cost of sea-wall protection, would add fully £2,000 a mile. In comparing my estimate per mile with Mr. Blackett's evidence of the general average cost per mile of

New Zealand railways (£7,000), I would observe that this is doubtless quite correct, but hardly a fair comparison, because all the earlier lines of railway were built with minimum curves of 5 chains, now the minimum curves are 8 chains.—JOHN ROCHFORT.

Mr. ALFRED GREENFIELD, Commissioner of Crown Lands, Nelson, examined.

910. *Mr. Fell.*] Will you explain to the Commission the tenure under which the Crown lands are held in this province by the different licensees and lessees?—Licenses are simply held for the term for which they are granted, which is ten and fourteen years, and subject to the right of Government to determine same without compensation, on giving twelve months' notice, and also subject to auction at the end of that term, for another similar term. Leases are granted with a right of purchase at any time during the currency of the lease, at a price to be assessed by the Land Board at the time of application to purchase, irrespective of industrial improvements; but the assessment is liable to be increased in the event of any prospect of large public works calculated to improve the value of the land, such as railways or roads.

911. Is there any limit to the discretion of the Board in the price which they may put on this land and ask from the applicant to purchase?—I think not.

912. In the event of a line by the central route being authorized, and its construction undertaken, what course would the Land Board adopt should leaseholders apply to purchase?—They would probably put a higher price on the land. That is the usual course.

913. Would you consider that you would be doing your duty if you did not endeavour to get such an increase put on?—No.

914. Have you any reason to suppose that the Land Board would not make such increase?—I should suppose they would undoubtedly.

915. How is the Land Board constituted?—It is constituted under the Land Act of 1867.

916. I presume a man cannot have his land assessed now, with leave to purchase throughout the currency of his lease?—No, certainly not. He can only have it assessed at the time of the application to purchase. These assessments generally hold good for six months.

917. There is a considerable area of land held under license along the central route?—Yes.

918. How long do the licenses last?—Ten years.

919. Are these licenses revocable?—No, unless the Governor shall be of opinion that the land therein comprised, or any part thereof, is required for sale as agricultural or pastoral land, when the license can be determined, without compensation, on giving the licensee twelve months' notice.

920. Suppose the Government did not propose to renew the licenses, would the land not be open for selection?—Certainly.

921. What is the extent of land held under license in the neighbourhood of Tarndale and those districts?—Considerable blocks.

922. In the event of that country rising largely in value from the construction of railway works, what course should you imagine would be adopted in regard to those licenses at the expiration of their present term?—They would either again be put up to auction as licenses, or they would be set apart for settlement.

923. They could then be set apart for settlement?—Yes.

924. I presume, if population offered, they would be set apart?—Yes, if suitable.

925. Do the leases contain reserves for roads?—Yes.

926. What advantage to the public estate would it prove in the event of the construction of an important line through this leasehold land?—It would greatly enhance the value of the land.

927. That could be taken advantage of in the way you have suggested?—Yes.

928. I presume it would be taken advantage of?—Yes. The Minister of Lands has called the attention of the Board to the necessity of keeping in view the possible construction of large public works when assessing land.

929. *The Chairman.*] Is there any condition, expressed or implied, with the licensees that at the end of their tenure the land shall be absolutely put up again to auction?—I think not.

930. *Mr. Fulton.*] How much land is held under lease?—In round numbers from 250,000 to 260,000 acres, which would be more or less affected by the central line.

931. Over this land the present lessees have a right of pre-emption?—Yes, at a price to be assessed, as before stated.

STATEMENT of Crown Lands in the Nelson Land District held under Leases and Licenses, between the Hurunui River and the Tophouse, which would be more or less increased in value by the construction of the proposed central line of railway.

	Acres.
Leases	415,253
Licenses	192,802
Leases and Licenses, Reserves	57,594
Total Area	665,649

Leases.—Of the lands held under lease, about 250,000 acres would be immediately benefited by the construction of the central railway, and greatly enhanced in value; the balance, lying to the westward of the proposed line, would be more or less benefited, but not to the same extent as the 250,000 acres.

Licenses.—The above area is held under licenses, most of them for ten years, subject to twelve months' notice, without compensation, should the land be required for sale as agricultural or pastoral land.

Leases and Licenses of Reserves.—These lands are let for ten and fourteen years from 1881.

ALFRED GREENFIELD,
Commissioner of Crown Lands, Nelson.

Nelson, 12th December, 1882.

Mr. Oswald Curtis, Nelson, examined.

932. *Mr. Fell.*] You were for some time Superintendent of this province?—I was Superintendent of this province from 1867 to 1876.

933. During that time was there a proposal made for the construction of a railway between Nelson and the West Coast *viâ* the Buller by means of a private company?—There was.

934. About what year was that?—In 1866 I introduced a bill, on behalf of the province, into the General Assembly, which was passed, enabling the Provincial Government to enter into a contract for the construction of a line from Nelson to Greymouth and Westport, on the principle of giving land in payment.

935. What resulted from that?—The Provincial Government instructed Mr. John Morrison, the agent for the colony in London, to enter into a contract. Negotiations took place for a year or two, which ended in nothing. But in 1870 Mr. Morrison entered into a complete contract, with the exception that it was never signed, with Mr. Alexander Brogden, Mr. Lancaster, and other members of the House of Commons. They got so far that the whole of the terms were agreed upon. The draft agreement was approved and engrossed, and was to have been signed at a particular time, but the outbreak of the Franco-Prussian war, of which the news arrived that morning, stopped the whole proceedings. This is Mr. Morrison's letter to me as Superintendent:—

John Morrison, Esq., London, to his Honour the Superintendent, Nelson.

"Office of the New Zealand Government Agency,

"Sir,— 3, Adelaide Place, King William Street, London, 19th July, 1870.

"I have the honour to inform you that the terms and conditions of the contract for the construction of the railway from Nelson to Westport and Cobden have been at length adjusted, having, through the valuable and important assistance rendered by the Hon. Mr. Bell, overcome the legal difficulties that heretofore existed.

"The contract should have been by this time in my possession, but it has not yet reached me; unfortunately the critical state of European affairs has interfered with its execution, but I trust to be enabled by an early opportunity to forward the document in question.

"Until then I abstain from entering into details, but I shall explain fully the various modifications I have santioned when I transmit the contract, which I hope will receive your approval.

"I have, &c.,

"John Morrison."

In the meantime Mr. Vogel brought down his public works policy in 1870. When the particulars of that policy reached London on the 16th November, 1870, Mr. Morrison wrote to me in these terms:—

John Morrison, Esq., London, to his Honour the Superintendent, Nelson.

"Office of the New Zealand Government Agency,

"Sir,— 3, Adelaide Place, King William Street, London, 18th November, 1870.

"The Government of New Zealand having undertaken to make certain railways throughout the colony, including the line between Nelson and Cobden (a decision publicly known here) on terms supposed to be more favourable than those offered to promoters by the Government of Nelson, it will be apparent that the action thus initiated extinguishes the hope on my part, as alike the necessity, to complete the contract I had provisionally made with Mr. Brogden and others for the construction of the Nelson and Cobden Railway.

"I have, &c.,

"John Morrison."

936. As a commercial scheme am I to understand that the construction of a railway between Nelson and Westport and Greymouth was undertaken, upon the system of giving land along the route, with the prospect of its being a financial success?—The arrangement with Mr. Brogden was that he was to make a part of the line at once, and decide as to the remainder within twelve months. He was to determine whether he would complete a contract for the remainder within twelve months. He was to make the part from Brunnerton to Greymouth within twelve months. When Mr. James Brogden had seen that country, he told me he was sorry his firm did not complete the contract, for he was sure they would have done much better had they done so than they were able to do in contracting for the General Government.

937. You are of opinion that the firm would have been satisfied with the financial scheme—with the proposals which were being undertaken with yourself as representing the Nelson Province?—Yes.

938. Are you of opinion that, if the tenure of land and the circumstances generally permitted, such a contract as that then proposed could financially be undertaken with success at this present time?—Yes, I am. At that time the coal mines at the Grey and the Buller were comparatively undeveloped, all of which would have become the property of Mr. Brogden and his friends, and the gold reefs at Inangahua and the Lyell, which are now of very considerable importance, had not then been discovered, and would also have been part of the concession to the company. The site of Reefton and other townships would moreover have been part of the property of the company, as well as a very large quantity of mineral and a moderate proportion of agricultural land. A great deal of the bush land in different parts is not surpassed anywhere. I have been all through the Seventy-Mile Bush in the North Island, and the bush at the back of Mount Egmont, which are looked upon as two of the best bush countries in the colony, and I consider the bush of Inangahua to be quite equal to, and I think I may say better than, either of those bushes. I was Chairman of the Railway Commission appointed in 1880, and I may say that was the opinion of my colleagues on that Commission.

939. Assuming that this central line of railway were constructed to the Tophouse, do you think it would be a prudent scheme for the Government to undertake the construction of a line from this down the Buller to the coast?—Yes; I think it would.

940. Why do you think it would be a prudent scheme?—I think it would tend very largely to settle the country. Although there are no large blocks of agricultural land in any one place, there is a considerable quantity at different points along the line. The actual value of the country consists in its minerals. The development of minerals invariably tends to the settlement of a country.

941. Can you say whether or not any pressure was brought to bear upon the Provincial Government by the General Government to induce them to abandon the scheme for the construction of this line by private enterprise?—Yes.

942. What shape did that pressure take?—In 1870, the Railways Act superseded altogether the Nelson and Cobden Railway Act which enabled the Provincial Government to enter into a contract. The General Assembly Act provided that the Government might enter into a contract on the terms contained in that Act. That took the matter out of the hands of the Provincial Government altogether.

943. Were there not some secret negotiations between the General Government, or some members of it, and the Provincial Government, by way of inducing the latter to abandon their pet scheme in view of the certainty of the thing being taken up by the General Government?—I can hardly say that there was anything definite. During the sitting of the Assembly I had a good deal of talk with Mr. Vogel before he introduced the Bill. There was no abandoning of the scheme on the part of the Provincial Government. Mr. Vogel said he could not have the two schemes go side by side; that he must take the matter into the hands of the General Government.

Mr. JOHN S. BROWNING, Chief Surveyor of Nelson Provincial District, examined.

944. *Mr. Fell.*] How long have you been here?—I have been here six years and a half.

945. Your professional duties have of course taken you through the country?—Yes.

946. I believe you have travelled over that part of it which would be affected by the construction of what is known as the central railway?—Yes.

947. Can you speak generally of its character and adaptability for settlement, assuming it to be open for selection?—The general character of the country is pastoral, but there is a quantity of agricultural land up the valleys which intersect the hills. In travelling over the country, the impression I have formed of the way in which settlement would be most easy would be to divide the valley lands which admit of agriculture into certain sections with a proportionate amount of pastoral land attached to them for grazing purposes. By such judicious subdivision or apportionment of land the country would have the largest population of which it is capable.

948. Assuming the construction of a railway through this central route, can you give any idea of the land accessible to the line and suitable for settlement?—We have hardly sufficient topographical knowledge of the valleys themselves.

949. From your own travelling can you say there are a good many of them?—I have estimated as nearly as I can that the agricultural land in the various valleys accessible from that route would be 30,000 or 40,000 acres, and the remainder would be what is called pastoral land.

950. Within what distance of the line?—Most of them would be the tributary valleys from the main line.

951. You do not include the valleys which are tributaries of the Clarence and Waiau?—No; nor the more distant streams.

952. If the land were apportioned as you suggest, would it be suitable for the maintenance of a population?—It would support a considerable population.

953. Have you been up the valleys of the Clarence and Waiau?—Yes.

954. Is the land similar to that in the valleys you have referred to?—The valleys lying westerly of the Clarence begin to get so near to the main range that they are not available. There is not so much available land. Round Lake Guyon and the Ada there is some very good land lying at a high elevation.

955. *Mr. Thomson.*] You mean it is suitable for mixed settlement instead of close settlement, as in the Waimea Plains?—Yes, about one of agricultural and five of pastoral.

956. Do you know the Alma Valley?—Yes.

957. Is there agricultural land about it?—Some of it is very good.

958. What is the width of flat land in the Alma Valley?—The widest part of the Alma is the flat under Tarndale.

959. I mean where it enters the mountains to the westward?—It varies from 40 chains to 20 chains.

960. Do you know the Yarrow Valley?—I only know the Yarrow Valley looking at it from the range.

961. You cannot tell us the quantity of agricultural land in the valley?—I have not been in it, but it appeared to be of considerable extent.

962. *Mr. Fell.*] You say the proportion of agricultural land and pastoral land is one to five?—Yes.

963. You think there might be 40,000 acres of agricultural land?—Yes.

964. Is the pastoral land so situated that it could be conveniently allocated amongst the proprietors of the 40,000 or 50,000 acres of agricultural land?—I think so.

965. *Mr. Fell:* This concludes the evidence I wish to bring forward, but the Committee are preparing a written statement which will be forwarded to the Commission when completed.

Statement by the Nelson Committee.

THE Commissioners are charged primarily to inquire into the probable cost and economical value of the lines already proposed for the main trunk line, Middle Island extension, and whether any other would be less costly and more beneficial. This would seem to treat it as already settled that a trunk line is to be constructed by one route or another. Nevertheless, the question being practically open until funds shall have been appropriated for carrying out the work, the Commissioners will certainly feel at liberty to declare their opinion on the expediency of carrying out any trunk line at all in the district referred to, at present or at any early date. The Nelson Committee therefore think it pertinent to the discussion to put on record the reasons in favour of completing the trunk line, independent of its immediate commercial value. These they conceive to be in a general way reducible to the political, social, and economical importance of bringing all the large sections of the population into close relations

by facilitating intercourse. The great extension of the colony from north to south gives peculiar force to this consideration. These Islands are one-fifth longer from north to south than Great Britain, and though from east to west the land is narrow, the great mountain chain which unequally divides the South Island calls imperatively for efforts to reduce the barrier that cuts off the long line of the West Coast settlements.

Easy, regular, and cheap means of transit within the country equalize and steady wages and the labour market. In England the collapse of the mining industry of Cornwall led to comparatively little suffering owing to the admirable railway system of the country. Durham and other large mining counties took up much of the disbanded labour of Cornwall. Dorsetshire has detached a part of its starving agricultural population into the more active farming counties. These movements would have been slower and less effectual had not the railway system diminished the cost of travelling by two-thirds, and the length of the poor man's journeys by nine-tenths of the time they occupied less than fifty years ago.

The formation of a national spirit and of sound political opinion is forwarded by the more rapid exchange of ideas which daily mails and more frequent personal intercourse among the population will promote. The present narrowness of local feeling disappoints those who formerly attributed it to provincial institutions. It would seem almost incredible that a civilised community should in our days, and for a small local advantage, or in causeless jealousy of a neighbouring community, indulge the vehement desire, shown in the present struggle by a large section of the people of Marlborough, to secure for their small population and district not only the advantages of railway communication, but the monopoly of these advantages, although to gain this monopoly the interests of their far more numerous neighbours must be sacrificed or postponed for a generation. Nothing would tend so much to check such local selfishness as the improved intercourse that would follow the completion of our system of internal communication.

It is matter of frequent observation that very many of the most successful of our population, after realizing fortunes, return to Europe, not merely as visitors, but as to their home. Time only can cure this habit, which, if perpetuated, brings the well-known evils of absentee proprietorship; but everything that tends to make life in the colony more attractive helps to diminish the mischief, by making the country a home, and evoking patriotic attachments. Among the means to this end is that of rendering the many varieties of climate, scenery, and social life which the colony possesses, accessible cheaply and commodiously.

It is already becoming evident, as many persons had long anticipated, that tourists from abroad, and especially from Australia, will in the future contribute an appreciable amount to the income of New Zealand and to its population. The connection of this fact with a complete railway system is obvious. The northern and western districts of the South Island possess no mean share of the attractions of landscape beauty and natural scientific curiosity. The tourist will almost always prefer land to sea travelling, because it possesses the variety he seeks in a much greater degree. The tourist has a double value for a colony; he furnishes a market on the spot for labour and produce, and he is a medium of spreading information respecting the country which it is using all means in its power to circulate.

Equity requires that, as the South Island from the Waiau-uwha to the Bluff has been included in one large system, and as financial provision has been made for as complete a system throughout the North Island, the remaining communities of Nelson, Marlborough, and the West Coast should be admitted with the least possible delay to share the same benefits. The whole population join in guaranteeing the public debts incurred in establishing the system, and national fair play requires that wide districts and considerable populations should not be shut out for long indefinite periods from the advantages their credit and their contributions to taxation have helped to create.

Lastly, from the publication of the proposals of 1870 to this day, the colonial estimates for public works have constantly recognized the claims of the unserved districts to be brought into the colonial system. A complete trunk line was a part, and indeed the main feature, of the original scheme, and has never been withdrawn or repudiated by any of the Governments or Ministers who have since dealt with the subject, nor by any Parliament which has sat since 1870. Confiding in the sincerity of repeated Ministerial declarations, expressly or tacitly adopted by the Legislature, Nelson and its representatives have from first to last supported the policy of 1870 and the subsequent period.

Into the question whether the colony can venture safely on the undertaking at any early date, it is not the place of the Committee to enter. They confine themselves to recalling to mind that the late Premier, Sir John Hall, and the present Colonial Treasurer, during the two last sessions of the Assembly, made the declaration, amid general approval, that the growing prosperity of the colony justified, among other enterprises, the extension of the South Island Trunk Line to Cook Strait, and the appointment of the Commission itself confirms and seals the long series of promises.

Leaving this preliminary question, the Committee apply themselves to the primary subject of the Commission. The following are submitted as essential conditions of the trunk line extension:—

1. It should serve directly, or provide means by connections for serving, a maximum of population present and prospective.
2. It should be direct within the ordinary limits accepted in practice.
3. It should be capable of construction at a cost not exceeding that admitted in other main lines in the colony.
4. Its gradients and curves should be as favourable as those generally admitted on the other main lines, and its technical features must not entail excessive cost or inconvenience in working.

Each of these conditions will be considered in turn with reference to the competing schemes, so far as information allows, and a comparison will be attempted under each head.

The route advocated by the Committee under the name central line follows throughout the old, natural, and obvious track used for more than twenty-five years by travellers and stockmen between Christchurch and Nelson and Marlborough. The only deviation from this track is in the passage from the valley of the Clarence to that of the Waiau-uwha, on which the Hossack Saddle on the Lyndon and Percival Run is substituted for the higher and much steeper Jollie's Pass.

The line has been declared by Mr. Blair (D.–1, p. 62) to be geographically the best, as passing through the very middle of the northern district. This is obvious enough, but it is only an inadequate testimony to its advantages. As a matter of fact it is geographically everything, the East Coast line nothing. Mr. Blair goes into no detail, but the Committee point out that it is not only central, but that it commands in its course every one of the large valleys from the Waiau-uwha northwards, including the river last named; and serves, directly or indirectly, nearly the whole present population of the northern district—the only exceptions being the people of the lower Awatere and of Kaikoura Peninsula. Its advantages will appear in following its course from south to north. Leaving the Red Post on the Hurunui Plain, it strikes the Waiau-uwha at the first great bend northwards, and follows the river to the Hanmer Plain, where it crosses it to follow the Hanmer River. At this crossing is met the first important connection with the most practical line from Christchurch to the West Coast by the Waiau-uwha, its tributary the Doubtful, the Amuri Pass, and the Ahaura to Brunnerton, Greymouth, Reefton, &c. Following the Hanmer to the Hossack Saddle, the central line descends again a short distance to the Clarence at the confluence of the Acheron. The line commands the whole habitable valley of the Clarence from the gorges between the two Kaikoura Ranges to Lake Tennyson and all its tributaries, several of which lead by very easy—almost imperceptible—saddles to the Upper Waiau-uwha. These valleys generally offer more than common facilities for thoroughly opening the country by cheap roads.

Arriving at the Acheron, the line mounts the valley by easy gradients, passing the tributary streams Guide and Severn, along which tracks lead to Barefells, Saxton's and Ward's Passes, and by them to the Upper Awatere. Stock and drays from the Awatere pass over Ward's Pass down the Acheron by Jollie's Pass and the Amuri to Christchurch.

Leaving the Acheron, the line passes up the Severn for a short distance, and then follows the Tarndale Brook to the summit on the Wairau River (height 3,270 feet). Thence it descends the Wairau Valley in an unbroken series of moderate gradients, which diminish as the line descends to Blenheim.

About sixty miles above Blenheim, and near the Tophouse Accommodation-house and Run, the line passes by the most important point of connection—the Big Bush Saddle (which it would be well to name the Tophouse Junction Saddle). This point, which can be reached either by a slight diversion of the main line or by a level branch, commands immediately the valleys of the Buller and of the Mohipiko (the longest arm of the Motueka) at their heads, and also less directly the valleys of the Motueka itself and of the Waimea. The passage to these valleys forms part of the Nelson–Greymouth line, which has appeared for many years on the Public Works Estimates in the item, "Nelson–Roundell." Should this line be executed—and there are no difficulties in the Buller Valley, or the Inangahua, or Mawhera-iti so great as on the Nelson–Roundell section—it would, in connection with the central line, form a very direct railway from the heart of the Grey and Buller basins to Blenheim, Picton, and Wellington, as well as to Nelson; and, with the Christchurch–Brunnerton line, would make a complete loop, thus opening the north-west coast to north and south.

It is physically impossible to lay out any other system for the service of the northern district which would approach this in convenience and economy of construction. Every other scheme must either borrow some of its essential features or neglect some large section of territory or population. Nature has laid down the routes, and for a mountainous country the system is one of extraordinary facilities. Of all conceivable schemes the East Coast line is the least widely useful, being cut off from the whole northern district by the Kaikoura chains and other rugged country, and serving only Lower Marlborough and the Kaikoura Peninsula.

As to the existing populations affected by the proposed central line, the Committee refer to Mr. Tinline's statistics, gathered from the census returns of this year. The essential point of these statistics is that only a very small part of the population—the inhabitants, namely, of some ridings of the Awatere County and those of Kaikoura and Cheviot Counties—would be without any appreciable advantage, direct or indirect, from the adoption of the central line. The total number thus omitted is 1,474. The whole of the Nelson District proper and the bulk of Marlborough would be included in its direct benefits, the latter district not so exclusively, but just as effectually, as by the coast line. The coast line, on the other hand, would pass by wholly without benefit, direct or indirect, a population of above 40,000 included by the other. The figures stand thus: Benefited by central line: Directly, 23,055; indirectly, 24,214; wholly omitted, 1,474. Benefited by coast line: Directly, 6,822; indirectly, *nil;* wholly omitted, 40,447. This disparity admits of no possible attenuation, but on the other hand it must be observed that a part of the small number omitted by the central line will enjoy facilities as great as four-fifths of the country enjoy by the line to the Red Post, and another portion will in any case be served by the Awatere line now in construction, a large local benefit already conceded to Marlborough alone.

The prospective population to be served by the several schemes must depend on the value of the territory opened by each, on its extent, configuration, soil, climate, and on the mineral and other wealth it may contain. On the extent there can be no dispute. The summit of the seaward Kaikouras marks the limit of the territory that can be better served by the coast line. The lower Awatere is already provided for by the line in construction. This and the rest of the country traversed by both lines is at present occupied exclusively as sheep and cattle runs. The total area commanded by the coast line is 973,000 acres. Of this Mr. Clark, Commissioner of Crown Lands, and Mr. Austin Ward, surveyor, Marlborough, reckon 107,222 acres all freehold, as land fit for the plough, 61,822 acres being already provided for, leaving 45,400 acres to the credit of the coast line. (Report of the Royal Commission on Railways, 1880, E.–3, pages 136–7.) There remains 865,778 acres, pastoral country, most of it very rugged, but containing no doubt much land improvable by substituting European grasses for the indigenous pasture.

Upon the central line there are 3,080,000 acres all told, of which 2,284,379 acres are Crown lands. Much of the freehold may fairly be compared with the Cheviot and Parnassus freehold, which it surpasses in area, if a large part of it is surpassed in quality by those runs. Both may therefore be properly set aside; the more so as those runs, and the Hurunui Plain, Hanmer Plain, and the Lower

Amuri generally are rendered practically accessible by the lines already made or in construction. Much of the two million and a quarter acres of Crown land on the central line is doubtless for the present purpose valueless, but there remain large districts of first-class grass-country, including land fit for the plough, and for improved meadow and pasture.

No general estimate has been made of the proportions of the several classes last-named. One district only has been spoken to by competent witnesses—Mr. Browning, Chief Surveyor, Nelson; Mr. Rochfort; Mr. Richmond, formerly Commissioner of Crown Lands, Nelson; and Mr. John Kerr, a resident for some years at Tarndale, and a sagacious and successful cattle-farmer. The district referred to lies between Tarndale and the Upper Wairau on the north, the valley of Waiau-uwha on the west, the limits of the Clarence Valley on the south, and those of the Acheron and its feeders on the east. Its total area is between 400,000 and 500,000 acres. Of this, the greater part is good grass-land; some of it too rough to be capable of use as meadow-land, but from 250,000 to 300,000 acres are now first-class pasture, comprising in the valleys and easy slopes 40,000 to 50,000 acres fit for the plough, and the rest 200,000 to 250,000 good grassy downs, some parts capable of becoming converted into hay-paddocks. The witnesses last mentioned concur in the opinion that it may be successfully settled by laying out small grazing or dairy farms, each including a homestead allotment of arable land.

The Committee have no authoritative estimate of the area fit for settlement in the Wairau Valley. It is eighty-five miles long from Tarndale to Blenheim, and from the Rainbow downwards is of considerable width. The length from the Rainbow to the Narrows, where compact settlement begins, is about sixty miles. It contains flats and terraces of large extent. The bounding ranges end frequently in easy slopes and smooth spurs, part of these well timbered. The soil in the flats is not generally equal to the Clarence District, but there are many spots fit for homesteads. As a safe conjectural estimate the Committee offer 75,000 acres as fit for similar colonization to that proposed for the Clarence.

Between the Tophouse and the Rainbow there are many spots of rare landscape beauty, the valley and lower slopes having open glades studded with park-like timber, and overlooked by picturesque peaks. This part of the valley, if made accessible by a railway, would almost certainly attract settlers of the wealthier class as a place of residence.

The climate of the uplands generally is good, though of course colder than on the plains. It is healthy, and it appears probable has advantages for some invalids. Garden and root crops as well as cereals flourish remarkably, and some fruits are produced better than in climates where frost is rarer.

Supposing the total available area, as above estimated, to be divided into farms averaging 500 acres, there would be settlement for 750 families within easy reach of the central line, which, with the labourers, storekeepers, mechanics, and others, who would be attendant on such settlement, would imply an increased population of from 5,000 to 6,000 persons.

No parallel addition to the population can be calculated on or expected from the construction of the coast line Either project would, however, bring with it an increase of population on the freehold lands at the extremities and around the roadside stations.

The mineral wealth of the northern district is principally found, and likely to be found, on the western side of the central ranges, and belongs properly to the consideration of the Christchurch–Greymouth–Nelson line. The wooded ranges between the Spencer Mountains and Reefton, and elsewhere around the Grey basin, are for the time difficult of access. Diggers have, however, occasionally visited the Upper Waiau-uwha for provisions.

The total value of gold raised in the Nelson Province, including Greymouth, up to the end of 1880, exceeded eleven millions sterling; more than half of it being from the Nelson District.

The obstacles on these parts of the New Zealand gold fields, arising from want of access and the great extent of forest land, would be materially diminished by the settlement of the Upper Clarence and Upper Waiau-uwha Valleys, and by the construction of the central line.

The Committee call attention to the views of Mr. Travers on the importance of settling the Grey basin as a necessary means of developing the coal fields, and they believe that the Christchurch–Greymouth line would be instrumental in effecting such settlement. They do not consider, however, that a heavy mineral traffic of any kind would be economically practicable over any of the saddles existing between the Grey basin and the East.

2. The second condition, that of directness between Wellington and the South, is best attained by the coast line in its most perfect form, that is to say, by a line starting from the existing railway on the south of the Weka Pass, and crossing the Cheviot and Parnassus runs to the coast. The distance by this route between Christchurch and the Port of Picton is about 203 miles; the distance by the central route is about 233 miles. If, however, the existing railway is followed to the Red Post, and extended to join the coast route near the confluence of the Eden with the Waiau-uwha, the disparity will be reduced by one-half, the distances being about 220 miles against 233.

As regards the distance from Christchurch to Nelson no comparison is possible, as the central line alone would serve that place. By the central line, however, Nelson is, so far as can be ascertained without accurate surveys, just the same distance from Christchurch as Picton by the coast line through Cheviot—namely, 203 miles.

Having regard to the character of the country, the Cheviot line is exceptionally direct, and the central line as concerns Christchurch to Nelson is nearly as much so. The greater circuit on the central main line to Picton is not, however, without notable precedents among English railways of importance. In an appendix (Appendix B) on this subject it is shown that, for a considerable period after the first great English lines had been constructed, many important towns on the trunk lines from the metropolis were reached by serious détours, and this for the same reason that would prevail in the adoption of the central line—namely, for the purpose of at once including as many centres of population as possible in the system. Among the towns so situated may be named York, Newcastle, Exeter, Plymouth, Dover, Portsmouth. Short cuts were introduced by degrees as traffic developed, and showed the probability of profit in a large and perfected system.

For political and economical reasons the communication between Auckland and the South will have to suffer at first a more serious divergence from the direct line than would occur in the service between Christchurch and Picton by the central line.

3. The third condition accepted for the trunk line, South Island extension, is that it shall be capable of construction at a cost not exceeding that admitted in similar cases within the colony. Here the central line answers the requirement far better than its competitor. Mr. Blair, a very resolute antagonist, allows that, notwithstanding its greater length, it would not cost more than the coast line. Mr. Rochfort's evidence tends to show that it would cost less. He cautiously estimates it at £8,000 per mile, complete and stocked. In this estimate, however, he includes a section of thirty miles not properly belonging to the trunk line (the extension of the Waimea line to the Tophouse, the greater part of which has appeared on the estimates for a long time under the titles "Nelson–Roundell" and "Nelson–Greymouth"), which stands on another footing. The section referred to contains a tunnel and heavy earthworks over a considerable length, and materially augments the average cost per mile in Mr. Rochfort's estimate.

A short description of the central route will best exhibit the grounds on which the Committee claim for it something below average costliness. It follows easy leading valleys for four-fifths of its length, and not more than a tenth part of it shows heavy work. From Blenheim to the Rainbow River, about seventy-six miles, the line is in the open Wairau Valley, and there is little in the shape of works except the bridges over the Wairau and Waihopai. Surface-formation will nearly everywhere prevail, and ballast is everywhere at hand in the river-bed. If indeed it is decided to carry the line near the level of the Tophouse Junction saddle, the spurs of the mountains must be followed in side-cutting for ten or twelve miles. Mr. Rochfort reports the spurs as admitting easy curves without deep cutting, and it must be observed that side-cutting on easy hills is the cheapest form of earthwork. It is not essential that the trunk line should pass near this saddle; the Nelson junction may be effected at any time by a short branch on a level leading along the hill-sides up stream. But with a view to economize mileage and prepare for the completion of the system, it would be advisable to incur the expense when the main line is under construction. The divergence towards the saddle would not force the gradients on the main line to anything near the ruling maximum of 1 in 50; even including this diversion the line from Blenheim to the Rainbow River would be exceptionally cheap.

Three miles of heavy work follow in the Gorge and along the shingle-slides higher up. They would include two or three small bridges with inexpensive and secure abutments on rock, and probably a few chains of tunnelling to secure good curves, as well as a mile of heavy side-cutting in rock not extremely hard. On the shingle-slips, as well as in the Gorge, some low timber-framing may be necessary to allow the moving shingle and the overflow of small streams during the winter-frosts to pass under the line. Thence through Tarndale Plateau and down the Acheron about thirty miles the works will be generally trifling, except at two points on the Acheron, where the river must be bridged and short rocky bluffs pierced with tunnels or open cutting. The formation will be generally on the surface. On the next section the most serious works in point of extension will be found. The Clarence requires a bridge of no great span, and the rise to and descent from the Hossack Saddle must involve a considerable length of side-cutting. The saddle itself may be reduced in height by cutting, the ridge being steep and narrow. The last section from the Hanmer Junction to the Red Post begins with a bridge over the Waiau-uwha, of no great length, but of considerable height and span. Some form of suspension bridge is suggested by Mr. Ashcroft. Beyond this point the line will be generally on the surface of the river-terrace.

Taken as a whole the works will not be serious, the payments for land trifling, the buildings and stock small and inexpensive. The Committee are advised that the line may be constructed and stocked at a cost something under £7,000 per mile, or for a gross sum of about £980,000. As to the cost of the East Coast line no evidence was produced in Nelson, but the advocate of the Cheviot route, Mr. Blair, has spoken distinctly in his report of 1879 (E.–1, page 65): he is comparing the Cheviot and Greenhills alternatives. "So far as can be judged without detailed surveys there is little to choose between the routes as regards the cost of the work. The country between the Conway and Kahautara in the one case, and the Mason and Kahautara in the other, is very rough indeed. Notwithstanding the steepness of the gradients the trial section of the Greenhills line shows a succession of cuttings and embankments far heavier than anything hitherto encountered in the railway works of New Zealand. In the first five miles north of the Whale's Back the line crosses thirteen broad ravines, five of them being from 50 to 90 feet deep, and eight of them from 90 to 160 feet. Further on the same section has four banks from 50 to 70 feet deep, and four from 90 to 160 feet. The cuttings are also on the same gigantic scale, several being 60 to 80 feet deep and a quarter of a mile long." Mr. Blair continues to describe the Greenhills route as to gradients in a most condemnatory style, and winds up thus: "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 obtained by the line thus described. Altogether I have not the slightest hesitation in rejecting the Greenhills route in favour of the coast line, *i.e.*, the line by Cheviot and Parnassus."

In his report of 1878 (E.–1, page 39) Mr. Blair had written thus: "Mr. Dobson's line by Cheviot is also very costly for about ten miles, but I am inclined to think it superior to Mr. Foy's on account of its lower summit level."

Mr. Foy had previously reported on the two coast lines; he sums up his observations thus (E.–1, 1876, page 39): "A railway line over such a country [Greenhills] could not possibly be made without doing so regardless of cost both as to construction and maintenance. A line by the coast is equally impossible." And again: "It is therefore demonstrably certain that the main trunk line can never pass through the Cheviot Hills District. . . . It is no use to fight against Nature, and it may be said with truth of the two competing lines that, whilst one is just practicable, the other is undeniably impracticable. . . ."

It is impossible to read these reports without a conviction that the undertaking of the coast line will launch the colony in a very extravagant expenditure. It will be observed that neither Mr. Blair nor Mr. Foy says anything of the works on the actual coast. There is, however, a long section on this

part of the line placed immediately under the cliffs, of which Mr. Rochfort reports that it will involve the tunnelling of several headlands and some miles of sea-wall. The latter works must be very costly and a constant source of anxiety. Cement or hydraulic lime must be brought from a distance, and it may not be possible to use the stone found on the site of the works. The masonry in such works must not only be of the first class but also massive, and the foundations always carefully watched.

There is another economical aspect of the question as important as the comparative cost of the two schemes proposed for the trunk line. Mr. Blair has sketched a comprehensive plan for the service of all the northern district, a plan which, with some modification, will certainly be executed sooner or later. This plan includes, of course, the coast trunk line, but it also includes an important section—little less than half of the central line. The substitution of the central line for the coast line would therefore diminish the mileage of the plan as a whole, as well as the cost per mile.

Original Proposal.	Miles.	*Modified Proposal* (*Difference, 46 miles*).	Miles.
Coast line (Waipara–Awatere)	125	Central line (Red Post to Blenheim) ...	146
Red Post–Brunnerton (Christchurch–Greymouth)	95	Hanmer–Brunnerton (Christchurch–Greymouth)	83
Ahaura–Belgrove (Nelson–Greymouth) ...	120	Ahaura–Belgrove (Nelson–Greymouth) ...	120
Roundell–Blenheim (Picton–Greymouth) ...	65	Roundell–Tophouse (Picton–Greymouth) ...	10
Blenheim–Awatere	15	Blenheim–Awatere	15
	420		374

The lengths in Mr. Blair's proposal have been here modified to agree with the advance of the constructed line since the date of his report. The new figures exhibit the mileage required to complete the system.

The excess of mileage to be constructed on Mr. Blair's scheme will obviously include the costly part of the coast line, and may be reasonably—perhaps too modestly—estimated at half a million of money. But this is not all. There are differences in the services in favour of the cheaper scheme. The latter omits Kaikoura and Flaxbourne, but substitutes for them all the country between the Hanmer Plain and the Tophouse, and affords a direct line from Nelson to Christchurch, for which Mr. Blair's scheme makes no provision.

4. In reference to condition as to the character of curves, gradients, &c., the Engineer-in-Chief having reported (D.–1, page 61, Surveys) that "it is possible to get a railway with workable gradients right through the middle of the Island from Nelson to Canterbury," it may seem only necessary to add that it is equally possible to get a line from Picton. On the latter, which is now the matter under discussion, there is only one passage, that from the Waiau-uwha to the Clarence by the Hossack Saddle, at which the gradient of 1 in 50—accepted on the Cheviot scheme and in use in most parts of the colony—will be required. Here it will be necessary over about twelve miles. It can be conveniently worked by many of the engines now on our lines. Its concentration on this one section makes it unnecessary for the heavy engine to travel further than between the Waiau and Clarence Valleys, a distance of twenty-four miles. It will be here and in the Wairau Gorge also, if anywhere, that the accepted limit of sharpness in curves will be touched. Elsewhere both gradients and curves will be moderate.

The subject of the economical importance of the high summit, which has been objected to in general terms, is discussed, with other objections, in the Appendices to this statement. (Appendix C–1, 2, and 3.) The Appendices are in the nature of fuller rejoinders to various doubts and difficulties suggested by opponents of the central line: they contain illustrations too lengthy to form part of the general statement. They have been contributed by Mr. Richmond. Enough, the Committee hope, has been advanced to enable the Commission to decide that the route here advocated possesses all the essentials of a trunk line, and most of them in a higher degree than the alternative proposals; and that it adds to these the qualities of a colonizing line.

APPENDIX A-1.

Fitness of Northern District for Settlement.—Climate.

The inducements presented by its greater cheapness, and by the wider utility of the central line to the present population, and the facility of valuable connections hereafter which it offers, are such that the Commission can have no difficulty in deciding in its favour, unless the disparaging view of its opponents respecting the value of the territory as regards climate and soil has impressed them with the idea that the narrow strip served by the East Coast line is destined to carry a larger population than can be hoped for in the valleys of the Wairau, Clarence, Waiau-uwha, &c. The importance of such a conclusion would be great, since a condemnation of the northern uplands as unfit for settlement would involve fully three-fifths of the whole South Island, which are of no better quality. That the Commission is asked to decide in this sense justifies the expenditure of some further time in discussing the probability of the disparaging view. The question of climate as affecting the efficiency of a railway is discussed separately. It will be here attempted to bring the light of physical geography and a wider local experience to bear on the evidence of the residents who have spoken on the question of habitableness. The territory northwards of the River Waiau-uwha lies between the 41st and 43rd parallels of south latitude—that is to say, about the same distance southwards of the equator as Central Italy from Naples to Florence, or as the northern parts of Spain and Turkey. But the climate of the great oceanic hemisphere in which we lie is more equable than that of the northern or continental hemisphere. The summer here is less hot, the winter less cold, than in like latitudes in the North. Snow, which in the North sometimes falls at the sea-level on the Tropic of Cancer, 23° north latitude, is unknown in this hemisphere nearer the equator than 32° south (Sir J. Herschel, Phys. Geog., § 276)—a difference of 8½° in favour of a New Zealand winter as compared with central Italy and northern Spain and Turkey. This would lead us to expect that the winter-climate of this

northern district would approach that of Algeria, in North Africa, a land resorted to by French and English invalids during winter, and such an expectation agrees fairly with the facts. The snow-level on the mountains visible around Blind Bay (*e.g.*, Gordon's Knob on the Motueka, and overlooking the Waimea, Upper Buller, and Wairau) varies in winter between 3,500 and 4,000 feet, and in Algeria snow lies occasionally for several days together on the higher plateaux overlooking the Sahara, at a level of 3,500 feet.

A land so thoroughly insulated as New Zealand experiences in the fullest degree this leading peculiarity of the southern oceanic climate—equability. On the other hand, the prevailing moisture of the air modifies this peculiarity as regards the mountain-regions having a western aspect. The snow is more abundant on these, in proportion to its prevalence at the sea-level, than in Europe. This, and not a general harshness of climate, is the reason of the vast glacier-system of the Southern Alps—wholly disproportionate as it is to the mass, and the mean altitude and latitude, of the chain. The uplands of the central line are, however, screened from the moist westerly winds by a triple barrier of mountains, the nearest and highest, the Spencer Range, being about twenty miles westward of the Wairau and Acheron Valleys. The two Kaikoura groups intercept and reduce the moisture of the easterly winds. The mountains along the line average only half the height of the Southern Alps, and there is no great snow-field and only one glacier of the second order within the limits of the district. In the absence of the refrigeration from any large elevated mass of ice or snow, snow cannot, except under unusual circumstances, lie long in its highest valleys. If it would be absurd to object to a winter-residence in Italy, Spain, or Algeria, on the ground of harsh climate, it is not much wiser to bring such an objection to settlement on the Wairau and Acheron. These considerations seem fully to confirm the testimony of the residents at Tarndale and Wairau Gorge to the effect that snow is not either deep or enduring in that neighbourhood.

The Wairau, at Tarndale, is about the highest point of any important valley in the district. The river rises indeed some ten miles to the westward, and probably at or near 4,000 feet above the sea, but the upper valley is narrow. The Upper Waiau-uwha and Clarence, and their chief tributaries, lie between 2,000 feet and the level of Tarndale. The upper limit of these levels barely exceeds that at which wheat is grown in Switzerland. The lower limit is pretty nearly that of the grape in proper aspects in the same country. In this latter point the Clarence Valley has proved, under Mr. Ward's management, equal to the Rhine and Rhone. In short, as far as level is concerned, all the cultures pursued in Switzerland are possible in the valleys under discussion; not, perhaps, for the productions of marketable exports, but for home consumption. On this point too the evidence of residents is confirmed by experience elsewhere, and by the conclusions of science.

If it be asked how the depreciating temper with regard to the wild upland country arose, the answer, apart from the blinding interests engaged in the present struggle, is not difficult. Population of course flowed first to the accessible and genial, as well as fertile, plains, and the highlands were neglected so long as lowlands were to be had, a period now nearly passed. Before the plains and valleys had been occupied, the colonists had become accustomed to a climate of rare mildness, so that severities, which are themselves mild compared with what Scotland, England, and indeed four-fifths of Europe endure nearly half the year, have become repugnant to many New Zealand settlers. Something of self-interest on the part of the pastoral occupants, who were for a long time jealous of the invasion of small settlers, has helped to confirm the bad name of the uplands, and the absence of people and houses has exaggerated every discomfort to the traveller.

APPENDIX A-2.

Configuration and Soil of Northern District.

The valleys on the central line are narrow, and, except the Wairau, rarely exceed or reach one mile in width. The soil is very various, including the results of the disintegration of schists, slates, and limestones. The form of the bottoms of the larger valleys is irregular terraces. The rivers do not wander much or occupy beds of disproportionate width. The hills from Tarndale southwards are in a great proportion rather large downs than mountains; some of them have very moderate slopes. The grass in this part of the country is exceedingly fine. To have seen the blue-grass of the Acheron and Clarence in summer, when in full seed, standing as high as a good wheat-crop, its polished heads waving in the sunshine beneath a light wind, and giving out a gentle *susurrus* as its heavy ears strike one another, is to have received an indelible impression of beauty, and of a fertility that ought not to waste in an unprofitable fallow. It is obviously by developing this fine pasture, which extends over a large area, that the best use can be made of the country. A higher class of breeding and grazing farms and dairy farms could be established in the valleys were the country made more accessible. By husbanding the immense summer's growth, of which the greater part is now wasted, the land would bear three times its present stock, which is limited by the winter-feed. The gradual introduction of European and American grasses, which are much more social in their habits than those indigenous to the country, would still further increase the feeding capability, and the use of the abundant water-supply in the irrigation of the valleys would be cheap, and to a New Zealander easy and very profitable. The geology of the country, as published, does not give any precise details of the district. By far the greater part consists of palæozoic and metamorphic rocks, with local patches of the Jurassic and Triassic series of rocks. The limestones are on the southern verge, forming considerable portions of the Highfield and Lyndon Runs, and probably the country around the Hossack Saddle. The area of good country is not accurately determined. Messrs. Rochfort and Browning agree in estimating the country in the Upper Clarence and Wairau at 250,000 acres or thereabouts; 75,000 acres more may be added for the Lower Wairau; giving 325,000 acres as a safe estimate of open and immediately accessible country.

APPENDIX A-3.

NOTES ON ALPINE SWITZERLAND, IN ILLUSTRATION OF THE VALUE OF THE NEW ZEALAND HIGHLANDS.

The most obvious European parallel to the character of the northern districts of the South Island of New Zealand, and the highlands of New Zealand generally, is Switzerland. If nearness to markets and the annual march of a great tourist army favour the European land, New Zealand has all the advantage in climate and elevation. The parallel of 46° 45′ north latitude runs through the middle of Alpine Switzerland; that of 42° south through the middle of the uncolonized part of the old Nelson Province. Switzerland is an inland country, distant at its western angle 170 miles from the nearest point of the Bay of Biscay, on its north-western side 160 miles from the British Channel, and on its southern side 60 miles from the Gulf of Genoa, in the Mediterranean. Its climate partakes largely of the continental character of the Northern Hemisphere, viz., great variability of temperature between summer and winter. Its summer is as hot as that of Auckland, its winter severer than that of the Auckland Islands or Kerguelen's Land. In respect to elevation its lowest points are—the escape of the Rhone a little below Geneva, 1,180 feet above the sea; and of the Rhine at Basle, 815 feet. Its highest point is Monte Rosa, 15,212 feet (Mont Blanc, in the Savoy Alps, whose peaks bound Switzerland, is 15,777 feet high).

Alpine Switzerland, from which the valley of the Rhine below Lake Constance, and of its tributaries below the lakes of Luzern, Zurich, Zug, Thun, &c., and some other level districts, are excluded, is the principal subject of the following notes.

It constitutes in area about two-thirds of the whole republic, or, say, 6,800,000 acres; and this is nearly the area of the district northwards of the Waiau-uwha and Ahaura Rivers. The entire republic occupies a territory about equal to what would be cut off to the northwards by a line from coast to coast through the mouth of the Teramakau River and Christchurch.

The following broad facts show in a general way the greatness of the contrast between Alpine Switzerland and our northern district in level. In an area equal to our district there are not less than 262 peaks exceeding 10,000 feet in height, and varying from 10,000 to 15,000 feet. Of these, 71 surpass 12,000 feet, and 120 surpass 11,000 feet.

Outside the Southern Alps New Zealand can show but one mountain for which a height of 10,000 feet is (only conjecturally) claimed, four or five exceeding 9,000, ten or a dozen rising to from 8,000 to 9,000, and as many more to between 7,000 and 8,000.

Of these mountains, six between 8,000 and 10,000 feet are within the northern district, where, however, the great majority of the summits deserving the name of mountains lie between 4,000 and 7,000 feet—a range of level at which would be found a large part of the summer pastures—the Alps properly so called—of Switzerland. None of the peaks in the immediate neighbourhood of the Wairau, the Clarence, or the Acheron exceed 7,000 feet. Mounts Odin and Kaitarau, among the Kaikouras, are forty miles from the nearest point on the central route; Mount Franklin is seventeen miles from the confluence of the Rainbow and Wairau. The summits of Spenser Range are twenty-five miles from the nearest point on the Acheron. The valleys of Alpine Switzerland are all hemmed in by mountains of a much higher order. The lowest and largest of these (hardly within the Alpine country proper), that of the Rhine between Chur (the chief town of Granbünden) and Lake Constance, is overlooked by peaks of from 7,000 to 8,000 feet. Higher up the Rhine than Chur, and in the valleys tributary to it and to the Rhone, above the lakes, the bounding ranges rise to peaks of the class contained in the list, from 10,000 to 14,000 feet high and upwards. These valleys form the bulk of Alpine Switzerland, and comprise the Vorder Rhein, Hinter Rhein, Prättigau, Upper Aar and Reuss, the Linththal, Grindelwald, Meiringen, the Upper Rhone (or Valais), the Upper Inn (or Engadine), the Upper Ticino and Adda, &c. The Valais is that which is most loftily guarded, passing between the Bernese, the Savoy, and the Monte Rosa groups. Most of these valleys and their branches are occupied, and some of them cultivated up to the glaciers, which descend to 6,000 and 5,000 feet.

The Swiss passes show the general elevation of the country as clearly as the summits. Sixty of them, including all the most important, average 7,500 feet in height, a mean which is also maintained in sixteen important passes named in the attached list. An imperfect list of passes, most of them in our northern district, shows a range of 1,200 to 4,500 feet, and a mean of 3,150 feet. Over most of the Swiss passes named in the list there are fine coach-roads, some of them exhibiting the boldest engineering, and constructed by the little cantons in which they lie without incurring any debt. The mean height of the twenty-two cantonal capital towns is 1,572 feet; that of the principal lakes is 1,470 feet.

A consideration of these facts will show that it is hardly exaggerating to say that, were the northern district elevated as a whole 3,270 feet (the height of Tarndale) above its present level, it would, even at that height, possess a winter-climate equal to that of Alpine Switzerland, and its summer would be longer but not so warm as that of the European Alps.

The population of the Swiss highlands averages twenty-one persons to the square mile, giving a total of about 223,000. The question, "How are these people occupied, and what is their condition?" is one of practical interest for us, seeing that New Zealand as a whole contains at least three milder Switzerlands, at present almost bare of population, and acting as a barrier to the intercourse of the people of the plains. Before giving an answer to this question, it should be stated that the Alpine valleys have been occupied to overflowing for hundreds of years. Their population is by no means principally due to the deluge of visitors that spreads over the land every summer. A large proportion of those who wait upon the tourists are, like them, birds of passage, who seek their living in all parts of Europe during the long winter, and do not swell the census. Though warmly attached to their land, the mountain population have, as long as they have had a history, sent out detachments of their surplus youth to seek their fortunes elsewhere in all sorts of occupations, civil and military. The population of the whole confederacy, lowland and highland together, has increased largely during the last thirty years. At the early part of that period railways had only begun to help trade, and Cook's tourists—a discovery of a New Zealand colonist—had only just begun to chip the egg. The population was then

1,980,000. At this day it is probably not below 2,750,000, but the increase is almost exclusively in the urban and lowland districts, and tourists are not the sole cause. English free trade has invited the excellent silk, woollen, and cotton goods of the confederacy to a good market, and factories as well as domestic manufacturers, are common in the low land valleys. With this we have, however, little concern, and turn to the uplands.

The great industries of the Alps are the rearing of cattle, and the dairy, and they are admirably carried on. A poor beast is not to be seen within the confederacy, winter or summer; and the cheese, butter, and milk are abundant and excellent. With eight months of close season, when frost and snow prevail, the system of the farm is necessarily different from that of our lowlands. The cows are stall-fed during the whole winter, and are consequently domesticated to a state of extreme gentleness. The hay-crop is of cardinal importance. Unless in very unfavourable years, two crops are a minimum. The meadows, which occupy chiefly the bottoms and easier slopes of the valleys, are densely grassed. The winter's manure is stored and applied as soon as the snows are melted, and again after each crop. This is done with immense care and industry; men and women are even seen carrying liquid manure on their backs in long buckets up hills steeper than those round Wellington and Nelson, to be distributed 400 or 500 feet above the valley. The usual way is to draw the manure out into the fields in elongated barrels on wheels (the cows doing a share of the haulage). From these it is ladled out over the ground with deep wooden shovels. The hay is not left long on the ground. In some districts, if the weather is uncertain, the grass is only dried for twenty-four hours, in a sort of loose haycocks kept open by frames of sticks in the form of crosses over which the grass is laid and hangs down. It is stored not in stacks but in sheds and lofts over the cowhouses. By this method, the hay lying lightly, fermentation is easily stopped at the proper point. The result is a very fragrant and nourishing hay. Occasionally between the hay-crops, or at the end of summer, the cows are let into the meadows; but, as soon as the snow has been long enough off the upland pastures—the real Alps—to allow the grass to come well forward, they are driven up and remain till the snow drives them down again. During their stay in the high pastures the dairy-business (including the pigs) is attended to on the spot in huts arranged for summer-dwellings as well as dairies. Domestic manufactures fill up the spare time in winter. Wheat up to 3,000 feet (Herschel, Phys. Geog., § 339), oats, buckwheat, flax and hemp, potatoes, and garden vegetables are cultivated in the valleys, and the apple, pear, cherry, and plum up to a considerable height. Beef and mutton are rare in Switzerland, even in large towns. Only the heifer calves are reared to maturity, and the surplus after maintaining the stock are killed for veal, the meat of the country and of a large part of Continental Europe.

The people are sedate but cheerful. They seem as a rule well-to-do, though pauperism exists among them. The homestead-buildings are generally large. The alps or upland pastures are joint holdings, over which the proprietors in the valleys adjoining have definite pasturage rights. That these holdings and rights are only moderately extensive (as ideas run in New Zealand) is evident. A population of twenty-one souls per square mile (or 640 acres) of territory, including mountain-tops, snow-fields, glaciers, river-beds, shingle-slides—even if we allow each holding to imply ten persons—gives much less to each holding than the minimum conceived of by Mr. Browning and Mr. Rochfort for the future freehold occupiers of the Clarence country; and these gentlemen were speaking of selected country, from which rugged mountain-tops would be excluded, and of a region where the summer is twice the length of the winter; whereas the proportions are inverted in Switzerland. Nevertheless, on this moderate area of rugged country the people not only live, but thrive, increase, and enjoy life. The Swiss are very sociable and travel much within their own limits as well as abroad. Railway trains are not empty in winter. The gatherings of musical, rifle-shooting, and other societies from all parts are large and frequent. The Swiss are musicians, although the lakes are now almost silent, the *volkslied* and *jodel* having retired before the throng of visitors, as nightingales retreat from the extension of a populous town. Music on the lakes and mountain-sides survives in the Tyrol, where railways are less omnipresent. Like all mountaineers, the Swiss are lovers of their country and home, and of old when they left it it was to return in later life. It is said that emigration is now going on to the United States on a serious scale. It is worth consideration by the Legislature and Government whether a small part of the stream could not be advantageously diverted to these shores. The people are not only hardy, laborious, experienced in mountain-farming, dairy-work, and the management of cattle, they are also accustomed to co-operation; and the inoculation of a district like the Clarence with such men and women would probably be a great success, if home-sickness (the German word *heimweh* suggests the thought of mountaineers away from their own country) did not interfere.

It would be instructive to follow the subject here opened into detailed accounts of some of the most notable special districts and populations of the country, and to extend the examination to other lands where mountain-regions under far harsher climates than Switzerland are occupied by prosperous populations. One of the diagrams placed in the hands of the Commission suggests the extraordinary case of Utah, the modern colony of the Mormons, on the shores of the Great Salt Lake, which is 4,200 feet above the sea. The signal success of that example of colonization of a land supposed, not unreasonably, to be a howling wilderness, is a reproof to the croaking temper which hastily condemns a country exceptionally blessed in soil and climate, merely because the adjacent country is even more highly blessed. But it might be overloading the cumulative proof of our case to press the matter further here.

Heights of Swiss Towns and Villages.

Aarau, 1,207 feet; Aigle, 1,374 feet; Airolo, 3,867 feet; Andermatt, 4,736 feet; Appenzell, 2,562 feet; Basle, 813 feet; Bern, 1,883 feet; Chateau d'Oex, 3,264 feet; Chaux de Fonds, 3,270 feet; Chur, 1,965; Davos Platz, 5,104 feet; Dissentis, 3,804 feet; Einsiedeln, 2,882 feet; Freiburg, 1,942 feet; St. Gallen, 2,106 feet; Trogen, 2,962 feet; Winterthur, 1,584 feet; Frauenfeld, 1,447 feet; Herisan, 2,549 feet; Geneva, 1,327 feet; Lausanne, 1,686 feet; Lauterbrunnen, 3,526 feet; Linththal, 4,642 feet; Luzern, 1,437 feet; Meiringen, 1,968 feet; St. Moritz, 6,088 feet; Neufchatel, 1,552 feet; Obergestelen, 4,448 feet; Saanen, 3,356 feet; Samaden, 5,599 feet; Sarnen, 1,630 feet; Sion, 1,710 feet; Thusis, 2,359 feet; Vernères, 3,061 feet; Zermatt, 5,314 feet; Zurich, 1,506 feet.

Lakes.

Constance, 1,306 feet; Biel or Bienne, 1,484 feet; Geneva, 1,231 feet; Lowerz, 1,534 feet; Neufchatel, 1,487 feet; Brienz, 1,711 feet; Luzern, 1,434 feet; Zug, 1,368 feet; Zurich, 1,342 feet; Lugano, 889 feet; Maggiore, 646 feet; Como, 699 feet.

List of Passes in Switzerland and New Zealand.

New Zealand.—Hector's Pass, 1,300 feet; Haast's Pass, 1,716 feet; Whitcombe's Pass, 4,212 feet; Browning's Pass, 4,325 feet; Arthur's Pass, 3,013 feet; Harper's Pass, 2,008 feet; Hurunui, 2,750 feet; Hope Saddle, 2,850 feet; Amuri, 3,170 feet; Ada (Cannibal) Gorge, 3,300 feet; Maling's Pass, 3,500 feet (?); Wairau-Clarence, 4,493 feet; Jollie's Pass, 2,826 feet; Hossack Saddle, 2,560 feet; Barefells, 4,363 feet; Ward's Pass, 3,792 feet; Saxton's Pass, 3,950 feet; Tarndale, 3,270 feet; Ward's (Wairoa) Pass, 2,400 feet (?); Riwaka-Takaka, 1,200 feet (?); Whangapeka, 3,000 feet (?); Inangahua, 1,127 feet; Maungatapu, 2,500 feet (?); Tophouse, Buller, 2,137 feet.

Switzerland.—Maloja, 5,941 feet; Lukmanier, 6,598 feet; Simplon, 6,593 feet; Bernina, 6,656 feet; St. Gotthard, 6,934 feet; Splugen, 6,943 feet; St. Bernardino, 7,016 feet; Grimsel, 7,134 feet; Julier, 7,401 feet; Albula, 7,586 feet; Gemmi, 7,650 feet; Furca, 7,990 feet; Nüfenen, 8,006 feet; Griess, 8,023 feet; Fluela, 8,329 feet; Great St. Bernard, 8,853 feet; Stelvio, 9,174 feet; Scaletta, 8,570 feet.

Average height of 19 known passes in the South Island, 3,150 feet; average of 18 important Swiss passes, 7,504 feet. The same average is maintained over 60 passes, including all those most in use.

List of New Zealand Mountains (omitting the Southern Alps).

(From lithographed maps published by the Public Works and Survey Departments.)

Mount Franklin, 10,000 feet; Mount Aspiring, 9,940 feet; Mount Odin (Tapuaenuku), 9,700 feet; Mount Earnslaw, 9,170 feet; Mount Kaitarau, 8,700 feet; Mounts Castor and Pollux, 8,633 feet; Mount Edwards, 8,459 feet; Mount Llawrenny, 8,500 feet; Mount Christina, 8,475 feet; Mount Alba, 8,268 feet; Mount Tyndall, 8,118 feet; Mount Una, 8,000 feet (?); Mount Fairy Queen, 8,000 feet (?); Mount Alta, 7,833 feet; Glacier Dome, 7,810 feet; Mount Ben Nevis (O), 7,650 feet; Hector Mountains (Remarkables), 7,638 feet; Mount Larkins, 7,431 feet; Temple Peak, 7,064 feet; Mount Albert, 7,038 feet. Vertical angle between Wairau and Rainbow Ranges—Rainbow Peak (N),* 6,975 feet; Castle Mount, 6,872 feet; Pembroke Peak, 6,700 feet. Wairau Gorge—Gorge Peak (NCR),* 6,647 feet; St. Bathans, 6,600 feet; Eyre Peak, 6,530 feet; Buckland Peaks (N), 6,500 feet. Wairau Valley—Woolshed Peak (BN),* 6,452 feet; Tarndale Peak,* 6,356 feet; Moffat Peak, 6,349 feet; Kurow Peak, 6,293 feet; Trig. Station, Wairau (C'N),* 6,258 feet; Hawkdun, 6,225 feet; Trig. Station, Wairau (FN),* 6,191 feet; Mount Eglinton, 6,085 feet; Trig. Station, Wairau (ARN),* 6,049 feet; Mount Lyell, 6,039 feet; Mount Peel (N), 6,000 feet; Boundary Peak (N), 5,926 feet; Roughridge, 5,878 feet; Trig. Station (CN), 5,846 feet; Mount Arthur (N), 5,800 feet; Snowdon (N), 5,800 feet; Franklin Mountains, 5,740 feet; Trig. Station E (N), 5,734 feet; Spire Peak, 5,567 feet; Mount Ligar, 5,559 feet; Mary Peaks, 5,500 feet; Mount Rochfort, 5,572 feet.

APPENDIX B.

Circuitous Routes of some English Lines.

Eight great groups of railways do the services of England and its connection with Scotland. The first in the field were the London and North-Western, the Midland, the Great Western, South-Western, and Brighton. At the first the London and North-Western alone carried the whole northern traffic from London on the London and Birmingham section, itself practically direct. Rugby junction on that line was the point of union of the line for Crewe (at which place two arms diverged to Liverpool and Manchester), and of the Midland line, serving Leicestershire, Derbyshire, Yorkshire, Durham, Northumberland, and East Scotland. The original Liverpool line was practically direct. The Manchester line has been since shortened by about six miles by the North Staffordshire line taking up the pottery-towns. The original York, Newcastle, and Edinburgh route was, five years later, superseded, so far as York and the North is concerned, by the Great Northern, with which the Midland subsequently entered into competition by a direct line from London to Leicester. As the crow flies, York is 174 miles distant from London; the first railway service by Rugby was 210 miles long. The Great Northern reduced this length to 192 miles long, and the improved Midland route is a trifle longer. Yorkshire, Durham, Northumberland, and Edinburgh submitted for the time to a circuit of 36 miles upon 174.

The Great Western line to Bristol followed the Thames Valley, making a detour of 16 miles from the bee-line of 103 miles, in order to connections with Oxford, Cheltenham, Gloucester, Worcester, the western counties of England, and South Wales. A subsequent loop-line by Newbury and Devizes shortens the distance to Bristol by about ten miles, but is little used except for local traffic. The Exeter extension of this company was even more circuitous. The bee-line in this case is about 156 miles; the original railway route by Bristol and Taunton is 193 miles long, a detour of 37 miles on 157. The directest route was many years later constructed by the South-Western Company by way of Basingstoke, Salisbury, and Yeovil, length 166 miles. Both routes are indifferently used, the convenience of the London terminus for different parts of the metropolis appearing to weigh more in the choice of a route by through passengers to Exeter, Plymouth, and Cornwall than the length of the journey.

For many years the London and Portsmouth traffic submitted to a surprising detour. The bee-line is about 64 miles. The original South-Western Company's route by Basingstoke, Bishopstoke, and Farnham was 93 miles, a detour of 29 miles on 64. The competition of the London and Brighton Company has led to a directer route by Guildford and Petersfield, length 72 miles.

Even the pleasure-route to the Continent of Europe was for a very long time circuitous. The bee-line from London to Dover is about 66 miles. The route for between fifteen and twenty years

* Those marked with a star are close to the central route.

adopted 20 miles of the Brighton line, making a right-angle bend at Reigate. The line was 88 miles long. By the Tunbridge line this distance is reduced to 75 miles.

The minor improvements of route in England have almost all followed the same course. The original lines were laid out with a view to securing connections and taking in important centres. As traffic increased, and not seldom faster than financial prudence would have dictated, the luxury of short cuts has been indulged.

APPENDIX C-1.

Climate as affecting Cost of Construction and Working.

The professional advocates of the coast line have not objected to the high level of the summit at Tarndale on the ground of climate; but the objection has been made by uninformed persons and needs rebutting. The evidence of residents is very clear, uniform, and favourable, and is supported by facts of a general character. It is nevertheless contended that snow enough falls to cause difficulty, or to entail outlay in providing against difficulty, in working a railway during the winter; and reference has been made to the Great Pacific Railway, United States of America, on which forty miles of snow-galleries are said to exist. Attached hereto is a diagram comparing the levels of the Pacific Railway with those on the proposed central route, which ought to dispose of the imagined difficulty on the central line on first inspection. The diagram shows that the Pacific line lies at a higher level than Tarndale (3,270 feet) for a distance of 1,205 miles, three-quarters of its total length. Of these 1,205 miles, 1,103 miles are above the 4,000, 635 above the 5,000, 450 above the 6,000, 128 above the 7,000, and 12 above the 8,000 feet line. It would be reasonable to suppose, and such no doubt is the fact, that the whole of the galleries are within the 1,205 miles higher than Tarndale; but in the absence of positive information let 3,000 feet be assumed as the lower limit of the snow-difficulty, and that the central route is subject to it above that level. We should then have 1,250 miles on the Pacific line and 14 miles of the central route New Zealand to compare, and the proportionate length of the galleries on the latter would be about 820 yards.

But there is no reason to suppose that there would be need of anything of the kind: snow there certainly is near the summit during winter, but the recorded depth of its accumulation is not great. There is no spot on the route where an avalanche has fallen or is possible. Drifts have occurred in the gullies to the depth of 5 or 6 feet, and perhaps more; but the winter diaries of two witnesses record nothing worse on the flats which the railway would occupy than snow-falls of 6 inches and 2 feet, lying for a few days together. The ordinary winter snow-line on the mountains visible from the Waimea varies from 3,500 to 4,000 feet. Gordon's Knob, forty miles from Nelson, and overlooking the Wairau Valley, is 5,459 feet high and rarely carries snow more than 1,500 feet below its summit, and that only for a few days together.

A line in regular work and provided against the contingency would not be encumbered by such falls as are known at Tarndale. Each train in passing would clear it away without appreciable retardation. Mr. Wragge, engineer of the Toronto–Bruce and Toronto–Mpissing lines in Canada, writes to Mr. Fairlie, the well-known locomotive manufacturer: "It may perhaps interest you to learn that your engines have shown themselves first-rate in snow, running through drifts of 4 or 5 feet in depth at a speed of twenty miles per hour." The engines referred to weigh 34 tons.

Several of the Alpine lines of Europe have summits higher than Tarndale, in higher latitudes and in far severer winter-climates than Tarndale. The Mont Cénis Railway, before the tunnel was made, crossed the pass latitude, 45° 10′ N., 6,882 feet high, on the Fell system. I believe this height to be correct, but am unable at this moment to verify it. The surrounding peaks are—Mont Cénis, 11,420 feet; Mont Tabor, 10,415 feet; Mont Cembin, 11,094 feet; Mont Genevre, 11,870 feet; Mont Viso, 12,612 feet; Mont La Meijie, 13,078 feet.

The entrances to the Gotthard tunnel are both higher than Tarndale (42° 10′ S.), namely, Göschenen, 46° 20′ N., 3,468 feet, and Airolo, 46° 12′ N., 3,687 feet. Glaciers descend on the northern side from peaks 10,000 to 12,000 feet high, within three miles of Göschenen.

The Brennerbahn, the highway between Austria and South Germany and Lombardy, crosses an open summit of 4,485 feet, in latitude 47° N. It has no snow-galleries, and is worked regularly during winter. Snow has to be occasionally removed by the snow-plough.

I cannot learn the height of the Apennine Pass on the railway from Venice and Bologna to Florence, Rome, &c., but it cannot be less than 2,500 feet, latitude 44° 5′ N. It is certainly subject to snow in ordinary seasons, and probably at times to considerable falls. It has no snow-sheds.

Trains have been interrupted by snow in the valley of the Rhone in the South of France, latitude about 44° N., at a level not 100 feet above the Mediterranean, and at a distance of fifty miles from that sea. But this interruption, in 1879, happened because the simple means for removing so rare and unexpected an obstacle were not at hand.

Mr. Foy, having considered the question with reference to lines reconnoitred by him in 1875 over the Wairau–Clarence summit, 4,500 feet, and Ward's Pass, Awatere–Acheron, 3,800 feet, declared in his report that the difficulty was imaginary.

APPENDIX C-2.

Practical Examples of High Summits.

The instances given in the last notes in illustration of the fallaciousness of the supposition that snow would be an obstacle to the working of the proposed central line may be viewed also as proving that elevations greater, and sometimes far greater, than that of Tarndale, and attained by longer and severer gradients, are not regarded in America and Europe as unpractical.

A glance at the diagram of the Pacific Railway shows that the ascent of the Sierra Nevada is much more abrupt, and the summit (7,200 feet) much higher than Tarndale. The ascent to the Sherman Pass (8,242 feet), in the Rocky Mountains, shows a close parallel on a large scale to the ascent from the Tophouse on the central line.

The Gotthardbahn passes Altorf, chief town of the Canton of Uri, at 1,499 feet, and rises 1,987 feet in 16½ miles (or about 1 in 44) to Göschenen, the northern entrance of the great tunnel. I

believe the line is developed in length to reduce the gradients. There is a further rise within the tunnel for the purposes of drainage. The summit can be little if any lower than 4,000 feet. On the southern side the line rises from the chief town of the Canton of Ticino, Bellinzona, near Lago Maggiore, 729 feet, to Airolo, 3,867 feet, a rise of 3,138 feet in thirty-six miles, an average gradient of 1 in 60. Some part of the ascent is through ground so rough and steep that, before reaching the great tunnel, two spiral tunnels are employed to develop the line in length, and thus moderate the gradients.

The Brennerbahn rises from Inspruck, capital of the Austrian Tyrol, 1,640 feet, to the Brenner Pass, 4,485 feet, in 29 miles, an average gradient of 1 in 54. The descent (4,185 feet) by the Adige Valley to Verona, on the edge of the Lombard plain (300 feet), is accomplished in 148 miles. The bulk of the descent is between the pass and Botzen or Bolsans (820 feet). 3,665 feet in 56 miles, average gradient 1 in 80.

I have no certain knowledge of the height of the entrances to the Mount Cénis tunnel, but, from the heights of the mountains, the necessary breadth of their bases, and the length of the tunnel (about seven miles), it is certain the entrances and summit cannot be much lower than those of the Gotthard tunnel (length about nine miles). Height of Gotthard Pass, 6,934 feet.

Two Italian lines cross the Apennines by open passes. I have travelled several times on the railway between Bologna and Florence. I believe the height of the pass to be about 2,500 feet. The gradients are severe on both sides, especially the southern descent to Pistoja. Bologna is on the level of the canal navigation of the plain of the Po, and the ascent, which is about twenty-five miles in length, begins not far from the city. One of the peaks at about eleven miles westward from the pass rises to 7,000 feet, and a pass on the direct road from Bologna to Florence, fifteen miles to the eastward of that crossed by the railway, is 3,200 feet high.

It is not here intended to argue that a high summit is an unimportant matter. In the notes next following it is attempted to point out when and how far it is an evil. What has been just stated goes only to show that high summits are not held to be prohibitory, and are freely accepted in mountainous countries, and permanently worked if tolerable gradients can be obtained.

On most of the railways above referred to the main traffic crosses the pass in each case. There is no merely descending tonnage of importance.

APPENDIX C-3.

Mechanical and Economic Objections to High Summits.

The real technical objection to a high summit on a railway is not climatic but mechanical and economic. It may increase the cost of haulage to a very serious extent, and under some circumstances may impair the safety of the traffic. It is now to be considered how far the high summit on the central line is open to either of these objections. For, in the first place, the high summit is not necessarily an evil. If it be attained within certain limits as to gradient by a practically-continuous rise, that is to say, without reverse gradients, and without employing ill-conditioned curves, and if the heavy traffic the line carries descends for the most part on one side or the other, and does not mount, it may even be an economical advantage, and does not affect the safe-working of the line.

The familiar case of colliery inclined planes, on which the loaded wagons descending from the pit's mouth draw up the empties by a rope passed over a pulley at the summit, is an extreme instance; but the advantage of a descending heavy traffic is not confined to such cases, where the descending and mounting trains are connected and partly balance each other. Suppose a case where the ascent requires exactly double the tractive force needed to draw a given load at a given pace on the level. Half the force is employed in overcoming friction, &c., the other half in overcoming gravitation. When a train has arrived at the summit there will be no engine-power needed to bring it down: gravitation will give it in descending a greater speed than the locomotive gave it in mounting—a greater speed because gravitation is a force supplied by a stationary engine—the earth—which has not to drag about its own weight, and is constant at all speeds on the same gradient, its effect being limited only by the increasing friction of the train as speed increases; whilst a locomotive's own weight absorbs more and more of its own force as speed and friction increase, and has less effective balance for the traction of the train as more is required. But it will do more than this. Whatever additional load the mounting train is capable of taking in at the summit or on the descent will be carried without fresh outlay of engine-power. This may be very important. In the case supposed above of a line whose gradients require in mounting a tractive force double that needed on the level, let it be assumed that the tonnage of raw produce descending is four times that of the manufactured goods ascending; let the engines be capable of taking up twenty wagons weighing five tons, and carrying eight tons each, but only one quarter loaded. The gross weight of the mounting train, including engine, would be: Engine 30 tons + wagons 100 tons + load 40 tons = 170 tons; and the tractive force required would, by the supposition, draw 340 tons over the same distance on a level. The descending train being fully loaded would weigh: Engine 30 tons + wagons 100 tons + load 160 tons = 290 tons; but the tractive force required in descending would be *nil*. To do the work on the level a tractive force exactly proportional to the gross tonnage is required, or 170 + 290, or making a correction of ten tons each way for the superior lightness of the engine needed: 160 + 280 = 440 tons. On the line with gradients 170 × 2 = 340 tons. Put in tabular form it stands thus:—

Line with Gradients.			Line on the Level.		
	Rising.	Descending.		Going.	Returning.
Engine	30 tons	30 tons	Engine	20 tons	20 tons
Wagons	100 „	100 „	Wagons	100 „	100 „
Load	40 „	160 „	Load	40 „	160 „
Power expended* ...	170 × 2	Nil	Power expended† ...	160 „	280 „

* Total power expended, 340.

† Total power expended, 440.

How far such advantage could be realized in practice depends on many considerations of detail, which it would be out of place to attempt to develope here. The gain or loss would vary in amount with every line and with every train. But it may be said generally that with lines laid out and constructed as ours in New Zealand, with good rolling-stock in fair order, and considerable preponderance of descending tonnage, continuous gradients of 1 in 100 to 1 in 150 would be preferable to a dead level. The favourable conditions would exist to a large extent on the whole length of the central route. The average rise on the northern side is about 1 in 145 without any reverse gradient. Allowing for levels at the stations, 1 in 140 would be about the mean gradient, and 1 in 70 or 1 in 90 as the line may be laid out, would be the maximum. Conditions as favourable exist on the other side, except the section between the Waiau-uwha and the Hossack Saddle, and there would be a reverse gradient from the latter spot to the Clarence. The rising gradient of 1 in 50 is too steep to be used without break, and the wear and tear on this would probably neutralize the general advantage between the Red Post and Tarndale. On the whole, however, considering the certain preponderance of the descending tonnage, large or small, it may safely be affirmed that the route would not be more costly to work than a level line, and somewhat cheaper than the coast line by Cheviot, on which the heavy tonnage must rise several sharp inclines. In this point of view the Greenhills route would be greatly inferior to both, having the defects of the Cheviot route in a much higher degree.

Assuming on the other hand that the tonnage would be equal in both directions, and that every gradient would be a practical loss, it is not true that a line with a high summit is necessarily worse mechanically than an undulating line. It is the accumulated amount of all the ascents that gives the measure of the loss. The sections of the central and Greenhills routes show an average rise going and returning of 2,850 and 2,386 feet respectively. But the central route being through leading valleys, its section shows very nearly the facts that construction would realize. That of the Greenhills route generalizes away a great number of small accidents involving many sharp reverse gradients. It tells nothing of the "fourteen distinct inclines in both directions of 1 in 25, three of 1 in 26, and ten varying from 1 in 30 to 1 in 50," nor of the "exceptional gradients which occur at the twenty-sixth mile," which Mr. Blair's report speaks. These would almost certainly make the total sum of the rises on that route greater than the one continuous rise on east side of the Tarndale summit. The Cheviot Hills route is much better, and no doubt its accumulated ascents are less, than that of the central route; but in this case the comparison of the highest summits in the two cases, 500 feet and 3,270 feet, vastly exaggerates the mechanical advantage of the Cheviot scheme on the supposition of an even tonnage in both directions to and from the centre of the lines.

The concentration of seven gradients has been properly insisted on by Mr. Blair (in the same report and referring to the Greenhills route) as convenient and economical. This exists most perfectly on the central route, when the "ruling gradient" of 1 in 50 need rule only on one section between the Waiau-uwha and Acheron, if it be thought advantageous so to arrange it. A bank-engine, or one of extra power, might be exchanged at the bottom and top of that section for one of smaller size. On the Cheviot route this ruling gradient is found at both ends of the line and in both directions. The more powerful engines must be used throughout, or changed four times instead of twice, as on the central route.

Judged by all these considerations combined, the mechanical conditions must be held to be superior on the central route in case the descending tonnage should be found to preponderate substantially, and little if at all inferior in any case to those of the coast route in its best form by way of Cheviot. The height to be ascended to Tarndale will not appreciably increase the cost of haulage as compared with that on the Cheviot route, and may cause an appreciable economy in the most probable case.

WELLINGTON, SATURDAY, 9TH DECEMBER.

The Commission met at 10 o'clock a.m. in the Parliament Buildings.

Captain ROBERT JOHNSON examined.

966. *The Chairman.*] The Commissioners are desirous of obtaining from you some information respecting the harbours on the northern portion of the Middle Island, and their connection with Wellington.

967. *Mr. Thomson.*] What is your opinion regarding the value of Picton Harbour as compared with Nelson Harbour?—There is no comparison between the two harbours. While the Picton Harbour is almost unlimited in size, and will take any number of ships of any size at any time of tide, the Nelson Harbour is exceedingly small, tidal, and is shallow on the bar.

968. What is the distance in nautical miles from Wellington to Nelson Jetty, and from Nelson Jetty to Picton Jetty?—From Wellington Jetty to Nelson Jetty direct *viâ* French Pass is 103 miles, and from the Wellington Jetty to Picton Jetty is 50 miles *viâ* Tory Channel. The shortest route from Wellington to Nelson is by the French Pass, which Pass of course can only be taken with the tide, and for a large ship it is scarcely safe except in daylight. When the light is erected to show the end of the reef, moderate-sized steamers can go through at night with safety—of course at proper state of the tide.

969. What size of vessel can at present go into Nelson Harbour daily with safety?—Steamers of, say, up to 250 feet long, and drawing 18 feet, can enter and leave Nelson Harbour at top or near top of high water all the year round, except during heavy sea, which happens, say, about ten days in the year.

970. What size of vessel can go into Picton Harbour at present, daily, with safety?—There is no limit to size, and, with ordinary care, there is perfect safety night or day at all times of tide.

971. Can vessels of the class which now go into Nelson Harbour always go through the French Pass?—Yes, always. A larger vessel can go through the French Pass than can work the Nelson Harbour daily.

972. With what size of vessels do you think it would be dangerous to go through the French Pass?—They must be vessels of very large size. There is no difficulty as to depth of water. There is sufficient water for any ship in the navy. A steamer of 1,000 or 1,500 gross tons can go through the

French Pass with safety. With a larger vessel it might be risky. Very much, however, depends on the master's skill and knowledge.

973. Are you acquainted with Cape Campbell?—Yes; I have frequently visited it. I sounded outside of the rocks with the view of testing the accuracy of the survey, but not inside except for the purpose of anchoring, and have often anchored inside.

974. Did you ever look at it with a view to its being a small packet harbour?—I never looked at it with that object, but I know it very well, and can give an opinion.

975. Will you give us an opinion?—I think there would be some difficulty and expense in making it, because the line of reef runs in a north-north-east direction, and any winds between the north-east and west send in a considerable sea, and the holding ground is not good. To make a harbour a breakwater would be required running from the reef in a west-north-west direction.

976. You have seen the breakwater at Oamaru?—Yes.

977. Would something like that suit?—Yes, no doubt.

978. Then you are of opinion that it is not impossible to have a packet harbour at Cape Campbell?—By no means.

979. I mean, of course, supposing a line of railway were taken down the East Coast with the view of giving greater facilities for passenger and postal service?—Yes; a vessel could run across quickly towards Wellington except in a heavy north-west wind, and towards Cape Campbell against a south-easter.

980. Then, in case of a north-west wind, could they not enter the harbour?—They could enter a harbour formed by running out a breakwater in a west-north-west direction.

981. In case of a strong north-west wind, could there be a landing to the east of Cape Campbell?—No; there are lots of detached rocks there, and I do not think it would be safe for vessels to go amongst them.

982. In case of strong northerly winds, could vessels not land their passengers and mails at the south-east side of Cape Campbell?—A landing could be effected, but the vessels would not be in a safe position, owing to the detached rocks. I would prefer a complete breakwater made on the north-west side, which would answer in all weather.

983. What is your opinion respecting Flaxbourne Harbour?—You can land there always in north-westerly weather, but with a south-easter a very heavy sea sets in, and no landing can be effected.

984. Would you prefer a harbour constructed at Cape Campbell to one at Flaxbourne for a packet and passenger service?—Yes, certainly.

985. Have you looked at the Kaikoura Harbour?—Yes.

986. What is your opinion regarding it?—The Kaikoura Harbour is exceedingly small—too small to allow any vessel of the description necessary to run the mails to enter there.

987. Have you examined it with reference to its improvement?—No, but I know it well. There are rocks on each side, pretty well defined, standing out of the water, and the distance between each side is too small to allow a vessel of any size to lie there with safety.

988. Comparing it with a proposed harbour at Cape Campbell, what would you think of it?—I would prefer Cape Campbell.

989. What is the present course of steamers going from Wellington to Picton?—From Wellington to Picton, after leaving Terawhiti, the vessels make for Tory Channel, and then up the Sounds.

990. In case of southerly gales is that a safe passage?—I think a vessel in the worst weather might enter Tory Channel, but with a south-east gale there is some risk in doing so, particularly at night.

991. What is the particular risk?—The tide always sets on to the north side, and, although there are leading lights for entering in the case of vessels running at night, in a heavy south-east gale there would be a difficulty in steering, and the heavy sea and tide would be liable to carry them on the north side of the entrance, so that they would find a difficulty in keeping the beacons in line. The north side would be the lee side.

992. In south-easterly gales are there any dangers between Wellington Heads and Terawhiti?—There are none but are sufficiently known and defined.

993. Would there be danger in case a vessel's machinery broke down?—There would be danger until the vessel came off Tom's Rock; then the wind would draw through the Straits, and would be fair one way or the other.

994. With the sails that steamers generally carry, you are of opinion that, having passed Tom's Rock, they would be safe?—Yes.

995. In all states of the tide?—Yes; the set of the tide would make no difference.

996. What is the particular part of the coast you consider dangerous?—When a vessel is immediately off Sinclair's Head, or, I may say, between Tom's Rock and Wellington Harbour, if the machinery were to give way off this part of the coast, with a southerly wind, she would be on a lee shore.

997. Has such ever happened to your knowledge?—No; I do not recollect an instance.

998. You know that on the trunk line from Auckland to Invercargill a large portion of the traffic would be necessarily passenger traffic, and you know the great horror passengers have of sea sickness. In strong southerly winds, is it not a very sickening passage from Wellington to Tory Channel?—Yes.

999. The passengers would try to avoid that if they could?—They would rather make a passage without it, no doubt.

1000. You know the distance from Dover to Calais?—Yes.

1001. And from Newhaven to Dieppe?—No.

1002. Are you aware that passengers prefer the shorter to the longer route?—I am not.

1003. If passengers could get a shorter passage, do you think they would take it in preference to the longer passage?—Yes; unless they could get a smooth passage by a longer route.

1004. Is there any shorter passage obtainable across the Strait than the present one?—There is a shorter one with less sea. I mean, instead of running to Wellington Harbour, I should make Porirua,

and then enter Queen Charlotte Sound by the main entrance. On that passage they would experience less sea and less tide rip, and it is eight miles shorter.

1005. You are aware that railway construction is now proposed by Porirua Harbour?—Yes.

1006. Provided there were railway facilities, and a pier for vessels, would that be an improvement on the present communication to Wellington?—I think it would be the most practicable, looking at it from a seaman's point of view.

1007. You say that there is smoother water to the north of Cook Strait than to the south?—Yes, much less rip on the route from Picton to Porirua than from Picton to Wellington.

1008. Provided you could get another harbour close to the town at Ohariu Bay, the distance of which from Wellington is about five or six miles, would it be convenient?—It would cost much more to get any shelter for ships there than at Porirua. I think a breakwater of, say, 400 yards, run off to convenient depth in Anchorage Bay would make a splendid packet harbour that could be used night or day at all times of tide.

1009. You think the difference of distance of railway would be nothing?—Yes.

1010. Then provided passenger traffic increased very much, is it likely that a packet service might be run across from Porirua Harbour to Queen Charlotte Sound?—Of the two I should prefer the Porirua line, looking to the future. In comparing the two, there is another objection to the Tory Channel; that is the difficulty of getting out when it is blowing a hard south-easter. It is not safe to attempt to go out of the Tory Channel when blowing a south-easter, while you can get out or in the main entrance in any weather.

1011. When population and traffic increase, you think we must look forward to having a packet service from Queen Charlotte Sound to Porirua Harbour, instead of from Pencarrow Heads to Tory Channel?—I am of opinion that the northern route, from Porirua through the main entrance into Queen Charlotte Sound, is the more preferable, as it could be carried on in all weather regardless of tide.

1012. With reference to rapid communication with the South Island, would you prefer the route by Porirua to the mouth of Queen Charlotte Sound, or from Wellington direct to Cape Campbell?—I think, with a train from the south, you could reach Wellington quicker by making the terminus at Cape Campbell, and taking the boat from there, but the passage is not so easy to make, and it would require a large-sized boat to make it practicable in all weathers. I look at Port Underwood as a very desirable place to consider. In the course from Wellington to Port Underwood, and *vice versâ*, with the prevailing south-easterly or north-westerly wind a vessel would have the wind abeam. You can always enter Port Underwood in any weather.

1013. Are you aware of the difficulties of railway communication and construction between Port Underwood and Blenheim?—No; I have merely looked at the subject from a nautical point of view.

1014. I presume there still remains the objection of successive rough seas between Port Underwood and Wellington?—Yes, but only during part of the passage, as, when vessels get about halfway across the Strait, the water becomes smoother towards the southern shore.

1015. Between Porirua and Queen Charlotte Sound would there be much difference as regards roughness of sea?—I think there would not be much difference during N.W. weather, but during a S.E. wind it would be much rougher between Wellington and Cape Campbell or Port Underwood than between Porirua and Queen Charlotte Sound.

Captain JOHN FAIRCHILD examined.

1016. *Mr. Thomson.*] You have heard the questions I asked Captain Johnson, and the answers he gave?—Yes.

1017. Will you give us your idea as to communication between Wellington and Picton?—I quite agree with Captain Johnson as to the advantages of Porirua, and as to its being the best communication between the two Islands that can ever be got. I have been of the same opinion for the last twenty years, and have been speaking about it. With regard to Cape Campbell, you would have to spend a great deal of money to make it a place at which vessels could land passengers at any time; and then there would be the difficulty of getting out of Wellington again in the south-east gales. Steamers running with passengers or mails from Wellington to Cape Campbell would require to be three times the size and power of steamers running from Porirua to Queen Charlotte Sound, as they would have south-east gales to fight against all the way across. In the Porirua and Picton route, you avoid the tide rip of the Strait; you have the beam wind both ways, and a vessel need never be detained.

1018. Could a vessel in northerly weather enter the Porirua Harbour?—The harbour is shallow, but there is a little bay where you can nearly always land. With a pier run out you could always land there.

1019. If a railway ran from Porirua to Wellington, would that be a favourite route for passengers?—It would be the best way between the two Islands. It is very nearly a straight line to Picton.

1020. If the present route were abandoned, you think the one from Porirua Harbour to Queen Charlotte Sound is far preferable to the one from Wellington to Cape Campbell?—Yes. It would be twenty times more costly to provide shipping accommodation at Cape Campbell than it would be at Porirua, and the route would not be so good.

1021. You consider the route from Porirua Harbour to Queen Charlotte Sound as safe a one as could possibly be obtained?—Yes, it is the safest route we can get. The only disadvantage is that Porirua Harbour is not a large one, but I think that can be got over easily enough. Vessels of any size can go to Titai Bay, where there is a good depth of water. You can enter the bay in all weathers. We land with our boats now in all weathers. A vessel of about eight feet draught of water would be able to run into the Porirua Harbour without any expenditure at all.

1022. Are the seas heavier in the south part of Cook Strait than in the north part?—The seas are the worst about Terawhiti. Going by Cape Campbell you partly clear the worst of them, but by the Tory Channel route you go through tide rips. The tide rips are very dangerous, and passengers are in great dread of them.

Mr. CHARLES M. CROMBIE, Deputy-Commissioner, Property-Tax Department, Wellington, examined.

1023. *The Chairman.*] The Commissioners desire to obtain from you some information as to the value and tenure of the land within a certain distance of each of the projected lines of railway—the East Coast line and the Central line. Are you in a position to give us that information?—Yes. The valuation now being made will be completed within from a fortnight to a month. From that valuation we could give the value of all Crown lands, and the value of all real property in each county and each road district. I think this assessment will be far more reliable than the valuation taken over two years ago.

1024. In the meantime you will be in a position to give us some general information from your own knowledge?—The only information I could now give would be that obtained from the old valuation rolls.

1025. *Mr. Fulton.*] Will you be able to supply a statement showing the ownership of land north of Amberley, taking both the East Coast and Central railway routes, the number of owners, the size of their holdings, and their present value?—The department will be able to give the value of all Crown lands, Native lands, and all sold lands in each county and riding of a county, and in each road district and ward of a road district. If a map is supplied showing each railway route, and the land on each side of it the value of which the Commission desire to know, the information can be furnished. I can also furnish information as to the nature of the tenure, whether Crown land or freehold.

APPENDICES.

APPENDIX No. 1.

[*See paragraph* 171, *evidence of Mr. Frederick Back, Christchurch.*]

APPROXIMATE STATEMENT showing Revenue and Expenditure on Christchurch–Waikari Line, from 1st April, 1882 (opening of extension to last-named station), to 11th November, 1882, being Eight Four-weekly Periods.

Revenue.	Expenditure.	Percentage of Receipts.
£24,871	£19,022	76·48.

A. C. FIFE,
Accountant, New Zealand Railways.

APPENDIX No. 2.

The INSPECTING ENGINEER, Middle Island, to the COMMISSIONERS.

To the Hon. Dr. Pollen, M.L.C., James Fulton, Esq., M.H.R., and J. T. Thomson, Esq., Royal Commissioners on Railway Routes in the Northern Portion of the Middle Island, New Zealand.

Public Works Department,
Head Office, Middle Island, Dunedin, 30th December, 1882.

GENTLEMEN,—

As promised when I had the honour of being examined before you in Christchurch, I send herewith two tables (Nos. 1 and 2) showing respectively, as regards the possible railways from Christchurch to Picton, or from Christchurch to Nelson, the length, estimated cost, and probable results ten years hence, for the whole of each line, and also for several subdivisions of each of the lines, along each of the proposed routes—viz., *viâ* coast line, *viâ* Tarndale, and *via* Maruia.

In addition to this information, I also undertook to write a report setting forth the bearing of these northern routes as regards a possible future connection by railway from Christchurch to the West Coast; and in order to illustrate this phase of the subject I have prepared a further Table (No. 3) showing the probable results which might be anticipated from the construction of branch lines to the westward, in connection with the several main lines above described, as follows:—(1.) A branch line from Rolleston to Brunnerton, in connection with a main line from Christchurch to Picton *viâ* the East Coast route. (2.) A branch line from Tophouse to Nelson, in connection with a main line from Christchurch to Picton *via* the Tarndale route. (3.) A branch line from Maruia to Reefton, in connection with a main line from Christchurch to Picton *viâ* the Maruia route. (4.) A branch line from Tophouse to Nelson, in connection with a main line from Christchurch to Picton *viâ* the Maruia route. (5.) Branch lines, collectively, from Maruia to Reefton, and from Tophouse to Nelson, in connection with a main line from Christchurch to Picton *viâ* the Maruia route. (6.) A branch line from Maruia to Brunnerton, in connection with a main line from Christchurch to Picton *viâ* the Maruia route.

In addition to the three tables above described, I have also compiled, and have now attached hereto, for ease of reference and comparison, a summary statement showing the principal results arrived at in the tables themselves, with some additional information as to the distances by the various routes in question between the principal centres of population which they would connect, or go towards connecting.

If these statements then be accepted as correct, there is little more which I can add upon the subject, as they show by figures, more clearly than I can do so in words, the relative merits of the different proposals. It may be desirable, however, while the subject is still necessarily fresh upon my mind, from having just finished compiling the tables, that I should draw the Commissioners' attention to what appear to me to be the most noteworthy of the results arrived at; but before doing this I would propose to describe as briefly as possible the basis upon which the various estimates of probable populations and revenues, &c., as given in the tables, were arrived at, as the value of such statements as these must necessarily depend altogether upon the soundness of the basis upon which they are compiled, as well as upon the care with which the various estimates and compilations are effected.

As to the basis of the various estimates then, the following were the principal items considered, no one being considered alone, but more or less weight being given to each according to the special conditions of the case:—

Probable Population in Boroughs Ten Years hence.—(1.) Probable increase by births. (2.) Probable increase due to assisted immigration. (3.) Probable increase due to the establishment of extended railway connection. (4.) Relative population of boroughs generally in respect to population of surrounding country districts, the relation for the whole colony being about as 1 to 2½. (5.) Increase under existing conditions between censuses of 1874 and 1881.

Probable Population in Country Districts Ten Years hence, or Seven Years after Construction of proposed Extension of Railways.—(1.) Increase by births. (2.) Increase due to assisted immigration. (3.) Increase between censuses of 1874 and 1881 in similar localities containing similar areas of agricultural lands, following on the establishment of railway communication.

Probable Revenue of Railways: Existing Portions of Lines.—(1.) Increase under existing conditions since 1877, and the extent to which same is due respectively to gradual growth and to other causes not so likely to be recurrent.

Probable Revenue of Railways in conjunction with proposed Extension.—(1.) Probable revenue of existing portions of lines ten years hence, if remaining under existing conditions, viz., without extensions. (2.) Probable effect of proposed extensions on this revenue. (3.) Revenue of similar existing railways, under what are estimated to be similar conditions of age and populations to be served, and commanding similar areas of agricultural lands.

Probable Working Expenses of Railways: Existing Portions of Lines.—(1.) Relation of increase of working expenses to increase of revenue since 1877. (2.) Relation of working expenses to revenue on other similar lines under conditions estimated to be more or less similar as regards the population to be served, and commanding similar areas of agricultural lands.

Probable Working Expenses of Railways in connection with proposed Extensions.—(1.) Probable working expenses of existing portions of lines ten years hence, if not extended further. (2.) Probable effect of proposed extensions on these working expenses. (3.) Relation of working expenses to revenue on existing railways having similar grades and similar character of traffic. (4.) Minimum to which it is found to be expedient or practicable to reduce the working expenses on lines of similar length and grades, where the traffic is insufficient to pay the cost of working.

Construction of Railways.—(1.) In most cases there were trial surveys which determined the distances, but in some few cases they had to be scaled from the survey maps. In these latter instances the maps used for scaling from were never of less scale than one mile to the inch. (2.) In some few cases there are detailed estimates, and where such exist they have of course been adopted. (3.) Where there were no such estimates the proposed lines have been estimated in short sections, by comparison with portions of existing lines passing through country of similar character.

Character of Lands traversed, Agricultural, Pastoral, Forest, or Barren.—Some of the information given under these headings has been obtained from actual records, but the majority of it in the outlying districts, concerning which no such records exist, is merely from estimation, based on a personal knowledge of the country, in connection with distances scaled from maps. As regards these items also, and similarly as regards the items of Crown lands and purchased lands, it should be mentioned that it has been generally assumed that the area of lands which would probably be affected by a railway would lie within a distance of ten miles on each side of the line. Where along any given ten miles of railway therefore the lands to the extent of ten miles on each side (or on one side when the other side was along the sea) were either agricultural or pastoral, or Crown or purchased, then the railway has generally been considered and stated as passing through lands of either of those characters accordingly for that ten miles; but where, for example, the width purchased throughout any given ten miles of railway only reached to the extent of one mile on each side (or on one side where the other side was along the sea), then a length of one mile only out of the ten miles would be stated as passing through purchased land, the remaining nine miles being held to be through Crown lands. To adhere to this rule rigidly has not always been practicable in consequence of the absence of accurate information, but it may nevertheless be regarded as the basis generally adopted and adhered to so far as was practicable.

Character of Lands traversed, Crown and Purchased.—Under these headings the information given is almost entirely taken from survey maps and records of the latest date procurable.

Coming now from abstract principles to particular cases, it may be desirable to state a few of the most readily intelligible of the facts from which the estimates of probable populations and railway revenues, &c., ten years hence were deduced, without however attempting to detail the processes employed in arriving at the deductions themselves, which cover about 150 pages of foolscap, and with which I do not propose to burden the Commissioners, as they have been already checked.

First, as regards probable populations. These of course, in other than mining districts, will mainly depend on the areas of agricultural lands traversed by railways, and the richness or otherwise of these lands. In boroughs the populations seem to average about 1 to every 2½ of the population in surrounding districts; and in agricultural country already opened up by railways for seven years or so, the populations generally vary between 1 to every 30 and 1 to every 60 acres of agricultural land lying within ten miles on each side of the railway-line, depending on the character of the lands and the proportion of women and children to adult males.

As regards the increase between the years 1875 and 1881 in the populations of some of the boroughs which will be affected by the railways now in contemplation, and also as regards the increase in the populations of some country districts following on the construction of railways, some further facts are stated below, together with some data as to the probable revenue and working expenses of existing lines.

Populations in Boroughs.

As instances of the increases in municipal populations, the following may be cited:—

	Populations. 1875.	1881.
Christchurch	12,000	...
Christchurch with Sydenham	...	23,673
Blenheim	1,050	2,107
Lyttelton	2,014	4,127
Timaru	1,000	3,917
Nelson	2,761	6,764

Populations in Country Districts.

In the case of the Ashburton County, through which the Hurunui-Bluff Railway passes for a distance of about thirty-eight miles, the land within ten miles of the railway on each side is more or less fit for agriculture, and the population, which was only 1,206 in 1875, increased to 8,691 in 1881, being at both periods centralized principally within ten miles of the railway route. The railway was opened for traffic at the end of 1874. In the six years following on the construction of the railway there appears therefore to have arisen an additional population in this case of, say, 7,500. The area of lands, more or less agricultural, in this case opened up was (38 miles × 20 miles) 760 square miles, equal to about 480,000 acres.

Again, in the case of the Geraldine County, through which the railway passes for a distance of about thirty-four miles, for about half of this distance there is land more or less agricultural to the extent of about ten miles on each side of the railway, while for the other half of the distance the line runs close to the sea-shore, having agricultural lands on the west side only. In this case, therefore, the area of more or less agricultural lands opened up within a distance of ten miles of the railway route would be, say, about 500 square miles, equal to 320,000 acres. The population in 1875 was 6,911, while in 1881 it became 12,729. The railway was opened for traffic at the end of 1875. Increase of population during six years following on construction of railway, say 5,700.

Again, in the case of the Waimate country. Length traversed by railway, thirty miles. Width of more or less agricultural land opened up by railway, say, on west side ten miles, and on east side from the railway to the sea, say, on the average, two miles. Total width twelve miles; area (30 miles × 12 miles) 360 square miles, equal to about 230,000 acres. Railway opened (average) early in 1877. Population in 1875 1,464, and in 1881 5,038. Increase in six years (during four years of which the railways existed) say 3,500.

Revenue of Railways.

First, on basis of population. It was found in several instances, by reference to railway statistics and population statistics, that the railway revenue in moderately thickly-populated agricultural districts, and where the railway had been opened for traffic for from seven to ten years, varied from £1 7s. to £2 3s. per head of the population existing within ten miles of the railway route, depending, as in the case of the populations themselves, on the quality of the land and the proportions of women and children to adult males.

Again, on the basis of the agricultural lands traversed. It was found in a few instances that an approximation to the actual revenue on existing railways was arrived at by assuming that one-fourth of the agricultural lands traversed was cropped each year, and that the consequent railway revenue, including return freight and passenger fares, was equivalent to one ton per acre cropped, carried throughout half the length of the railway at tariff rates for grain. Again, still on the basis of agricultural lands traversed, and where a railway had been opened for traffic for about seven years: in a few instances tried, where the agricultural lands were fairly good and reached to the extent of about ten miles on each side of the railway throughout its whole length, the revenue of the railway was found to average from about £1,000 to £1,300 per mile per annum; while on average lines, where the width and character of agricultural lands were variable, and the width sometimes less than ten miles on each side, the revenue varied from £500 to £800 per mile per annum.

Again, from the returns published by the Working Railways Department, it will be seen—first, that the revenue of railways passing through fairly good agricultural districts fairly well populated varies from about £800 to about £500 per mile per annum, while the revenue for railways passing through land of inferior quality, or lands very sparsely populated, as for instance the Picton to Blenheim and the New Plymouth to Waitara lines, varies from about £400 to £300 per mile per annum; second, that for lines yielding revenues of £500 per mile per annum and over, the working expenses may fairly be assumed at from 66 per cent. to 60 per cent. of the gross revenue, while for lines yielding less than £500 per mile of revenue the working expenses should be taken at fully two-thirds of the revenue; and, third, that the minimum which could safely be assumed for working expenses in any instance is £200 per mile per annum.

In further explanation of the results arrived at in the tables, it may be well to state as follows: As regards the items headed "Further Portions which are provided for by Loan Act of 1882," it should be explained that the £180,000 mentioned in the Public Works Statement as provided for "Main Trunk Line Extension Northward" has been assumed as being available for construction of railway along the southern end of whichever route may be recommended by Commissioners as the best one to adopt for a through line, except to such extent as the Government stands committed to works already undertaken. Thus it has been assumed that the whole of this £180,000, together with the liabilities upon and estimated cost of completion of the Weka Pass section, and the line from Waikari to the north side of the Hurunui (£80,000), which has been otherwise provided for, will be available for extension northwards along the Tarndale route in the event of that being the one adopted; while, on the other hand, the Government being, as I understand it, already committed to the completion of the present northern railway to a point on the road to Waiau Township, about ten miles north of the Hurunui, near the Red Post, only £140,000 out of the aforesaid £180,000 has been assumed as being available for construction of extension northwards from Waipara along the East

Coast route, in the event of the adoption of that route, the other £40,000 being required to complete the line from Hurunui to the point near the Red Post. Thus altogether I have assumed £180,000 plus £80,000, total £260,000, as being available under Loan Act for southern portion of Tarndale route, if that is adopted; while I have only assumed £180,000 less £40,000, viz., £140,000, as available under Loan Act for the East Coast route, in the event of the choice falling upon it. While the total estimated costs, therefore, of the lines from Christchurch to Picton *via* the East Coast route, and *via* Tarndale route, inclusive of the portions already constructed, and further portions provided for by Loan Act of 1882, are stated in tables as being practically the same, viz., £1,840,000 and £1,850,000 respectively, it has to be borne in mind that the total expenditure on construction of railways northwards from Waipara will be, not £10,000 less if the coast route is adopted than it would be if the Tarndale route is adopted, but on the contrary £180,000 more, consisting of the following items:—

1. Expenditure—Waipara to Waikari		£70,000
2. Liabilities on same	£5,000	
3. Completion same, and construction of line Waikari to Hurunui, with Hurunui Bridge	75,000	
		80,000
4. Construction Hurunui to near the Red Post		40,000
Total		190,000
Deduct amount which coast line is less		10,000
Balance as above		£180,000

As it would appear, however, from the results shown on Table No. 1, that the line from Waipara to Waikari and northwards even as far as the Lottery River (a point considerably beyond the Red Post) would more than pay interest on its cost, there would be nothing to regret in this investment of an extra £180,000.

Reverting then again to the items headed "Further Portions provided for by Loan Act of 1882," it should also be mentioned, as regards the several amounts quoted in the Public Works Statement, as provided for the extension of the northern lines southwards, that the £40,000 set down for "Nelson to Roundell—Extension from Belgrove" has been assumed as being available only for the Tarndale or Maruia routes, while the £90,000 set down for "Main Trunk Line through South Island—Extension southwards from Blenheim," has been assumed as being available for either the East Coast, Tarndale, or Maruia route, but only to the southward of Blenheim, and not between Blenheim and Nelson *viâ* Rai Valley; and in this connection it should also be stated that the fact of the sum set down in tables as provided for towards East Coast route being £95,000, while for the Tarndale and Maruia routes it is quoted as £90,000, is due to the existence of works to the extent of about £5,000 already completed along the East Coast route to the southward of Blenheim.

As regards the estimated cost of the various lines, it is believed that the amounts set down are in all cases liberal, and they provide for all equipment and rolling-stock estimated to be requisite up to a period seven years after the lines are opened for traffic, so as to correspond with the period at which the revenues are estimated for. Thus the cost of the lines at the date of their being first opened for traffic would probably be from one to two thousand per mile less that the sums set down in the tables; but by the time that considerable traffic had grown up and that accommodation was provided to meet it, in the shape of additions to stations and rolling-stock, &c., it is anticipated that the cost would reach the amounts set down.

In the case of the estimate for branch line from Rolleston to Brunnerton *via* Lake Lyndon and Arthur's Pass, it should be explained, in view of some previous estimates for the same line, that the previous ones being less that the sum now set down is due to the fact that they were based on exceptionally steep grades, while the one now given in the tables is based on grades of 1 in 50, to correspond with the other lines, thus of course involving considerable additional cost in grading, especially in the summit tunnel; and as regards the distance as now stated along this route, from Rolleston to Brunnerton, as compared with same as given in tables accompanying my report on the Ada Saddle route, it should further be explained that the route there contemplated was from the main line of the Malvern Hills Railway *via* the Waimakariri Gorge to the Cass, whereas the route now estimated for is from the Whitecliffs Branch *via* Lake Lyndon and Craigieburn to the same point, involving an additional length of twenty miles to travel, but being much cheaper to construct, and affording access to a larger area of agricultural lands not already accommodated by railways constructed or in progress.

As it does not come within the scope of the tables, it may also be well to mention here the fact that £100,000 is already provided by the Loan Act towards the railway from Brunnerton to Reefton, which would form portion of the branch line shewn from Maruia to Brunnerton.

The revenues have been calculated on the basis of the last tariff, which came into operation on the 11th December, 1882. There are only one or two points with regard to them which call for any special comment, namely, as to the through passenger traffic and the traffic in coal and timber, and in both instances these only affect the branch lines, and those portions of the main lines described under the headings "Through Connections."

As regards the through passenger traffic, I have found a great deal of difficulty in getting any trustworthy data to calculate from, as the Union Company, when applied to on behalf of the Commissioners, did not consider it expedient to afford me any information as to the existing passenger traffic between Lyttelton and the northern ports. From such data as I could get, however, I have estimated that the through passenger traffic by rail from Christchurch to whatever port is adopted as the northern terminus of the railway would possibly reach, say, seven years after the line is finished, a total of ten first- and ten second-class passengers each way daily.

As regards the coal trade, on the other hand, I have been supplied in every case with the most copious information as to the trade at present done, and the anticipated increase in the same, by the

various companies engaged in it, together with the present and probable sea freights to Lyttelton and Timaru under varying conditions, and from these data I have come to the conclusion that until the West Coast ports are very materially improved—a result not likely, at the present contemplated rate of expenditure upon them, to accrue for a great number of years—it would be practicable for a railway along either the Arthur's Pass or Maruia route to compete with the sea in delivering West Coast coal at Christchurch, and, in the case of the Arthur's Pass route, probably at Timaru also. At the present time the case stands as follows: Sea freight per ton from Greymouth to Lyttelton, average throughout the year, 16s.; railway, Brunnerton to Greymouth, 2s.; railway, Lyttelton to Christchurch, 3s.; wharfages and port dues, 2s.: total per ton by sea, £1 3s. As against this the tariff rate by rail *viâ* Arthur's Pass route would be only 15s., or by the Maruia route 17s. 1½d. These rates being based on the tariff which is common to all New Zealand, there seems no reason to presume that they would involve a loss on lines of similar ruling gradients to the existing ones; nor would there appear to be any reason why exceptional rates should be charged on this particular line, even if the tariff rate for coal adopted throughout the colony generally does involve a loss, as it is supposed the new grain rate may do. Even, however, if the railway charged £1 2s. 6d. per ton for the first few years, reducing to £1 per ton in the future, equivalent respectively to 50 per cent. and 33 per cent. over present tariff rates, by Arthur's Pass route, there is little doubt that it would get the traffic, for the following amongst other reasons: First, the coal would be much less damaged: it would be put from the mine into the railway trucks, and never handled again until it reached its destination, whereas at present it is subjected to two additional handlings, being dropped into the hold of the ship at Greymouth and shovelled out from thence at Lyttelton; and, secondly, the coal merchants at Christchurch would no doubt prefer a certain and continuous supply to the present uncertain and intermittent one, as it would probably in many instances save them one handling, by enabling them to send the coal direct from the railway trucks to the consumers, as is at present the practice in Greymouth itself, besides releasing a large amount of capital which under existing circumstances is necessarily locked up in storage yards and coal. Even if in Europe it is found that shipping can compete with railways in the carriage of coal, it does not necessarily follow that it should do so here, partly because the coal here is more friable, and partly on account of the very much higher rate of wages here, rendering two or three extra handlings of the coal a very serious item in damage and expenditure.

It may perhaps be held that these considerations are rather outside of the question of the best route for the northern railway; but, as the subject presents itself to me, it seems impracticable to thoroughly consider the propriety of diverting the north line, even ever so little, out of its most direct course, with the view of facilitating communication with the West Coast, without studying at the same time the nature and requirements of the West Coast products, and the best means of providing an outlet for them with advantage to the colony generally. Were a more limited view of the subject to be taken, and the northern portion of the Middle Island only to be considered, it might even appear from the facts stated above that the expenditure of £600,000 and £500,000 respectively, on the more or less tentative projects of the construction of ports at Greymouth and Westport, would be a mistake, as this expenditure will be yielding no direct revenue on its cost, whereas a railway costing £1,700,000 is estimated to yield 2½ per cent. of direct revenue. Considering the wants of the other portion of of the colony however this aspect of the subject would be untenable; but, even in view of the whole colony, it may be a question whether it would not be best for the present to carry the Greymouth coal by rail, constructing, at the present time, a high-class harbour at Westport only.

Actuated by these considerations, I have estimated that a line *viâ* Maruia would carry annually to Christchurch 60,000 tons of coal, while for a line *via* Arthur's Pass, on account of its shorter distance and consequently lower tariff rate, and also on account of its advantages towards a southern market at Timaru, &c., I have estimated for 80,000 tons annually, from Brunnerton to Rolleston.

In further explanation of the estimates of railway revenues, I should mention that in the case of all additions to existing lines, whether they be main lines or branches, with the one exception of the branch from Rolleston to Brunnerton, the revenues credited to such additions include the increase in revenue which the construction of these new portions in each case would probably create on the portions previously existing or provided for. The revenue credited to the additions and branches in each case therefore, with the one exception before mentioned, must not be assumed as being necessarily earned within the limits of said addition or branch, as part of it would be earned on the lines previously existing or provided for, but, though so earned partly by the additions and partly by the existing portions, the increase in each case is all nevertheless due to the construction of the addition. To have shown exactly, not alone what the increase and revenue would be in each case, but also exactly how much of it would be earned on the new portions and how much on the existing portion, would have made the tables too cumbrous; and in the case of the additions to main lines the method adopted cannot well lead to any misconception, as the results are never shown individually for the additions themselves, but only for the additions combined with the portions previously existing or provided for. In the case of the branches, however, for the purpose of facilitating the compilations and also for the purpose of enabling them to be compared relatively one with another, the results have been shown separately for each branch, and it is therefore necessary to state, that with the one exception as before mentioned, these results cannot be reckoned upon as likely to accrue on the branches themselves alone, independent of the main lines with which they would be connected. Thus for instance it must not be supposed that a railway from Maruia to Reefton, *per se*, would pay 1·00 per cent., or one from Tophouse to Nelson 2·01 per cent., independent of the main lines; but the relative merits of the two undertakings would nevertheless probably be about as 1 per cent. to 2 per cent., and when combined with the main lines with which they are connected the total results for the whole would probably be about as stated.

The case of the branch from Rolleston to Brunnerton having been made exceptional is due to the fact that I thought it inexpedient to introduce into the tables the cost of the existing main lines from Christchurch to Rolleston, and possibly for some distance south of Rolleston, with its already large existing traffic and elasticity of increase; and therefore, as the total cost from Brunnerton to Christchurch was not debited to the line, it would not have been proper to take credit for the total revenue between those places. In that case, therefore, the revenue credited to the branch is that which would

probably be earned upon itself alone between Brunnerton and Rolleston, although it would also convey some revenue-paying traffic to the existing main south line.

In the case of the estimate of probable revenue for line Christchurch to Waikari, it may seem strange at first sight that, while the percentage of profit is now only 3·58, it is estimated that ten years hence it will reach 6·36. This, however, is not an unreasonable estimate, bearing in mind that sixteen out of the forty-nine miles is entirely new line, upon which the traffic has not as yet had time to get developed, while at the same time the working expenses happen at the present time to be exceptionally high, viz., 70 per cent. of the total revenue. While the revenue, therefore, during the next ten years will probably largely increase, the working expenses, taking a fair average percentage on revenue, will not probably be much greater than at present. These remarks also apply equally to the estimates for Christchurch to Waipara, as given in tables, because, having no data for subdivisions of present traffic, I have set it down *pro rata* at per mile.

It may also be well to state distinctly that, in estimating the working expenses, I have included nothing for interest on capital invested. Thus, for example, if a railway is shown as being likely to yield, say, 3 per cent. at a period, say, seven years after the line is completed, it must be borne in mind that, if the money borrowed to make it with costs 5 per cent., the colony as a whole, and as distinct from the persons using the railway, would be paying (up to seven years after its commencement) from 5 per cent. to 2 per cent. on the accruing capital invested; while, after seven years, the cost to the colony, similarly considered, would probably be from 2 per cent. gradually downwards.

As regards the period adopted for the estimation of the probable traffic, &c., on the various lines, namely, ten years hence, or seven years after the completion of the lines to the various extents stated, it will of course be evident that the whole railway, along whichever route is chosen, will not be at all likely to be completed within three years from now. I have, nevertheless, however, assumed it so, for the reason that, in order to make a proper comparison of the relative merits of each addition, it was necessary to suppose all the additions to be coincident in point of time. Had I done otherwise—*i.e.*, had I allowed gradually increasing times for the successive additions—it would have been necessary, at each successive period, to make allowance for the probable increase in populations and consequent railway revenue along the portions of lines previously existing and provided for, and this would not only have made the tables too cumbrous, but would also (in the absence of still further complications) have introduced an actual error into them, as the successive additions would thus have appeared to be contributing traffic to the existing and provided-for portions which would be in reality partly due to the growth of years, and therefore not altogether due to the additions themselves.

A short description, in a narrative form, of a few of the results arrived at in the tables in the case of some one of the lines considered may perhaps not be out of place, as assisting, in conjunction with the summary tables (Nos. 1 to 6) hereto attached, in illustrating how the tables themselves have been compiled, and enabling them to be the better understood.

Taking then, for example, the line from Christchurch to Picton *viâ* the East Coast route: In this case the portion already opened for traffic at the north end is from Picton to Blenheim, length 19 miles, and cost £190,000. The interest on this expenditure paid by the undertaking as at present existing is 1·27 per cent., and the probable interest on same ten years hence, exclusive of any consideration of extensions, is 1·80 per cent. If to this existing investment there be added a further length of 12 miles, from Blenheim to the Awatere, probable cost £95,000, which is already provided for by Loan Act of 1882, the result would be a line from Picton to Awatere, length 31 miles and cost £285,000, and the probable interest on this undertaking as a whole, at a period of seven years after its entire competion, would be 2·46 per cent. From this it would appear that the proposed extension in that case will improve the condition of the existing undertaking. Adding to this then a further length—namely, from Awatere to Flaxbourne, distance 12 miles, and probable cost another £95,000—we have a railway from Picton to Flaxbourne, length 43 miles, and cost in all £380,000, which is estimated to yield 2·60 per cent. interest at a period, as before, about seven years after the whole is complete. This further addition in this case would therefore appear to promise a still further enhancement in the value of the existing undertaking. Beyond Flaxbourne no further extension to the southward is recommended at present as a merely local line, as it is not believed that any such would be justified by the probable results. Coming then to the south end, we find the portion already opened for traffic to be from Christchurch to Waipara, length 40 miles, and cost £300,000. This yields at present 3·60 per cent., and at a period of ten years hence, exclusive of any consideration of extensions, it is estimated that it will yield 6·40 per cent on the capital invested. If to this there be added a further length of 20 miles—namely, from Waipara to Greta, probable cost £140,000, which is already provided for—there would be a railway from Christchurch to Greta, length 60 miles, and probable cost £440,000, and this as a whole is estimated to yield interest at the rate of 6·00 per cent. While not therefore calculated to actually improve the conditions anticipated for existing line ten years hence, it would appear that the results as a whole would probably be more than sufficient to justify an extension so far. In this and the succeeding case, however, as also in the case of the extension from Awatere to Flaxbourne, it has to be borne in mind that the results calculated upon are on the assumption that the greater portion of the agricultural land along the line would be cultivated to nearly their full extent within a short period after the completion of the railway, and not kept locked up in the hands of five or six individuals; and, were it possible to make some arrangement towards insuring this being done before the extensions are undertaken, it would render the anticipated results much more certain than they can be regarded as being under existing conditions. Having got the line from Christchurch to Greta, and finding it would be likely to pay so far, we can now try the effect of a further addition, say from Greta to Parnassus, 20 miles, probable cost £120,000. Adding this, as before, to the previous portions, we have a railway from Christchurch to Parnassus, length 80 miles, and probable cost in all £560,000. This, by the figures given in the tables, is shown to be likely to pay 6·00 per cent. on its total cost, and the extension to Parnassus would therefore appear to be more than justifiable. Beyond that point, however, no further extension to the northward is recommended as a local line, as the railway at Parnassus would have got nearly to the end of the good agricultural land in that locality, and, besides that, its extension northwards from there would begin to get far more costly. For the total northern and southern portions therefore, as local lines, we have apparently justifiable at north

end, from Picton to Flaxbourne, 43 miles, costing £380,000, and estimated to yield interest, say seven years after completion, at the rate of 2·60 per cent.; and at the south end, from Christchurch to Parnassus, 80 miles, costing £940,000, and estimated to yield, under the same conditions, 6·00 per cent. Total for both ends, 123 miles, costing £940,000, and estimated to yield, seven years after completion, an average of 4·63 per cent. on the total cost. If to these undertakings, then, there be added the balance necessary to convert the two local lines into a main trunk north and south line—namely, the piece from Flaxbourne to Parnassus, 82 miles, estimated to cost £900,000—the total result will be: Length, Christchurch to Picton *viâ* coast line, 205 miles, costing £1,840,000, and estimated to yield interest at the rate of 3·03 per cent. on the total expenditure, at a period, say, seven years after line is opened for traffic throughout. This is in all cases presuming that seven years after completion of line would mean in or about ten years hence, because if it implied, say, twenty or thirty years hence, then all the results given would be considerably modified by the increase in populations and revenues along existing lines accruing in the longer interval.

Coming now to the subject of the most noteworthy of the results arrived at in the tables, and putting aside the possibility of Nelson being the terminal port, for the reason that Picton is so much a better one, it would seem, on the face of it, that, as regards the three alternative routes for a railway from Christchurch to Picton, the one by the coast line is far the best, its cost being at any rate not any greater than that of the Tarndale route, and being much less than that of the Maruia route, and its maximum elevation being at the least 2,300 feet less, and its distance to travel at the least thirty-eight miles less, than by either of the other routes, while at the same time it is estimated to pay 3·03 per cent. on its cost, as compared with 2·38 per cent. and 1·10 per cent. in the cases of the other routes. This is as regards the line as a whole; but, looking also to the items considered as local lines only, it appears that, while an addition to the existing Picton to Blenheim Railway, to the extent of twenty-four miles southwards from Blenheim, along the East Coast route, would tend to improve the existing state of things, which is far from being a satisfactory one, a similar extension along the Tarndale or Maruia routes, for even fifteen miles, would make the case still worse than it is at present, and beyond fifteen miles it would offer no prospect of paying any interest at all.

The ostensible purposes of the Tarndale and Maruia routes being therefore merely to afford connections with Nelson and the West Coast, it might be well now to see what advantages they present in this respect. Taking first the Tarndale route, in connection with a branch from Tophouse to Nelson, it would appear that the cost would be £2,313,000, and the probable net returns for same 2·02 per cent.; while, for the connection of Nelson with the southern railway system by a direct line from Nelson to Blenheim, in connection with the main line from Blenheim to Christchurch *via* coast, the total cost would be practically the same, namely, £2,310,000, and the net returns also practically the same, viz., 2·09 per cent. While adding therefore thirty-eight miles to the distance from Christchurch to the northern terminal port, which is assumed to be Picton, the adoption of the Tarndale route would afford no facilities for the connection of Nelson with Picton and Blenheim and Christchurch over those which would be afforded by the coast line, and a mere glance at the table of distances on sheet 7 of the summary statement attached hereto will show that as regards a connection with the West Coast the Tarndale route offers no advantages whatever, the distance to travel by it from Christchurch to Greymouth being 309 miles, while by the Maruia route it would be only 220 miles, and by Arthur's Pass branch only 169 miles. Taking then the Maruia route for the main line, in connection with a branch from Maruia to Brunnerton, it would appear that the total cost of the main line and branch in this case would be £3,310,000, yielding interest at the rate of 1·52 per cent.; while, for main line from Christchurch to Picton *via* East Coast, together with a branch from Rolleston to Brunnerton *via* Arthur's Pass, the cost would be, relatively speaking, only a little more, namely, £3,540,000, the interest to be anticipated in that case being 2·78 per cent. On the basis of financial results alone, therefore, the coast line, with Arthur's Pass branch, would appear to be far the best; and when it is further taken into account that the distances from Christchurch to Picton, and from Christchurch to Greymouth, by the Maruia route, with its branch to Brunnerton, would be respectively 296 miles and 220 miles, as against 205 miles and 169 miles by the coast line with branch *via* Arthur's Pass, there seems to be no doubt at all that the latter alternative is much the better of the two.

I have, &c.

C. Y. O'Connor,

Inspecting Engineer, Middle Island.

P.S.—Attached hereto I also send, as requested by Mr. Thomson, some extracts from the railway tariff tables, showing the freights chargeable for coal, timber, wool, and grain, for various distances.

Freight on Coal—Tariff Rate per Ton.—1 to 2 miles, 2s.; 3 to 4 miles, 2s. 6d.; 5 to 12 miles, 3s. From 12 to 50 miles add 2d. per mile; from 50 to 75 miles add 1d. per mile; and thenceforward add ½d. per mile. Thus for 200 miles the rate would be 3s. + 6s. 4d. + 2s. 1d. + 5s. 2½d.: total, 16s. 7½d. Similarly for 300 miles the rate would be £1 0s. 9½d.

Freight on Timber—Tariff Rate per 100 *Feet.*—1 to 13 miles, 8d.; from 13 to 16 miles add 1d. per mile; from 16 to 28 miles add ½d. per mile; from 28 to 31 miles add ½d. per mile; from 31 to 33 miles add ½d. per mile; from 33 to 73 miles add 3d. for every 8 miles; for the 6 miles from 73 to 79 miles add 1d.; from 79 miles to 223 miles add 1d. for every 8 miles or fraction of 8 miles; for the 3 miles from 223 miles to 226 miles add 1d.; thenceforward add ¼d. per mile. Thus for 200 miles the rate would be 8d. + 3d. + 6d. + 1d. + 1d. + 15d. + 1d. + 16d. = 4s. 3d. Similarly for 300 miles the rate would be 6s. 0½d.

Freight on Wool—Tariff Rate per Bale.—1 to 12 miles, 1s.; from 12 to 51 miles add 1d. per mile; from 51 miles to 89 miles add 3d. for every 4 miles; from 89 to 150 miles add 1d. for every 4 miles or fraction of 4 miles; for the 2 miles from 150 to 152 miles add 1d.; thenceforward add ½d. per mile. Thus for 200 miles the rate would be 1s. + 3s. 3d. + 2s. 4d. + 1s. 4d. + 1d. + 1s. = 9s. Similarly for 300 miles the rate would be 11s. 1d.

*Freight on Grain—Tariff Rate per Ton.*1 mile, 2s.; from 1 mile to 10 miles add 2d. per mile; thenceforward add 1d. per mile. Thus for 200 miles the rate would be 2s. + 1s. 6d. + 11s. 10d. = 19s. 4d. Similarly for 300 miles the rate would be £1 7s. 8d.

TABLE No. 1.

PROPOSED RAILWAY FROM CHRISTCHURCH TO PICTON.

Route.	Portions already opened for Traffic.																					
	Length.	Extent.	Cost.	Present Results, and also Estimated Results at Period about Ten Years Hence.												Lands traversed.				Lands traversed.	
				Annual Revenue.		Annual Working Expenses.		Annual Profit.		Annual Percentage on Cost (Profit).		Population.									
												Present.		Probable.							
				Present.	Probable.	Present.	Probable.	Present.	Probable.	Present.	Probable.	Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
	Mls.		£	£	£	£	£	£	£			No.	No.	No.	No.	Mls.	Mls.	Mls.	Mls.	Mls.	Mls.
Viâ East Coast—																					
North end ...	19	Picton to Blenheim ...	190,000	7,685	10,260	5,268	6,840	2,417	3,420	1·27	1·80	3,000	3,000*	9,000	6,000*	6	2	11	...	2	17
South end ...	40	Christchurch to Waipara	300,000	36,000	48,000	25,200	28,800	10,800	19,200	3·60	6·40	23,000	30,000†	35,000	60,000†	40	...	...	...	...	40
Viâ Tarndale—																					
North end ...	19	Picton to Blenheim ...	190,000	7,685	10,260	5,268	6,840	2,417	3,420	1·27	1·80	3,000	3,000*	9,000	6,000*	6	2	11	...	2	17
South end ...	49	Christchurch to Waikari	370,000	44,100	58,800	30,870	35,280	13,230	23,520	3·58	6·36	23,100	30,000†	36,000	60,000†	49	...	...	...	...	49
Viâ Maruia—																					
North end ...	19	Picton to Blenheim ...	190,000	7,685	10,260	5,268	6,840	2,417	3,420	1·27	1·80	3,000	3,000*	9,000	6,000*	6	2	11	...	2	17
South end ...	49	Christchurch to Waikari	370,000	44,100	58,800	30,870	35,280	13,230	23,520	3·58	6·36	23,100	30,000†	36,000	60,000†	49	...	...	...	...	49

* These represent populations of Picton and Blenheim combined. † These represent Christchurch and its suburbs, including Sydenham.

Route.	Further Portions which are provided for by Loan Act of 1882.									
	Length.	Extent.	Estimated Cost.	Population along the Line as at present, and also as it is estimated it will be at Period say Seven Years after these Portions of Line are opened for Traffic.		Lands traversed.				Lands traversed.	
				Present.	Probable.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
	Miles.		£	No.	No.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Viâ East Coast—											
North end ...	12	Blenheim to Awatere ...	95,000	800	2,000	8	4	...	...	...	12
South end ...	20	Waipara to Greta	140,000	50	2,000*	15	5	...	...	...	20
Viâ Tarndale—											
North end ...	15	Blenheim to Marchburn River...	90,000	700	2,000	12	3	...	...	...	15
South end ...	40	Waikari to Lottery River ...	260,000	300	4,000*	30	10	...	...	...	40
Viâ Maruia—											
North end ...	15	Blenheim to Marchburn River...	90,000	700	2,000	12	3	...	...	...	15
South end ...	40	Waikari to Hanmer Plains ...	260,000	300	4,000*	30	10	...	...	...	40

* These estimates are based on the supposition that the agricultural land along the line will be subdivided into allotments of reasonable size, and sold or let by present proprietors to working agriculturists at reasonable rates.

Route.	"Portions already opened for Traffic," and "Further Portions which are provided for by Loan Act of 1882," combined.															
	Length.	Extent.	Estimated Cost.	Estimated Results at Period about Ten Years Hence, presuming that Railway is opened for Traffic to this extent within say three years.						Lands traversed.				Lands traversed.	
				Annual Revenue.	Annual Working Expenses.	Annual Profit.	Annual Percentage on Cost (Profit).	Population.				Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
								Present.		Probable.							
								Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.						
	Miles.		£	£	£	£		No.	No.	No.	No.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Viâ East Coast—																	
North end ...	31	Picton to Awatere	285,000	19,260	12,240	7,020	2·46	3,800	3,000*	11,000	6,000*	14	6	11	...	2	29
South end ...	60	Christchurch to Greta	440,000	66,000	39,600	26,400	6·00	23,050	30,000†	37,000	60,000†	55	5	...	...	...	60
Viâ Tarndale—																	
North end ...	34	Picton to Marchburn River ...	280,000	14,760	9,840	4,920	1·76	3,700	3,000*	11,000	6,000*	18	5	11	...	2	32
South end ...	89	Christchurch to Lottery River ...	630,000	85,800	51,480	34,320	5·45	23,400	30,000†	40,000	60,000†	79	10	...	...	...	89
Viâ Maruia—																	
North end ...	34	Picton to Marchburn River ...	280,000	14,760	9,840	4,920	1·76	3,700	3,000*	11,000	6,000*	18	5	11	...	2	32
South end ...	89	Christchurch to Hanmer Plains	630,000	85,800	51,480	34,320	5·45	23,400	30,000†	40,000	60,000†	79	10	...	...	...	89

* These represent populations of Picton and Blenheim combined. † These represent Christchurch and its suburbs, including Sydenham.

Route.	Still further Portions which may possibly be provided for hereafter, independent of any question of a through connection.											
	Length.	Extent.	Estimated Cost.	Population along the Line as at present, and also as it is estimated it will be at Period say Seven Years after these Portions of Line are opened for Traffic.		Lands traversed.				Lands traversed.	
				Present.	Probable.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
	Miles.		£	No.	No.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Viâ East Coast—											
North side ...	12	Awatere to Flaxbourne ...	95,000	400	1,000*	12	...	...	...	...	12
South side ...	20	Greta to Parnassus ...	120,000	50	2,000*	15	5	...	...	...	20
Viâ Tarndale											
North side ...	...	...	...	...	...	...	...	...	...	...	...
South side ...	...	...	...	...	...	...	...	...	...	...	...
Viâ Maruia—											
North side ...	...	...	...	...	...	...	...	...	...	...	...
South side ...	...	...	...	...	...	...	...	...	...	...	...

* These estimates are based on the supposition that the agricultural land along the line will be subdivided into allotments of reasonable size, and sold or let by present proprietors to working agriculturists at reasonable rates.

Route.	"Portions already opened for Traffic," "Further Portions which are provided for by Loan Act of 1882," and "Still further Portions which may possibly be provided for hereafter, independent of any question of a through connection," combined.																	
	Length.	Extent.	Estimated Cost.	Estimated Results at Period about Ten Years Hence, presuming that Railway is opened for Traffic to this extent within say three years.								Lands traversed.				Lands traversed.	
				Annual Revenue.	Annual Working Expenses.	Annual Profit.	Annual Percentage on Cost (Profit).	Population.				Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
								Present.		Probable.							
								Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.						
	Miles.		£	£	£	£		No.	No.	No.	No.	Miles.	Miles	Miles.	Miles.	Miles.	Miles.
Viâ East Coast—																	
North end ...	43	Picton to Flaxbourne	380,000	26,460	16,560	9,900	2·60	4,200	3,000*	12,000	6,000*	26	6	11	...	2	41
South end ...	80	Christchurch to Parnassus ...	560,000	84,000	50,400	33,600	6·00	23,100	30,000†	39,000	60,000†	70	10	...	...	...	80
Viâ Tarndale—																	
North end. ...	34	Picton to Marchburn River ...	280,000	14,760	9,840	4,920	1·76	3,700	3,000*	11,000	6,000*	18	5	11	...	2	32
South end ...	89	Christchurch to Lottery River ...	630,000	85,800	51,480	34,320	5·45	23,400	30,000†	40,000	60,000†	79	10	...	...	...	89
Viâ Maruia—																	
North end ...	34	Picton to Marchburn River ...	280,000	14,760	9,840	4,920	1·76	3,700	3,000*	11,000	6,000*	18	5	11	...	2	32
South end ...	89	Christchurch to Hanmer Plains	630,000	85,800	51,480	34,320	5·45	23,400	30,000†	40,000	60,000†	79	10	...	...	...	89

* These represent populations of Picton and Blenheim combined. † These represent Christchurch and its suburbs, including Sydenham.

Route.	Through Connection.									
	Length.	Extent.	Estimated Cost.	Population along the Line as at present, and also as it is estimated it will be at Period say Seven Years after these Portions of Line are opened for Traffic.		Lands traversed.				Lands traversed.	
				Present.	Probable.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
	Miles.		£	No.	No.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Viâ East Coast ...	82	Flaxbourne to Parnassus, viâ Coast	900,000	1,300	5,000*	20	36	...	26	29	53
Viâ Tarndale ...	120	Marchburn River to Lottery River, viâ Tophouse and Tarndale	940,000	200	600	10	72	14	24	99	21
Viâ Maruia ...	173	Marchburn River to Hanmer Plains, viâ Tophouse, Hampden, Maruia, and Cannibal Gorge	1,700,000	1,000	3,000	...	99	52	22	141	32

* This estimate is based on the supposition that the agricultural land along the line will be subdivided into allotments of reasonable size, and sold or let by present proprietors to working agriculturists at reasonable rates.

Route.	Whole Line, Christchurch to Picton.																							
	Length.	Extent.	Estimated Cost.	Estimated Results at Period about Ten Years Hence, presuming that Railway is opened for Traffic to this extent within say three years.								Lands traversed.				Lands traversed.		Highest Level reached above Sea-level.	Gradients.	
				Annual Revenue.	Annual Working Expenses.	Annual Profit.	Annual Percentage on Cost (Profit).	Population.				Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.		Steepest.	Ruling.
								Present.		Probable.										
								Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.									
	Mls		£	£	£	£		No.	No.	No.	No.	Mls	Mls	Mls	Mls	Mls	Mls	Feet.		
Viâ East Coast	205	Picton to Christchurch, viâ Coast	1,840,000	147,360	91,560	55,800	3·03	28,000	33,000*	56,000	66,000*	116	52	11	26	31	174	500	1 in 50	1 in 50
Viâ Tarndale ...	243	Picton to Christchurch, viâ Tophouse and Tarndale	1,850,000	129,360	85,320	44,040	2·38	27,300	33,000*	51,600	66,000*	107	87	25	24	101	142	3,000	1 in 50	1 in 50
Viâ Maruia ...	296	Picton to Christchurch, viâ Tophouse, Hampden, Maruia, and Cannibal Gorge	2,610,000	124,780	95,920	28,860	1·10	28,100	33,000*	54,000	66,000*	97	114	63	22	143	153	2,870	1 in 50	1 in 50

* These represent populations of Picton and Blenheim, combined with those of Christchurch and its suburbs, including Sydenham.

30th December, 1882.

C. Y. O'Connor,
Inspecting Engineer, Middle Island.

TABLE No. 2.

PROPOSED RAILWAY FROM CHRISTCHURCH TO NELSON.

Portions already opened for Traffic.

Route.	Length.	Extent.	Cost.	Present Results, and also Estimated Results at Period about Ten Years Hence.								Lands traversed.					
				Annual Revenue.		Annual Working Expenses.		Annual Profit.		Annual Percentage on Cost (Profit).		Population.					
												Present.		Probable.			
				Present.	Probable.	Present.	Probable.	Present.	Probable.	Present.	Probable.	Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.	Agricultural	Pastoral.
	Mls		£	£	£	£	£	£	£			No.	No.	No.	No.	Mls	Mls
Viâ East Coast—																	
North end ...	...	...	...	...	...	...	...	...	...	...	...	...	7,000*	...	12,000*	...	...
South end ...	40	Christchurch to Waipara	300,000	36,000	48,000	25,200	28,800	10,800	19,200	3·60	6·40	23,000	30,000†	35,000	60,000†	40	...
Viâ Tarndale—																	
North end ...	23	Nelson to Belgrove ...	153,000	8,519	13,110	6,236	8,740	2,283	4,370	1·49	2·86	6,000	7,000*	10,000	12,000*	23	...
South end ...	49	Christchurch to Waikari	370,000	44,100	58,800	30,870	35,280	13,230	23,520	3·58	6·36	23,100	30,000†	36,000	60,000†	49	...
Viâ Maruia—																	
North end ...	23	Nelson to Belgrove ...	153,000	8,519	13,110	6,236	8,740	2,283	4,370	1·49	2·86	6,000	7,000*	10,000	12,000*	23	...
South end ...	49	Christchurch to Waikari	370,000	44,100	58,800	30,870	35,280	13,230	23,520	3·58	6·36	23,100	30,000†	36,000	60,000†	49	...

Route.	Lands traversed.				Lands traversed.	
	Forest.	Barren.	Crown.	Purchased.		
	Mls	Mls	Mls	Mls		
Viâ East Coast—						
North end ...	...	...	...	...		
South end ...	...	...	...	40		
Viâ Tarndale—						
North end ...	...	...	...	23		
South end ...	...	...	...	49		
Viâ Maruia—						
North end ...	...	...	...	23		
South end ...	...	...	...	49		

* These represent Nelson. † These represent Christchurch and its suburbs, including Sydenham.

Further Portions which are provided for by Loan Act of 1882.

Route.	Length.	Extent.	Estimated Cost.	Population along the Line as at present, and also as it is estimated it will be at Period say Seven Years after these Portions of Line are opened for Traffic.		Lands traversed.				Lands traversed.	
				Present.	Probable.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
	Miles.		£	No.	No.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Viâ East Coast—											
North end ...	12	Blenheim to Awatere ...	95,000	800	2,000*	8	4	...	...	...	12
South end ...	20	Waipara to Greta	140,000	50	2,000*	15	5	...	...	...	20
Viâ Tarndale—											
North end ...	6	Belgrove to Motueka Valley ...	40,000	100	1,000	3	3	...	...	...	6
South end ...	40	Waikari to Lottery River ...	260,000	300	4,000	30	10	...	...	...	40
Viâ Maruia—											
North end ...	6	Belgrove to Motueka Valley ...	40,000	100	1,000	3	3	...	...	...	6
South end ...	40	Waikari to Hanmer Plains ...	260,000	300	4,000	30	10	...	...	...	40

* These estimates are based on the supposition that the agricultural land along the line will be subdivided into allotments of reasonable size, and sold or let by present proprietors to working agriculturists at reasonable rates.

"Portions already opened for Traffic," and "Further Portions which are provided for by Loan Act of 1882," combined.

Route.	Length.	Extent.	Estimated Cost.	Estimated Results at Period about Ten Years Hence, presuming that Railway is opened for Traffic to this extent within say three years.								Lands traversed.				Lands traversed.	
				Annual Revenue.	Annual Working Expenses.	Annual Profit.	Annual Percentage on Cost (Profit).	Population.									
								Present.		Probable.							
								Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
	Miles.		£	£	£	£		No.	No.	No.	No.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Viâ East Coast—																	
North end ...	12	Blenheim to Awatere	95,000	9,000	5,400	3,600	3·79	800	7,000*	2,000	12,000*	8	4	...	...	...	12
South end ...	60	Christchurch to Greta	440,000	66,000	39,600	26,400	6·00	23,050	30,000†	37,000	60,000†	55	5	...	...	...	60
Viâ Tarndale—																	
North end ...	29	Nelson to Motueka Valley ...	193,000	14,910	9,940	4,970	2·57	6,100	7,000*	11,000	12,000*	26	3	...	...	...	29
South end ...	89	Christchurch to Lottery River ...	630,000	85,800	51,480	34,320	5·45	23,400	30,000†	40,000	60,000†	79	10	...	...	...	89
Viâ Maruia—																	
North end ...	29	Nelson to Motueka Valley ...	193,000	14,910	9,940	4,970	2·57	6,100	7,000*	11,000	12,000*	26	3	...	...	...	29
South end ...	89	Christchurch to Hanmer Plains	630,000	85,800	51,480	34,320	5·45	23,400	30,000†	40,000	60,000†	79	10	...	...	...	89

* These represent Nelson. † These represent Christchurch and its suburbs, including Sydenham.

Route.	Still further Portions which may possibly be provided for hereafter, independent of any question of a through connection.										
	Length.	Extent.	Estimated Cost.	Population along the Line as at present, and also as it is estimated it will be at Period say Seven Years after these Portions of Line are opened for Traffic.		Lands traversed.				Lands traversed.	
				Present.	Probable.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
	Miles.		£	No.	No.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Viâ East Coast—											
North end ...	12	Awatere to Flaxbourne ...	95,000	400	1,000*	12	...	...	...	...	12
South end ...	20	Greta to Parnassus	120,000	50	2,000*	15	5	...	...	...	20
Viâ Tarndale—											
North end ...	...	...	...	...	...	...	...	...	...	...	...
South end ...	...	...	...	...	...	...	...	...	...	...	...
Viâ Maruia—											
North end ...	...	...	...	...	...	...	...	...	...	...	...
South end ...	...	...	...	...	...	...	...	...	...	...	...

* These estimates are based on the supposition that the agricultural land along the line will be subdivided into allotments of reasonable size, and sold or let by present proprietors to working agriculturists at reasonable rates.

Route.	"Portions already opened for Traffic," "Further Portions which are provided for by Loan Act of 1882," and "Still further Portions which may possibly be provided for hereafter, independent of any question of a through connection," combined.																	
	Length.	Extent.	Estimated Cost.	Estimated Results at Period about Ten Years Hence, presuming that Railway is opened for Traffic to this extent within say three years.				Population.				Lands traversed.				Lands traversed.	
				Annual Revenue.	Annual Working Expenses.	Annual Profit.	Annual Percentage on Cost (Profit).	Present.		Probable.		Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
								Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.						
	Miles.		£	£	£	£		No.	No.	No.	No.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Viâ East Coast—																	
North end ...	24	Blenheim to Flaxbourne ...	190,000	16,200	9,720	6,480	3·41	1,200	7,000*	3,000	12,000*	20	4	...	...	...	24
South end ...	80	Christchurch to Parnassus ...	560,000	84,000	50,400	33,600	6·00	23,100	30,000†	39,000	60,000†	70	10	...	...	...	80
Viâ Tarndale—																	
North end ...	29	Nelson to Motueka Valley ...	193,000	14,910	9,940	4,970	2·57	6,100	7,000*	11,000	12,000*	26	3	...	...	...	29
South end ...	89	Christchurch to Lottery River ...	630,000	85,800	51,480	34,320	5·45	23,400	30,000†	40,000	60,000†	79	10	...	...	...	89
Viâ Maruia—																	
North end ...	29	Nelson to Motueka Valley ...	193,000	14,910	9,940	4,970	2·57	6,100	7,000*	11,000	12,000*	26	3	...	...	...	29
South end ...	89	Christchurch to Hanmer Plains	630,000	85,800	51,480	34,320	5·45	23,400	30,000†	40,000	60,000†	79	10	...	...	...	89

* These represent Nelson. † These represent Christchurch and its suburbs, including Sydenham.

Route.	Through Connection.									
	Length.	Extent.	Estimated Cost.	Population along the Line as at present, and also as it is estimated it will be at Period say Seven Years after these Portions of Line are opened for Traffic.		Lands traversed.				Lands traversed.	
				Present.	Probable.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.
	Miles.		£	No.	No.	Miles.	Miles.	Miles.	Miles.	Miles.	Miles.
Viâ East Coast—											
North end ...	80	Nelson to Blenheim ...	660,000	3,000	6,000	15	11	54	...	30	50
South end ...	82	Flaxbourne to Parnassus ...	900,000	1,300	5,000*	20	36	...	26	29	53
Viâ Tarndale ...	107	Motueka to Lottery River, viâ Tophouse and Tarndale	1,000,000	100	1,500*	15	56	22	14	89	18
Viâ Maruia ...	157	Motueka Valley to Hanmer Plains, viâ Tophouse, Hampden, Maruia, and Cannibal Gorge	1,700,000	760	2,500*	5	83	57	12	123	34

* These estimates are based on the supposition that the agricultural land along the line will be subdivided into allotments of reasonable size, and sold or let by present proprietors to working agriculturists at reasonable rates.

Route.	Whole Line, Christchurch to Nelson.																					
	Length.	Extent.	Estimated Cost.	Estimated Results at Period about Ten Years Hence, presuming that Railway is opened for Traffic to this extent within say three years.									Lands traversed.				Lands traversed.		Highest Level reached above Sea-level.	Gradients.	
				Annual Revenue.	Annual Working Expenses.	Annual Profit.	Annual Percentage on Cost (Profit).	Population.													
								Present.		Probable.											
								Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.		Steepest.	Ruling.
	Mls		£	£	£	£		No.	No.	No.	No.	Mls	Mls	Mls	Mls	Mls	Mls	Feet.		
Viâ East Coast	266	Nelson to Christchurch, viâ Rai Valley, Blenheim, and Coast Line	2,310,000	149,100	100,720	48,380	2·09	28,600	37,000*	53,000	72,000*	125	61	54	26	59	207	500	1 in 50	1 in 50
Viâ Tarndale ...	225	Nelson to Christchurch, viâ Tophouse and Tarndale	1,823,000	132,810	82,820	49,990	2·74	29,600	37,000*	52,500	72,000*	120	69	22	14	89	136	3,000	1 in 50	1 in 50
Viâ Maruia ...	275	Nelson to Christchurch, viâ Tophouse, Hampden, Maruia, and Cannibal Gorge	2,523,000	124,260	92,820	31,440	1·25	30,260	37,000*	53,500	72,000*	110	96	57	12	123	152	2,870	1 in 50	1 in 50

* These represent Nelson and Christchurch, with the suburbs of latter including Sydenham.

30th December, 1882.

C. Y. O'Connor,
Inspecting Engineer, Middle Island.

TABLE No. 3.

Main Line.

Route.	Already opened for Traffic.			Still to be constructed.			Total.			Estimated Results on Main Lines only at Period about Ten Years Hence, presuming in each case that the whole of the Main Line is open for Traffic within say three years from now.								Lands traversed.				Lands traversed	
	Length.	Extent.	Cost.	Length.	Extent.	Probable Cost.	Length.	Extent.	Probable Cost.	Probable Annual Revenue.	Probable Annual Working Expenses.	Probable Annual Profit.	Probable Annual Percentage on Cost (Profit).	Population. Present. Along Line.	Population. Present. In Towns at Termini.	Population. Probable. Along Line.	Population. Probable. In Towns at Termini.	Agricultural	Pastoral.	Forest.	Barren.	Crown.	Purchased.
	Miles.		£	Miles.		£	Miles.		£	£	£	£		No.	No.	No.	No.	Mls	Mls	Mls	Mls	Mls	Mls
Christchurch to Picton, East Coast Route, combined with a Branch from Rolleston to Brunnerton.																							
North end...	19	Picton to Blenheim ...	190,000	146	Blenheim to Waipara, viâ Coast ...	1,350,000	205	Picton to Christchurch	1,840,000	147,360	91,560	55,800	3·03	28,600	33,000*	56,000	66,000*	116	52	11	26	31	174
South end...	40	Christchurch to Waipara	300,000																				
Christchurch to Picton, Tarndale Route, combined with a Branch from Tophouse to Nelson.																							
North end...	19	Picton to Blenheim ...	190,000	175	Blenheim to Waikari, viâ Tophouse and Tarndale	1,290,000	243	Picton to Christchurch	1,850,000	129,360	85,320	44,040	2·38	27,300	33,000*	51,600	66,000*	107	87	25	24	101	142
South end...	49	Christchurch to Waikari	370,000																				
Christchurch to Picton, Maruia Route, combined with a Branch from Maruia to Reefton.																							
North end...	19	Picton to Blenheim ...	190,000	228	Blenheim to Waikari, viâ Tophouse, Hampden, Maruia, and Cannibal Gorge	2,050,000	296	Picton to Christchurch	2,610,000	124,780	95,920	28,860	1·10	28,100	33,000*	54,000	66,000*	97	114	63	22	143	153
South end...	49	Christchurch to Waikari	370,000																				
Christchurch to Picton, Maruia Route, combined with a Branch from Tophouse to Nelson.																							
North end...	19	Picton to Blenheim ...	190,000	228	Blenheim to Waikari, viâ Tophouse, Hampden, Maruia, and Cannibal Gorge	2,050,000	296	Picton to Christchurch	2,610,000	124,780	95,920	28,860	1·10	28,100	33,000*	54,000	66,000*	97	114	63	22	143	153
South end...	49	Christchurch to Waikari	370,000																				
Christchurch to Picton, Maruia Route, combined with Branches from Maruia to Reefton and from Tophouse to Nelson.																							
North end...	19	Picton to Blenheim ...	190,000	228	Blenheim to Waikari, viâ Tophouse, Hampden, Maruia, and Cannibal Gorge	2,050,000	296	Picton to Christchurch	2,610,000	124,780	95,920	28,860	1·10	28,100	33,000*	54,000	66,000*	97	114	63	22	143	153
South end...	49	Christchurch to Waikari	370,000																				
Christchurch to Picton, Maruia Route, combined with a Branch from Maruia to Brunnerton.																							
North end...	19	Picton to Blenheim ...	190,000	228	Blenheim to Waikari, viâ Tophouse, Hampden, Maruia, and Cannibal Gorge	2,050,000	296	Picton to Christchurch	2,610,000	124,780	95,920	28,860	1·10	28,100	33,000*	54,000	66,000*	97	114	63	22	143	
South end...	49	Christchurch to Waikari	370,000																				

* These represent populations of Picton and Blenheim combined with those of Christchurch and its suburbs, including Sydenham.

TABLE No. 3—*continued.*

BRANCHES.

Already opened for Traffic.			Still to be constructed.			Total.			Estimated Results due to Construction of Branch Lines at Period about Ten Years Hence, presuming that the whole of the Branch Lines and also the whole of the Main Line are opened for Traffic within say three years from now.								Lands traversed.				Lands traversed	
													Population.									
													Present.		Probable.							
Length.	Extent.	Cost.	Length.	Extent.	Probable Cost.	Length.	Extent.	Probable Cost.	Probable Annual Revenue.	Probable Annual Working Expenses.	Probable Annual Profit.	Probable Annual Percentage on Cost (Profit).	Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.	Agricultural	Pastoral.	Forest.	Barren.	Crown.	Purchased.
Miles.		£	Miles.		£	Miles.		£	£	£	£		No.	No.	No.	No.	Mls	Mls	Mls	Mls	Mls	Mls
				CHRISTCHURCH TO PICTON, EAST COAST ROUTE, COMBINED WITH A BRANCH FROM ROLLESTON TO BRUNNERTON.																		
20	Rolleston to Home Bush ...	60,000	127	Home Bush to Brunnerton, viâ Lake Lyndon, Craigieburn, Arthur's Pass, and Lake Brunner	1,640,000	147	Rolleston to Brunnerton ...	1,700,000	139,650	97,020	42,630	2·51	8,800	3,000*	18,000	6,000*	62	30	39	16	101	46
				CHRISTCHURCH TO PICTON, TARNDALE ROUTE, COMBINED WITH A BRANCH FROM TOPHOUSE TO NELSON.																		
23	Nelson to Belgrove ...	153,000	33	Belgrove to Tophouse	310,000	56	Nelson to Tophouse ...	463,000	27,960	18,640	9,320	2·01	6,160	7,000	12,000	12,000	31	17	8	...	15	41
				CHRISTCHURCH TO PICTON, MARUIA ROUTE, COMBINED WITH A BRANCH FROM MARUIA TO REEFTON.																		
...	...	...	33	Maruia Valley to Reefton	330,000	33	Maruia Valley to Reefton ...	330,000	9,900	6,600	3,300	1·00	500	1,500†	1,500	3,000†	4	...	29	...	33	...
				CHRISTCHURCH TO PICTON, MARUIA ROUTE, COMBINED WITH A BRANCH FROM TOPHOUSE TO NELSON.																		
23	Nelson to Belgrove ...	153,000	30	Belgrove to Tophouse	280,000	53	Nelson to Tophouse ...	433,000	27,960	18,640	9,320	2·15	6,160	7,000	12,000	12,000	31	17	5	...	12	41
				CHRISTCHURCH TO PICTON, MARUIA ROUTE, COMBINED WITH BRANCHES FROM MARUIA TO REEFTON AND FROM TOPHOUSE TO NELSON.																		
23	Nelson to Belgrove ...	153,900	33 30	Maruia Valley to Reefton ... ... Belgrove to Tophouse	330,000 280,000	86	Maruia Valley to Reefton, and Nelson to Tophouse	763,000	37,860	25,240	12,620	1·65	6,660	8,500	13,500	15,000	35	17	34	...	45	41
				CHRISTCHURCH TO PICTON, MARUIA ROUTE, COMBINED WITH A BRANCH FROM MARUIA TO BRUNNERTON.																		
...	...	...	72	Maruia to Brunnerton	700,000	72	Maruia to Brunnerton ...	700,000	72,000	50,400	21,600	3·09	4,500	3,000*	9,500	6,000*	11	7	54	...	68	4

* These represent the populations of Greymouth and Brunnerton. † This represents Reefton and the mining population in the immediate vicinity.

TABLE No. 3—*continued.*

MAIN LINE AND BRANCHES COMBINED.

Already opened for Traffic.			Still to be constructed.			Total.			Estimated Results for Main Lines and Branches combined at Period about Ten Years Hence, presuming that both Main Line and Branches are opened throughout for Traffic within say three years from now.								Lands traversed.				Lands traversed.		Main Line.			Branches.		
													Population.														
													Present.		Probable.												
Length.	Extent.	Cost.	Length.	Extent.	Probable Cost.	Length.	Extent.	Probable Cost.	Probable Annual Revenue.	Probable Annual Working Expenses.	Probable Annual Profit.	Probable Annual Percentage on Cost (Profit).	Along Line.	In Towns at Termini.	Along Line.	In Towns at Termini.	Agricultural.	Pastoral.	Forest.	Barren.	Crown.	Purchased.	Highest Level reached above Sea-level.	Gradients. Steepest.	Gradients. Ruling.	Highest Level reached above Sea-level.	Gradients. Steepest.	Gradients. Ruling.
Mls		£	Mls		£	Mls		£	£	£	£		No.	No.	No.	No.	Mls	Mls	Mls	Mls	Mls	Mls	Feet.			Feet.		
CHRISTCHURCH TO PICTON, EAST COAST ROUTE, COMBINED WITH A BRANCH FROM ROLLESTON TO BRUNNERTON.																												
79	Picton to Blenheim, Christchurch to Waipara, and Rolleston to Home Bush	550,000	273	Blenheim to Waipara, and Home Bush to Brunnerton	2,990,000	352	Christchurch to Picton, and Rolleston to Brunnerton	3,540,000	287,010	188,580	98,430	2·78	37,400	36,000	74,000	72,000	178	82	50	42	132	220	500	1 in 50	1 in 50	2,560	1 in 50	1 in 50
CHRISTCHURCH TO PICTON, TAENDALE ROUTE, COMBINED WITH A BRANCH FROM TOPHOUSE TO NELSON.																												
91	Picton to Blenheim, Christchurch to Waikari, and Nelson to Belgrove	713,000	208	Blenheim to Waikari, and Belgrove to Tophouse	1,600,000	299	Christchurch to Picton, and Nelson to Tophouse	2,313,000	157,320	103,960	46,640	2·02	33,460	40,000	63,600	78,000	138	104	33	24	116	183	3,000	1 in 50	1 in 50	2,100	1 in 50	1 in 50
CHRISTCHURCH TO PICTON, MARUIA ROUTE, COMBINED WITH A BRANCH FROM MARUIA TO REEFTON.																												
68	Picton to Blenheim, and Christchurch to Waikari	560,000	261	Blenheim to Waikari, and Maruia Valley to Reefton	2,380,000	329	Christchurch to Picton, and Maruia Valley to Reefton	2,940,000	134,680	102,520	32,160	1·09	28,600	34,500	55,500	69,000	101	114	92	22	176	153	2,870	1 in 50	1 in 50	2,200	1 in 50	1 in 50
CHRISTCHURCH TO PICTON, MARUIA ROUTE, COMBINED WITH A BRANCH FROM TOPHOUSE TO NELSON.																												
91	Picton to Blenheim, Christchurch to Waikari, and Nelson to Belgrove	713,000	258	Blenheim to Waikari, and Belgrove to Tophouse	2,330,000	349	Christchurch to Picton, and Nelson to Tophouse	3,043,000	152,740	114,560	38,180	1·25	34,260	40,000	66,000	78,000	128	131	68	22	155	194	2,870	1 in 50	1 in 50	2,100	1 in 50	1 in 50
CHRISTCHURCH TO PICTON, MARUIA ROUTE, COMBINED WITH BRANCHES FROM MARUIA TO REEFTON AND FROM TOPHOUSE TO NELSON.																												
91	Picton to Blenheim, Christchurch to Waikari, and Nelson to Belgrove	713,000	291	Blenheim to Waikari, Maruia Valley to Reefton, and Belgrove to Tophouse	2,660,000	382	Christchurch to Picton, Maruia Valley to Reefton, and Nelson to Tophouse	3,373,000	162,640	121,160	41,480	1·23	34,760	41,500	67,500	81,000	132	131	97	22	188	194	2,870	1 in 50	1 in 50	2,200	1 in 50	1 in 5
CHRISTCHURCH TO PICTON, MARUIA ROUTE, COMBINED WITH A BRANCH FROM MARUIA TO BRUNNERTON.																												
68	Picton to Blenheim, and Christchurch to Waikari	560,000	300	Blenheim to Waikari, and Maruia to Brunnerton	2,750,000	368	Christchurch to Picton, and Maruia to Brunnerton	3,310,000	196,780	146,320	50,460	1·52	32,600	36,000	63,500	72,000	108	121	117	22	211	157	2,870	1 in 50	1 in 50	2,200	1 in 50	1 in 50

30th December, 1882.

C. Y. O'CONNOR,
Inspecting Engineer, Middle Island.

ALTERNATIVE RAILWAY ROUTES, Christchurch to Picton, and Christchurch to Nelson, with Branches to the westward.

SUMMARY STATEMENT showing the Principal Results arrived at in the Tables accompanying this Report, together with some Additional Information as to the Distances by the various Routes in question between the Principal Centres of Population which they would connect or go towards connecting.

No. 1. Christchurch to Picton—East Coast Route.

Description.	Length.	Cost.	Percentage on Cost.
	Miles.	£	
North End.			
Already constructed—Picton to Blenheim	19	190,000	Present 1·27, Probable 1·80.
Provided for by Loan Act, 1882—Blenheim to Awatere ...	12	95,000	...
Results—Picton to Awatere	31	285,000	Probable 2·46.
Still further portions justifiable as local lines—Awatere to Flaxbourne	12	95,000	...
Total results—Local lines, North End	43	380,000	Probable 2·60.
South End.			
Already constructed—Christchurch to Waipara	40	300,000	Present 3·60, Probable 6·40.
Provided for by Loan Act, 1882—Waipara to Greta ...	20	140,000	...
Results—Christchurch to Greta	60	440,000	Probable 6·00.
Still further portions justifiable as local lines—Greta to Parnassus	20	120,000	...
Total results—Local lines, South End	80	560,000	Probable 6·00.
Total North End—Picton to Flaxbourne	43	380,000	Probable 2·60.
Total South End—Christchurch to Parnassus	80	560,000	Probable 6·00.
Total results—North and South Ends	123	940,000	Probable 4·63.
Through connection—Flaxbourne to Parnassus	82	900,000	...
Total results—Picton to Christchurch, East Coast Route	205	1,840,000	Probable 3·03.

No. 2. Christchurch to Picton—Tarndale Route.

Description.	Length.	Cost.	Percentage on Cost.
	Miles.	£	
North End.			
Already constructed—Picton to Blenheim	19	190,000	Present 1·27, Probable 1·80.
Provided for by Loan Act, 1882—Blenheim to Marchburn River	15	90,000	...
Results—Picton to Marchburn River	34	280,000	Probable 1·76.
Still further portions justifiable as local lines—Nil	...	...	...
Total results—Local lines, North End	34	280,000	Probable 1·76.
South End.			
Already constructed—Christchurch to Waikari	49	370,000	Present 3·58, Probable 6·36.
Provided for by Loan Act, 1882—Waikari to Lottery River ...	40	260,000	...
Results—Christchurch to Lottery River	89	630,000	Probable 5·45.
Still further portions justifiable as local lines—Nil	...	...	...
Total results—Local lines, South End	89	630,000	Probable 5·45.
Total North End—Picton to Marchburn River	34	280,000	Probable 1·76.
Total South End—Christchurch to Lottery River	89	630,000	Probable 5·45.
Total results—North and South Ends	123	910,000	Probable 4·31.
Through connection—Marchburn River to Lottery River ...	120	940,000	...
Total results—Picton to Christchurch, Tarndale ...	243	1,850,000	Probable 2·38.

No. 3. Christchurch to Picton—Maruia Route.

Description.	Length.	Cost.	Percentage on Cost.
	Miles.	£	
North End.			
Already constructed—Picton to Blenheim	19	190,000	Present 1·27, Probable 1·80.
Provided for by Loan Act, 1882—Blenheim to Marchburn River	15	90,000	...
Results—Picton to Marchburn River	34	280,000	Probable 1·76.
Still further portions justifiable as local lines—Nil	...	...	...
Total results—Local lines, North End	34	280,000	Probable 1·76.
South End.			
Already constructed—Christchurch to Waikari	49	370,000	Present 3·58, Probable 6·36.
Provided for by Loan Act, 1882—Waikari to Hanmer Plains ...	40	260,000	...
Results—Christchurch to Hanmer Plains	89	630,000	Probable 5·45.
Still further portions justifiable as local lines—Nil	...	...	...
Total results—Local lines, South End	89	630,000	Probable 5·45.
Total North End—Picton to Marchburn River	34	280,000	Probable 1·76.
Total South End—Christchurch to Hanmer Plains	89	630,000	Probable 5·45.
Total results—North and South Ends	123	910,000	Probable 4·31.
Through connection—Marchburn River to Hanmer Plains ...	173	1,700,000	...
Total results—Picton to Christchurch, Maruia Route ...	296	2,610,000	Probable 1·10.

No. 4. Christchurch to Nelson—East Coast Route.

Description.	Length.	Cost.	Percentage on Cost.
	Miles.	£	
North End.			
Already constructed—Nil	...	...	...
Provided for by Loan Act, 1882—Blenheim to Awatere ...	12	95,000	3·79
Results—Blenheim to Awatere	12	95,000	3·79
Still further portions justifiable as local lines—Awatere to Flaxbourne	12	95,000	...
Total results—Local lines, North End	24	190,000	3·44
South End.			
Already constructed—Christchurch to Waipara	40	300,000	Present 3·60, Probable 6·40.
Provided for by Loan Act, 1882—Waipara to Greta ...	20	140,000	...
Results—Christchurch to Greta	60	440,000	Probable 6·00.
Still further portions justifiable as local lines—Greta to Parnassus	20	120,000	...
Total results—Local lines, South End	80	560,000	Probable 6·00.
Total North End—Blenheim to Flaxbourne	24	190,000	Probable 3·41.
Total South End—Christchurch to Parnassus	80	560,000	Probable 6·00.
Total results—North and South Ends	104	750,000	Probable 5·34.
Through connection—Nelson to Blenheim	80	660,000	...
Through connection—Flaxbourne to Parnassus	82	900,000	...
Total results—Nelson to Christchurch, East Coast Route	266	2,310,000	Probable 2·09.

No. 5. Christchurch to Nelson—Tarndale Route.

Description.	Length.	Cost.	Percentage on Cost.
	Miles.	£	
North End.			
Already constructed—Nelson to Belgrove	23	153,000	Present 1·49, Probable 2·86.
Provided for by Loan Act, 1882—Belgrove to Motueka Valley ...	6	40,000	...
Results—Nelson to Motueka Valley	29	193,000	Probable 2·57.
Still further portions justifiable as local lines—Nil	...	...	...
Total results—Local lines, North End	29	193,000	Probable 2·57.
South End.			
Already constructed—Christchurch to Waikari	49	370,000	Present 3·58, Probable 6·36.
Provided for by Loan Act, 1882—Waikari to Lottery River ...	40	260,000	...
Results—Christchurch to Lottery River	89	630,000	Probable 5·45.
Still further portions justifiable as local lines—Nil	...	...	...
Total results—Local lines, South End	89	630,000	Probable 5·45.
Total North End—Nelson to Motueka Valley	29	193,000	Probable 2·57.
Total South End—Christchurch to Lottery River	89	630,000	Probable 5·45.
Total results—North and South Ends	118	823,000	Probable 4·77.
Through connection—Motueka Valley to Lottery River ...	107	1,000,000	...
Total results—Nelson to Christchurch, Tarndale Route	225	1,823,000	Probable 2·74.

No. 6. Christchurch to Nelson—Maruia Route.

Description.	Length.	Cost.	Percentage on Cost.
	Miles.	£	
North End.			
Already constructed—Nelson to Belgrove	23	153,000	Present 1·49, Probable 2·86.
Provided for by Loan Act, 1882—Belgrove to Motueka Valley ...	6	40,000	...
Results—Nelson to Motueka Valley	29	193,000	Probable 2·57.
Still further portions justifiable as local lines—Nil	...	...	...
Total results—Local lines, North End	29	193,000	Probable 2·57.
South End.			
Already constructed—Christchurch to Waikari	49	370,000	Present 3·58, Probable 6·36.
Provided for by Loan Act, 1882—Waikari to Hanmer Plains ...	40	260,000	...
Results—Christchurch to Hanmer Plains	89	630,000	Probable 5·45.
Still further portions justifiable as local lines—Nil	...	...	...
Total results—Local lines, South End	89	630,000	Probable 5·45.
Total North End—Nelson to Motueka Valley	29	193,000	Probable 2·57.
Total South End—Christchurch to Hanmer Plains	89	630,000	Probable 5·45.
Total results—North and South Ends	118	823,000	Probable 4·77.
Through connection—Motueka Valley to Hanmer Plains ...	157	1,700,000	...
Total results—Nelson to Christchurch, Maruia Route ...	275	2,523,000	Probable 1·25.

No. 7.

SUMMARY STATEMENT showing Cost, &c., of Main Lines and Branches, and also showing Distances to travel, by the various Routes between the Principal Centres of Population which they would connect or go towards connecting.

Description.	Distance to travel.					Height to rise.	Already opened for Traffic.		Still to be constructed.		Totals.		Probable Return for Total Expenditure. — Percentage on Cost.
	Christchurch to Picton.	Christchurch to Nelson.	Christchurch to Greymouth.*	Christchurch to Reefton.	Rolleston to Brunnerton.		Length.	Cost.	Length.	Probable Cost.	Length.	Probable Cost.	
	Miles.	Miles.	Miles.	Miles.	Miles.	Feet.	Miles.	£	Miles.	£	Miles.	£	Per Cent.
MAIN LINES.													
Christchurch to Picton, viâ Coast	205	...	...	...	...	500	59	490,000	146	1,350,000	205	1,840,000	3·03
„ „ Tarndale	243	...	...	...	...	3,000	68	560,000	175	1,290,000	243	1,850,000	2·38
„ „ Maruia	296	...	...	...	...	2,870	68	560,000	228	2,050,000	296	2,610,000	1·10
Christchurch to Nelson, viâ Coast	...	266	...	...	...	500	40	300,000	226	2,010,000	266	2,310,000	2·09
„ „ Tarndale	...	225	...	...	...	3,000	72	523,000	153	1,300,000	225	1,823,000	2·74
„ „ Maruia	...	275	...	...	...	2,870	72	523,000	203	2,000,000	275	2,523,000	1·25
BRANCH LINES.													
Rolleston to Brunnerton	...	...	...	...	...	2,560	20	60,000	127	1,640,000	147	1,700,000	2·51
Tophouse to Nelson, from Tarndale Route	...	...	...	...	...	2,100	23	153,000	33	310,000	56	463,000	2·01
„ „ Maruia Route	...	...	...	...	...	2,100	23	153,000	30	280,000	53	433,000	2·15
Maruia to Reefton	...	...	...	...	...	2,200	...	...	33	330,000	33	330,000	1·00
Maruia to Brunnerton	...	...	...	...	...	2,200	...	...	72	700,000	72	700,000	3·09
MAIN LINES AND BRANCHES COMBINED.													
Christchurch to Picton, East Coast Route...	...	...	...	...	...	500							
„ with Branch Rolleston to Brunnerton	205	266	169	200	147	2,560	79	550,000	273	2,990,000	352	3,540,000	2·78
Christchurch to Picton, Tarndale Route	...	...	...	...	...	3,000							
„ with Branch Tophouse to Nelson ...	243	225	309	262	315	2,100	91	713,000	208	1,600,000	299	2,313,000	2·02
Christchurch to Picton, Maruia Route	...	...	...	...	...	2,870							
„ with Branch Maruia to Reefton ...	296	275	220	173	226	2,200	68	560,000	261	2,380,000	329	2,940,000	1·09
Christchurch to Picton, Maruia Route	...	...	...	...	...	2,870							
„ with Branch Tophouse to Nelson ...	296	275	220	173	226	2,100	91	713,000	258	2,330,000	349	3,043,000	1·25
Christchurch to Picton, Maruia Route	...	...	...	...	...	2,870							
„ with Branch Maruia to Reefton ...	...	...	...	...	...	2,200							
„ and Branch Tophouse to Nelson ...	296	275	220	173	226	2,100	91	713,000	291	2,660,000	382	3,373,000	1·23
Christchurch to Picton, Maruia Route	...	...	...	...	...	2,870							
„ with Branch Maruia to Brunnerton	296	275	220	173	226	2,200	68	560,000	300	2,750,000	368	3,310,000	1·52

* For distances, Christchurch to Brunnerton, subtract in each case 8 miles from the figures given in this column.

By Authority: GEORGE DIDSBURY, Government Printer, Wellington.—1883.

APPENDIX No. 3.

Mr. MAXWELL to the SECRETARY, Middle Island Railway Extension Commission.

SIR,— Railway Department, Head Office, Wellington, 18th January, 1883.

I have the honour to reply to your letter of the 3rd instant, requesting an expression of opinion on the estimates of cost of working, and the revenue derivable from certain projected lines of railway furnished by Mr. C. Y. O'Connor, C.E.

As, doubtless, the data on which these estimates are based are similar for the different cases, the results exhibited are no doubt valuable for comparing the relative advantages of the routes; but, as the data in question are not supplied, it is not competent for me to offer a very definite opinion on the individual results presented.

Some of the chief elements determining the cost of working are—(1) The rate of wages; (2) the cost of materials and stores; (3) the tonnage and passengers moved, and the distances they are carried.

The chief elements determining the revenue will be—(1) The tonnage and passengers moved, and the distances they are carried; (2) the rates charged for these services.

Of the three items named under the cost of working, the third is the most uncertain to make any prediction upon, while it is also a principal factor in the group: this factor is also an element affecting the revenue. Probably the better way to form an opinion upon this important point would be to study the results found on some other existing line traversing a similarly sparsely-populated district, and to observe the districts themselves. It will evidently be to a large extent a matter of judgment whether the country traversed by the projected line is, or is not, likely to approximate to the standard in its capacity for contributing passengers and goods, either for local or through traffic.

As regards the rates, after assuming a certain traffic, before attempting to estimate the revenue it should be first determined whether they should be fixed at remunerative standards or not—in other words, whether the railway is to be run to obtain the best commercial results to the institution, or whether it should be subservient to some general policy of the country, disregarding the direct financial results.

The results of working under current rates and wages on the New Zealand railways are not yet obvious. Past results cannot be taken as a reliable guide, as the order of things prevailing now differs from that of former years.

As an extreme example affecting the uncertainty which must attend any estimate of anticipated revenue, I may show how the changes in the grain rates have fluctuated, viz: Canterbury Provincial rate per ton, 1876, 50 miles, 11s. 11d.; 100 miles, 18s. 3d. Current New Zealand railways, 50 miles, 6s. 10d.; 100 miles, 11s. In the one case a profit is realized, in the other a loss.

With examples of this kind before us, and in the absence of any fixed principles of action for working, it would be unwise for me to offer any decided views on the question of anticipated revenue.

I have, &c.,
J. P. MAXWELL,
General Manager, New Zealand Railways.

The Secretary, Middle Island Railway Extension Commission.

APPENDIX NO. 4.

Dr. HECTOR to the Hon. the CHAIRMAN, Middle Island Railway Extension Commission.

SIR,— Colonial Museum of New Zealand, Wellington, 23rd January, 1883.

In reply to your letter of the 13th December last, asking to be informed if any geological survey has been made of the district lying between Maruia River and the upper part of the Buller River and the main range as far west as the Cannibal Gorge, I have the honour to state that a partial examination of the district in question was made by myself in 1868 and again in 1872, but that the district along the west flank of the main range is still unexplored. My observations led me to believe that a very considerable area of the distance commencing from the west side of Rotorua Lake is occupied by the same coal formation that contains valuable seams at Greymouth and Westport, and that the coal formation forms a succession of scarps facing the Spencer Range, and resting at a considerable elevation on a series of highly mineralized rocks, comprising granite, diorite, and serpentine, cutting through Upper Silurian and Devonian rocks, which conditions are throughout New Zealand highly favourable for the development of mineral lodes.

Along the base of the scarps, and between them and the west base of the Spencer (or main) Range, it appeared to me, from distant views, as if there existed a succession of low saddles, and that probably an easy line of access might be obtained that would form part of an arterial line through the Island.

The great advantage that will follow the opening-up of coal and other mineral deposits at the summit-level of such a line is very obvious, as the heavy freights would be downhill in all directions, whether to Canterbury, Cook Strait, or the West Coast.

As soon as was possible after the receipt of your letter I despatched Mr. Cox, Assistant Geologist, to make a special examination of the district in question, and have instructed him as to the above points, fully explaining to him my previous observations. I expect to receive his report about the end of February, and will at once communicate the result to you. I may state that he started on the 4th instant, and in a note dated the 18th instant he informed me, "I find the coal formation is continuous from the Hope to Hampden, and, from its strike, would appear to flank Mount Murchison. It appears again close to Rotorua, as you told me, but I did not see the seam you mentioned. I hear that coal occurs up the Matakitaki for some distance, so I think you will be thoroughly borne out in your surmises as regards its extension, and so far the boundaries you sketched in on the map are very close to the truth. Granite and syenite form the whole block between the Rotorua and Rotoiti Lakes and the Buller, between the Devil's Grip and Owen River, at least close down to the latter place; and

from there to Hampden the measures are standing at angles of 50° to 70°, striking N. to N. 40° W., and dipping easterly." In another letter he states that "A quite low saddle—really no rise at all to speak of—occurs between the head of the Howard and the Rotorua Lake, and I am informed that the saddle between the Howard and Rotoiti is quite low; but it is quite impossible to travel it now, owing to the quantity of fallen timber."

I have, &c.,

JAMES HECTOR,
Director.

The Hon. Dr. Pollen,
Chairman, Middle Island Railway Extension Commission.

APPENDIX No. 5.

MEMORANDUM by Mr. BLACKETT.

Public Works Office, Nelson, 9th December, 1882.

In re *Mr. Rochfort's Plans, &c., of Central and East Coast Routes of Extension northwards from Christchurch.*

As requested by you I have examined Mr. Rochfort's plans and section of the two routes, and find some few discrepancies and errors in both routes.

Central Route.—On plan he gives height of saddle as 3,070 feet above the sea, and on section 3,230 feet. The first height agrees very nearly with my own at head of Alma; the other may be at head of Travellers' Valley. I cannot make the difference between Travellers' Valley Route and that down Alma more than 3½ miles, whereas Mr. Rochfort makes it 5 miles. The Hossach Saddle is incorrectly spelt Hossack by Mr. Rochfort. My heights agree so nearly with Mr. Rochfort's in this route that I do not think it necessary to give them.

East Coast Route.—The grades between 57½ miles and 62 miles on section Waipara to Blenheim are, if I remember Mr. Dobson's plan, incorrect, as I think he makes 1 in 50 throughout. This point could be settled by reference to the Engineer in Charge, Middle Island. The grades between Ure River and Blenheim are all limited to 1 in 50, although shown steeper by Mr. Rochfort. On Greenhills route, by Mr. Foy, Mr. Rochfort shows a 1 in 7 grade from Whale's Back to Conway and Charwell Saddle. This should be 1 in 7 Whale's Back to Conway River (see pencil line).

I enclose a skeleton tracing showing approximate position of East Coast, Central, and Maruia routes, which may be of service to you.

I have, &c.,

J. GEO. BLACKETT,
Resident Engineer.

The Hon. Dr. Pollen, Chairman Railway Extension Commission.

APPENDIX No. 6.

The SECRETARY, Reefton Railway League, to the RAILWAY COMMISSIONERS.

GENTLEMEN,— Reefton, 30th November, 1882.

By direction of the Reefton Railway League I have the honour to submit the enclosed circular for your favourable consideration, and, in respect thereto to urge the practicability of travelling over the proposed Ada Pass railway route, and further respectfully submit that but a short time, unattended with danger, would be required to compass the journey.

I have, further, the honour to draw your attention to the situation of the Ada Pass on the map as being the most central, as indicated by the term, of the several proposed railway routes going northwards, and from which a branch line of twenty-nine miles in length would connect the West Coast, by which all interests could be served.

I have, &c.,

HENRY GEO. HANKIN,
Secretary.

The Hon. the Members of the Royal Railway Commission.

Circular.

GENTLEMEN,—

At your request I have the honour to report that during the time that I acted in the capacity of Engineer to the Inangahua County Council I had occasion to make several trips through the Cannibal Gorge Pass for the purpose of prospecting for a road-line to connect Reefton with the cattle-runs on the Canterbury side of the Spencer Range.

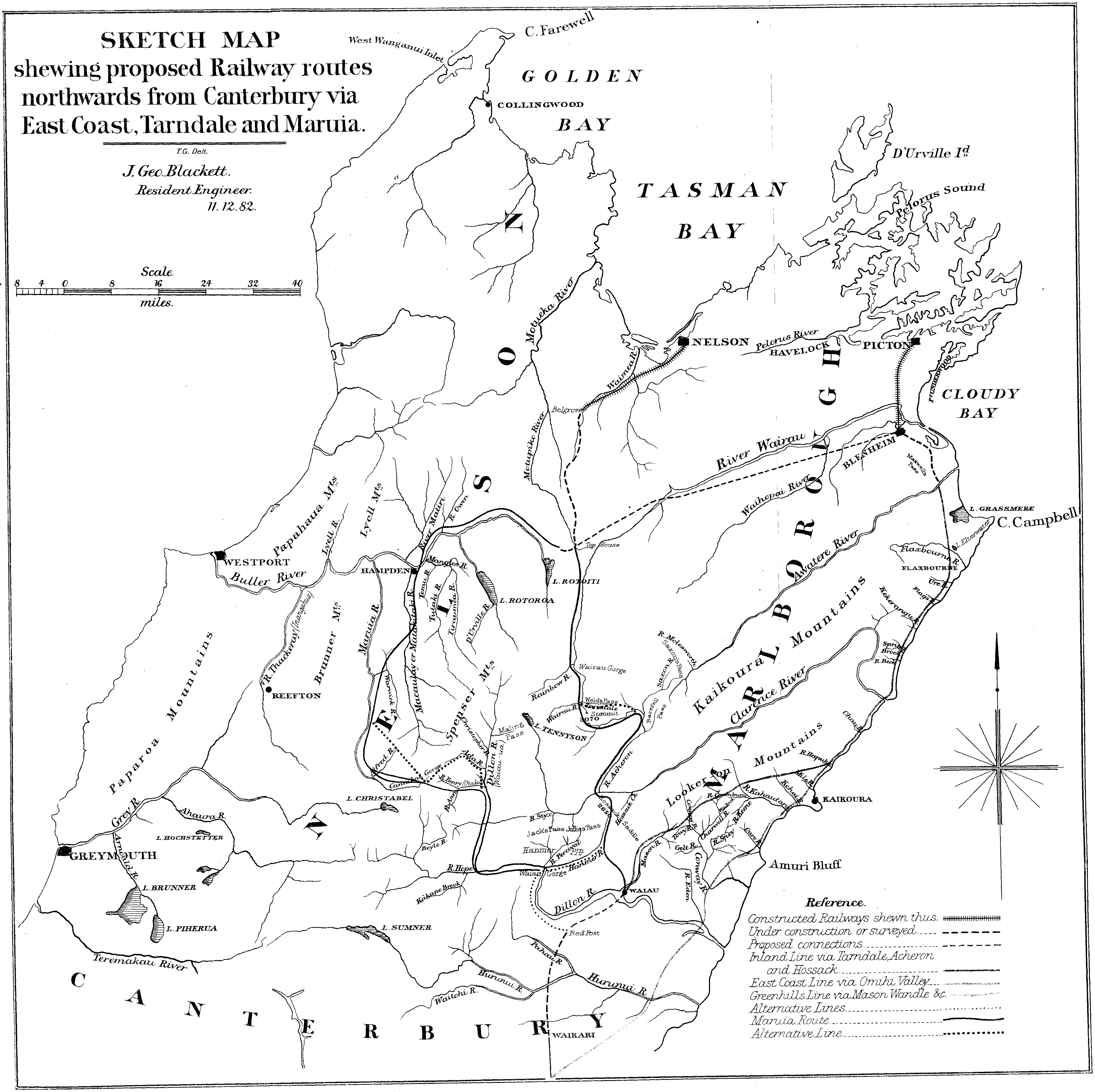
During these journeys I discovered that the maps of that portion of the country were in error, as they each and all show the head-waters of the Maruia River running north along the western base of the Spencer Range. I also discovered that the same error existed upon the Canterbury side of the range with respect to the head of the Ada River (a tributary of the Waiau), as the maps show that the Spencer Range acts as the divide between the heads of the Maruia and Ada Rivers.

The divide between the Maruia and Ada Rivers is a very low saddle; and the Maruia River, instead of going north on the western base of the Spencer Range, has cut its way through the heart of the Spencer Range to the Ada Saddle, which is the true divide between the head-waters of the Maruia and Ada Rivers. This statement can be corroborated by Mr. George Walker, station proprietor, Maruia Plains; and Mr. W. L. Fowler, station master, Lake Guyon. Moreover, and as a proof that the above statement is correct, on the 4th March, 1880, at a quarter to 7 a.m., I left Fowler's Station, on Lake Guyon, in company with Mr. George Walker, and on horseback made the passage of the gorge and arrived at Reefton at 2 a.m. on the 5th, doing the journey in nineteen hours, including a rest of an hour on the Maruia Plains. To travel across the Spencer Mountains would be a feat impossible on horseback; also, it must be taken into consideration that we had five and a half hours' travelling after night-fall. Moreover, it rained during the whole journey, insomuch that the Maruia River rose rapidly during the time we were passing through the gorge.

I have, &c.,

WILLIAM GARDNER,
Late Engineer, Inangahua County Council.

The members, Reefton Railway League.


SKETCH MAP
shewing proposed Railway routes
northwards from Canterbury via
East Coast, Tarndale and Maruia.
T.G. Delt.
J. Geo. Blackett.
Resident Engineer.
11. 12. 82.
Scale.
8 4 0 8 16 24 32 40
miles.
C. Farewell
West Wanganui Inlet
GOLDEN BAY
COLLINGWOOD
TASMAN BAY
D'Urville Id.
Pelorus Sound
NELSON
Pelorus River
HAVELOCK
PICTON
Pt. UNDERWOOD
CLOUDY BAY
Motueka River
Waimea R.
Belgrove
Motupiko River
River Wairau
BLENHEIM
Maxwell's Pass
Waihopai River
Awatere River
L. GRASSMERE
C. Campbell
L. Elterwater
Flaxbourne R.
FLAXBOURNE
Ure R.
Flags R.
Kekerangu R.
Spring Brook
R. Beck
Ohau R.
R. Hapuku
Mile R.
Kowhai R.
KAIKOURA
R. Kahautara
Amuri Bluff
Kaikoura Mountains
Clarence River
Looker on Mountains
NELSON
MARLBOROUGH
CANTERBURY
Papahaua Mts.
Lyell R.
Lyell Mts.
WESTPORT
Buller River
HAMPDEN
River Matiri
R. Owen
Mangles R.
Top House
L. ROTOITI
L. ROTOROA
Temu R.
Tutaki R.
Tiraumea R.
D'Urville R.
Maruia R.
Macaulay or Matakitaki R.
R. Thackeray (Inangahua)
Brunner Mts.
REEFTON
Warwick R.
Spenser Mts.
Christopher R.
Alfred R.
Cannibal Gorge
Ada R.
R. Henry (Otaki)
Dillon R. (Waiau-ua)
Maling Pass
L. TENNYSON
Rainbow R.
Wairau Gorge
Weld's Pass
Tarndale Summit
3070
Wairau R.
R. Molesworth
Saxon's Pass
Saxon R.
Barefell Pass
R. Acheron
Hossack 2650
Hossack Ck.
Hossack Saddle
R. Styx
Jack's Pass
Jollies Pass
Hanmer
Hanmer Pln.
R. Percival
Hanmer R.
R. Hope
Waiau Gorge
Boyle R.
R. Ann
Kakapo Brook
L. CHRISTABEL
Paparoa Mountains
Grey R.
Ahaura R.
L. HOCHSTETTER
GREYMOUTH
Arnold R.
L. BRUNNER
L. PIHERUA
Teremakau River
L. SUMNER
Dillon R.
WAIAU
Mason R.
Towy R.
Gelt R.
Charwell R.
R. Greenburn
Conway R.
R. Spey
R. Keene
Oaro R.
R. Eden
Red Post
Pahau R.
Hurunui R.
Waitohi R.
WAIKARI
Reference.
Constructed Railways shewn thus.
Under construction or surveyed
Proposed connections
Inland Line via Tarndale, Acheron and Hossack
East Coast Line via Omihi Valley
Greenhills Line via Mason Wandle &c.
Alternative Lines
Maruia Route
Alternative Line

MIDDLE ISLAND RAILWAY EXTENSION COMMISSION.

[The appended Papers, Nos. 1 to 5, were amongst those handed in by the Commissioners, with their Report, and have been printed by direction of the Government. Nos. 6 and 7 were received after the date of the Report.]

No. 1.

NOTES upon and COMPARATIVE STATISTICS in relation to the EAST COAST and INLAND LINES of ROUTE of the PICTON–HURUNUI RAILWAY. By Mr. JOHN TINLINE.

THE Government having determined to complete a through line of railway from Christchurch to Picton, and to refer the question of the route to be adopted to a Royal Commission, I have thought it desirable, in the public interest, to collect the information contained in the following tables (which have been compiled from the latest Government returns), with the view of assisting the Commissioners in arriving at a sound conclusion on the subject. A long and intimate acquaintance with the country to the northward of the Hurunui justifies me in indorsing the views of Mr. Blair, as given in his last report on the public works of the Middle Island, to the effect that, geographically, so far as the Middle Island is concerned, the best route for a through railway is that which leads by the Amuri and Hanmer Plains, Jollie's Pass, and Upper Clarence and Wairau Valleys to Blenheim, with a loop from the Tophouse to join the Nelson and West Coast Railway. But Mr. Blair omits to point out another aspect in which this line is, geographically, the best, namely, that by taking a branch from the Hanmer Plains up the Hope River to the saddle between it and the Ahaura, and from thence down the Ahaura to its junction with the Grey, and from thence up the Little Grey to Reefton and down the Inangahua to the Buller, the whole of Westland and of the west coast of the Provincial District of Nelson, rich in its coal and gold fields, and offering an unlimited area for profitable mining and other enterprise, and supplying a market for the agricultural and pastoral products of Canterbury and Marlborough, would be brought into communication with the trunk-line of railway through the South Island. Independently, moreover, of these considerations, as affecting the South Island only, the routes thus indicated would open up the trade of the major part of the districts referred to, to Wellington, which would then become one of the natural centres from which it could be carried on with facility. A reference to a map of the colony will show this in the clearest manner.

Mr. Blair, however, in his report, states that, if the question to be considered in connection with a through route is merely the quickest line between Christchurch and Picton, then the extra length involved in the central line outweighs the geographical advantages which he admits it to possess; and, in this view of the matter, gives the preference to the East Coast line, notwithstanding his admission that it presents "great difficulties of construction." If the question were indeed that which he assumes it to be, I should not dispute the conclusion he arrives at: but I assume that the principal object in the construction of a railway system is to render accessible the greatest possible extent of territory available for use and occupation, and to accommodate the greatest number of persons. If I am correct in this view, then these objects will best be attained by the construction of the line from Waikari to the Hanmer Plains, and from thence by the Hope Saddle to Westland, as indicated above, whilst communication between Picton and Christchurch on the one hand, and the west coast of the South Island on the other, would be subserved by the construction of the line from Blenheim to the Tophouse, joining the Nelson and West Coast Railway by a loop through the low pass in the Big Bush, and from the Tophouse to the Hanmer Plains, along the line indicated in Mr. Blair's report, except that the descent from the Clarence to the Hanmer Plains would not take place at Jollie's Pass, but by a route recently pointed out by me to Mr. Blair, and examined by Mr. Blackett, junior, the Resident Engineer for Nelson and Marlborough, and found by him to do away with the principal engineering difficulty dwelt upon by Mr. Blair. The accompanying map shows the relative areas, exclusive of Westland and the West Coast, which would be opened out by the central (called in Mr. Blair's report the "Inland Route") and the East Coast lines respectively; and a reference to this map and to the accompanying tables will show that, in every aspect, whether geographical, commercial, or otherwise, the advantages which the colony at large would attain by the construction of the central line, with its branch to Westland, are overwhelmingly great when compared to the saving of an hour or an hour and a half's time in the transit from Christchurch to Picton. It will be seen also that the East Coast line cuts directly across the valleys of all the great rivers lying between Waikari and Blenheim, necessitating either a considerable extent of tunnels or the ascent and descent of the watersheds between these rivers, and that, between the Amuri Bluff and the turn-in at Flaxbourne, a distance of about sixty miles, it will have, with the exception of the small settlement at Kaikoura Peninsula, the sea on one side and the huge masses of the Kaikoura Mountains on the other, whilst throughout its whole length it will be

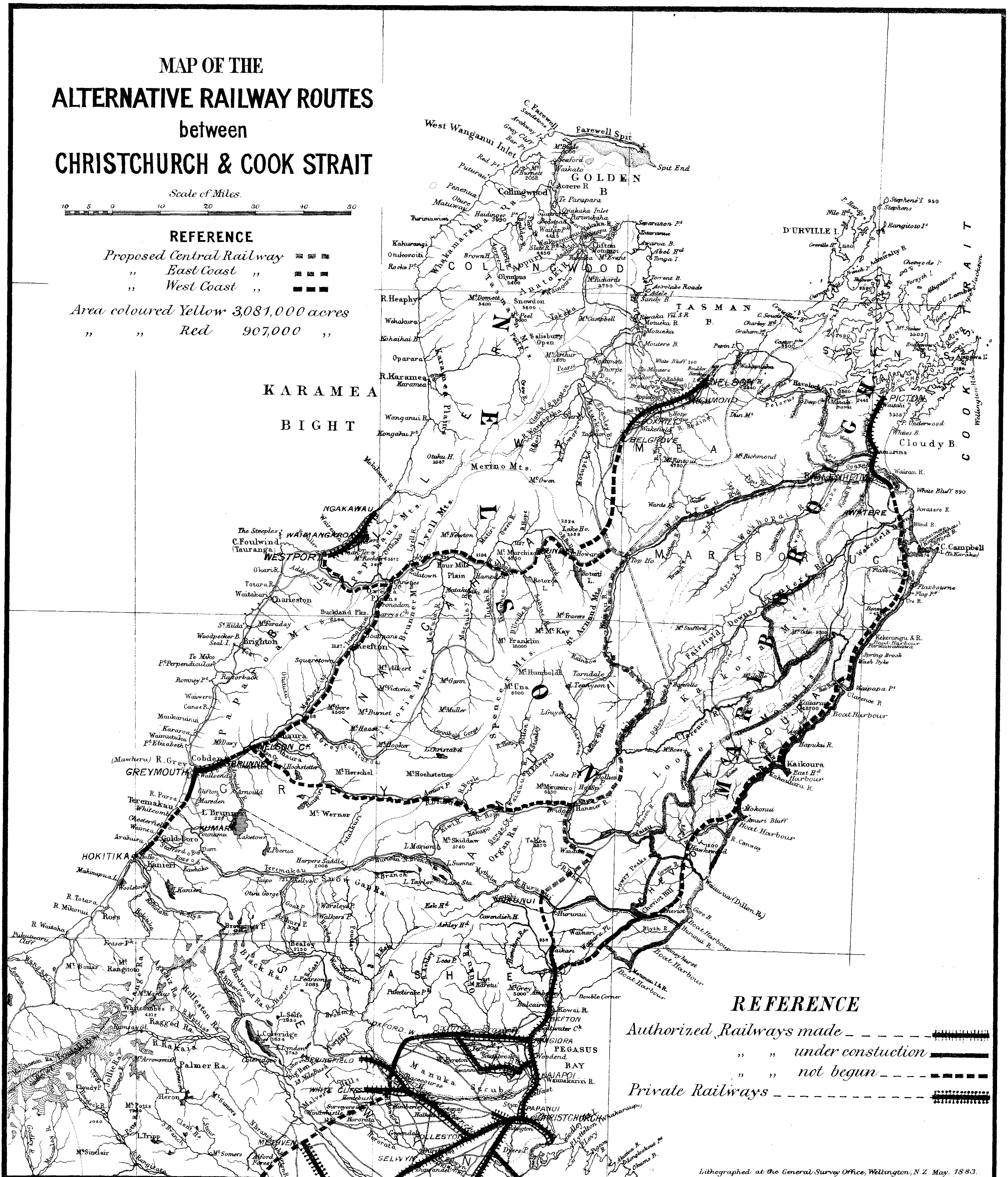
completely cut off by practically insurmountable physical obstacles from the country to the westward of the strip coloured pink, through which it is intended to pass. It will further be seen that the central line and the lines suggested to connect Westland and the West Coast follow almost entirely the courses of the greater valleys, the only difficulties to be overcome being the ascent to the Valley of the Clarence, now shown to be comparatively easy, and the descent on the western side of the Hope saddle, which, however, only involves an addition of two or three miles to the length of the line. Upon the accompanying map the East Coast line through the strip of country marked red is shown in black, as is also the line from the bridge at the Hanmer Plains to the junction with the Grey River line at Nelson Creek, and the extension of that line along the valleys of the Little Grey, Inangahua, and Buller Rivers, whilst the central line, with its loop to join the Nelson and West Coast Railway, is shown in red. I have had under consideration the suggested line through the Cannibal Gorge to Reefton, but I am satisfied, not only from my own knowledge of the country, but from information derived from trustworthy sources, that this line would be more costly in construction per mile, and not so advantageous to Westland and the basin of the Grey as the line by the Hope and Ahaura Valleys. I refrain from further comments, feeling assured that the question under discussion will be exhaustively dealt with by the proposed Commission.

Wellington, 30th September, 1882. JOHN TINLINE.

RETURN showing the RUNS and other HOLDINGS dependent on the Proposed LINE of RAILWAY betwixt WAIPARA and COOK STRAIT, within the Country coloured Yellow on accompanying Map. Compiled from Official and other Sources.—September, 1882.

Name of Run or Locality.	Name of Holder.	Crown Lands in Run.	Freehold Lands in Run.	Sheep.	Cattle.	Horses.
		Acres.	Acres.			
Glenmark	G. H. Moore	28,878	75,748	87,500	40	100
Waipara	Partridge and Edwards ...	...	3,398	4,350	11	18
Basin Farm	J. Douglas	...	300	1,238	...	...
Waikari	Chamberlain	...	2,980	2,416	10	10
,, ...	T. Armstrong	...	500	1,140	6	9
,, ...	Buchanan and Wade ...	431	2,588	2,500	10	10
,, ...	J. Cowie	...	390	1,200	40	11
,, ...	C. D. Fox	...	1,358	1,890	1	4
,, ...	Little Brothers ...	...	2,788	5,097	27	27
,, ...	Luckey and Noon ...	...	435	750	6	13
,, ...	J. McFarlane	...	1,456	2,823	20	6
,, ...	W. Parkerson	...	1,360	1,850	...	3
,, ...	F. Perrot	...	223	482	5	3
,, ...	L. W. Tosswill ...	...	1,500	3,403	50	15
,, ...	Sanderson and Studholme	11,079	12,517	19,852	14	13
Horsley Down	Mallock and Lance ...	85,614	28,300	57,255	110	50
Hurunui	Pyne and Russell ...	...	3,000	3,000	...	...
,, ...	E. and J. Michel ...	...	1,848	1,540	...	7
,, ...	D. Crossley	31,875	154	8,393	6	10
Hurunui Lakes	G. McMillan	17,480	184	6,300	40	30
,, ...	W. Parkerson	21,000	...	7,800	...	6
Waipara and Waikari ...	Sundry farmers ...	...	3,000	1,385	675	255
Balmoral	Dalgety and Co. ...	17,881	38,681	31,227	6	41
,, Reserve ...	,, ...	5,540	...			
Tekoa	G. W. McRae	31,643	15,493	14,850	23	30
Pahau Reserve	Earshman and Co. ...	3,991	...	3,250	20	12
,, Pastures	,, ...	...	5,724	4,085		
St. Leonard	Wilkin and Davidson ...	...	29,108	26,091	155	52
Kaiwara	W. McFarlane ...	...	43,792	17,700	16	25
Awehray	J. McFarlane			12,719		
Mount Pam	R. Chapman	...	13,600	10,600	12	12
Rotherham	R. Forrester	...	250	997	6	6
,, ...	E. Jones	...	1,471	4,500	340	30
Upper Wairau	,, ...	14,000	198			
Culverden	Wilson's Trustees ...	...	24,881	20,508	9	47
Montrose	W. O. Rutherford ...	18,000	23,115	18,000	40	20
Highfield	H. Wharton	51,893	22,799	41,452	100	26
,, (Clarence) ...	,, ...	...	...	10,000	...	...
Lyndon	G. and J. Tinline ...	40,618	35,394	36,798	500	70
,, (Clarence) ...	,, ...	...	...	10,000	...	...
Leslie Hills	G. Rutherford ...	...	28,851	17,750	30	15
Sherwood	Walter Rutherford ...	3,181	...	2,542	32	4
Woodbank	W. Atkinson	...	8,988	6,500	...	25
Hanmer Springs Reserve ...	J. Fry	877	...	454	30	12
,, ,, ...	Unoccupied	1,631	...	...	...	...
Glynn Wye	W. A. Low	55,610	9,000	17,500	80	7
St. Helens (Barefells) ...	,, ...	179,194	14,824	54,800	20	33
,, (Acheron) ...	,, ...			16,490		
Hopefield	Dalgety and Co. ...	20,185	...	695	6	19
St. Andrews	T. Holmes	10,300	...	...	350	24
St. James	McArthur Brothers ...	50,932	20	21,000	200	35
Stanley Vale	W. L. Fowler	13,000	20	4,700	300	30
Carried forward ...	...	714,833	450,236	627,372	3,346	1,175

MAP OF THE ALTERNATIVE RAILWAY ROUTES between CHRISTCHURCH & COOK STRAIT


Scale of Miles.
10 5 0 10 20 30 40 50
REFERENCE
Proposed Central Railway
" East Coast "
" West Coast "
Area coloured Yellow 3,081,000 acres
" " Red 907,000 "
KARAMEA BIGHT
GOLDEN B
TASMAN B.
D'URVILLE I.
COOK STRAIT
Cloudy B.
PEGASUS BAY
COLLINGWOOD
NELSON
MARLBOROUGH
AMURI
GREY
WESTLAND
ASHLEY
SELWYN
Farewell Spit
Collingwood
NELSON
RICHMOND
FOXHILL
BELGROVE
Havelock
PICTON
BLENHEIM
AWATERE
C. Campbell
Kaikoura
NGAKAWAU
WAIMANGAROA
WESTPORT
Charleston
Brighton
Reefton
GREYMOUTH
BRUNNER
KUMARA
HOKITIKA
Ross
Hanmer R.
Cheviot
Waikari
Amberley
SEFTON
RANGIORA
KAIAPOI
PAPANUI
CHRISTCHURCH
ROLLESTON
SPRINGFIELD
WHITE CLIFFS
METHVEN
REFERENCE
Authorized Railways made
" " under constuction
" " not begun
Private Railways
Lithographed at the General Survey Office, Wellington, N.Z. May, 1883.

RUNS and other HOLDINGS on CENTRAL RAILWAY—*continued.*

Name of Run or Locality.	Name of Holder.	Crown Lands in Run.	Freehold Lands in Run.	Sheep.	Cattle.	Horses.
		Acres.	Acres.			
Brought forward ...	...	714,833	450,236	627,372	3,346	1,175
Tarndale	A. Adams	136,918	1,105	18,261	1,500	10
Rotherham and Waiau ...	Sundry farmers ...	...	500	...	359	91
Warden Tytler (Clarence) ...	J. Ward	79,074	16,636	40,000	...	...
The Jam (Clarence) ...	W. Gibson	8,000	...			
Kekerangu (part of) ...	Symons's Trustees ...	30,000	...	10,000	...	...
Upcot	J. Green	31,500	11,098	11,850	...	...
Fairfield	T. Cawthron	6,850	10,868	6,090	...	...
Langridge	G. Monro	24,300	7,500	9,200	...	...
The Muller	Blick's Trustees ...	...	11,583	5,000	...	...
,, ...	Miss Newcome ...	...	3,310	...	...	...
Middlehurst	K. Mowat	26,070	14,542	12,500	...	33
Molesworth	Willis and Furhmann ...	51,075	1,753	12,200	270	71
Leafield	P. Dillon	10,400	17,429	11,500	13	25
Valleyfield	G. Monro	...	3,000	2,700	3	7
Renwick	J. Newman	...	480	700	...	...
Delta	Renwick's Trustees ...	1,505	5,956	5,051	60	21
Renwick	W. Brydon	...	600	1,020	...	...
Avondale	G. Teschemaker ...	39,030	24,127	16,500	...	15
Summerlands	Teschemaker and Gillon	...	8,795	4,200	...	...
Langley Dale	W. Adams	6,984	5,735	1,810	40	15
Benhopai	J. Nicholson	6,586	24,712	14,124	20	6
Bankhouse	A. Monro	9,200	16,817	11,165	14	12
Erina	Bell and Sons	5,270	967	3,500	30	10
Wairau Valley	Bell Brothers	40,200	4,724	4,500	22	13
Lansdowne	C. A. Watts	...	15,650	8,000	65	20
Hillersden	T. Carter			16,000		
Stronvaar	,, ...	29,000	84,000	12,600	45	123
Te Arowhenua	,, ...			4,800		
Wantwood	,, ...			10,000		
Birch Hill	W. Pollard	78,035	20,440	25,000	140	70
Tophouse Reserve ...	W. L. Fowler	28,756	...	4,700	75	10
Renwick and Wairau Valley	Sundry farmers ...	...	2,000	2,000	315	185
Roto-iti	J. Kerr	4,659	5,259	4,500	...	...
Motupiko	D. Kerr	7,203	1,626	2,500	25	8
Gordon Downs	Ellis and Co.	8,790	6,979	4,000	3	18
Sherry	R. McRae	901	4,194	3,500	...	...
Upper Motueka	Sundry farmers ...	...	3,000	2,000	619	146
Total	...	1,385,139	795,621	928,843	6,964	2,084

RETURN showing the RUNS and other HOLDINGS on or near to the proposed EAST COAST RAILWAY, betwixt WAIPARA and BLENHEIM.

Compiled from Official and other Sources.—September, 1882.

Name of Run or Locality.	Name of Holder.	Crown Lands in Run.	Freehold Lands in Run.	Sheep.	Cattle.	Horses.	Distance of Homestead from where they now ship their Produce.	Distance of Homestead from a Probable Station on the Proposed Railway Line.
		Acres.	Acres.	Acres.				
Glenmark	G. H. Moore	...	...	...	...	...	This property already served by the Central Railway betwixt Waipara and Waikari.	
Motunau	H. J. Hall	4,100	15,245	19,500	30	16	1 mile from Motunau Boat Harbour ...	About 8 miles; but road difficult.
Stoneyhurst	Clifford and Weld ...	1,799	21,000	18,000	28	34	2 miles from Stoneyhurst ,, ...	,, ,, ,,
Happy Valley	W. Robinson	...	8,440	80,000	400	80	2 ,, ,, ,, ...	,, ,, ,,
Cheviot Hills	,, ...	...	83,755				5 miles from Port Robinson	Near to station.
Cheviot Reserve	...	606	...	...	...	...		
Cabbage-tree Flat	Corlett Brothers ...	...	1,814	1,260	...	...	...	Near to station.
Parnassus	J. G. Anstey	921	43,701	32,390	54	24	16 miles from Amuri Boat Harbour ...	,,
Hawkeswood	J. McFarlane	...	38,982	25,000	65	30	12 ,, ,, ,, ...	About 3 miles to Pine Flat.
Hawkeswood Reserve ...	...	1,417	...	...	...	...	3 ,, ,, ,,	
Mendip Hills	A. W. Rutherford ...	1,280	13,780	9,000	12	15	13 ,, ,, ,, ...	About 3 miles to Pine Flat.
Ferniehurst	R. Tinline	...	3,126	2,883	14	13	11 ,, ,, ,, ...	About 1 mile to Pine Flat.
Conway Hills	,, ...	9,400	2,098	4,400	...	...	6 ,, ,, ,, ...	About 3 miles to Pine Flat.
Claverley	W. Smith	5,910	2,777	4,900	6	11	1 ,, ,, ,, ...	No probable station between Pine Flat and Kaikoura.
Ludstone	,, ...	...	2,655	2,455	2	12	2 miles from Kaikoura Harbour	About 2 miles.
Greenhills	Bullen Brothers ...	70,824	28,381	45,445	130	120	20 ,, ,, ,, ...	About 20 miles.
Swyncombe	W. D. Wood	13,950	13,070	3,922	30	10	7 ,, ,, ,, ...	About 5 miles.
Mount Fyffe	A. Collins	25,000	2,207	4,000	14	3	6 ,, ,, ,, ...	About 4 miles.
Kincaid	A. and H. Ingles ...	23,200	2,400	9,000	21	41	3 ,, ,, ,, ...	About 2 miles.
Kaikoura	Parsons Brothers ...	...	582	1,658	12	38	2 ,, ,, ,, ...	About 1 mile.
Waipapa Reserve	W. Gibson	1,500	...	2,000	26	6	2 miles from Waipapa Boat Harbour ...	About 1 mile.
Waipapa Native Reserve ...	,, ...	...	2,400					About 3 miles.
Waipapa	G. Gibson	56,000	3,408	11,000	20	10	6 ,, ,, ,, ...	,,
Woodbank	Trolove's Trustees ...	5,770	8,231	9,000	26	11	7 ,, ,, ,, ...	About 1 mile.
The Shades	J. Chayter	...	7,663	6,550	...	...	4 miles from Kekerangu Boat Harbour ...	About 4 miles.
Kekerangu, Part of	Symons's Trustees ...	74,515	23,562	41,500	100	55	1 ,, ,, ,, ...	About 1 mile.
Flaxbourne	Clifford and Weld ...	12,612	78,000	57,135	45	75	3 miles from Flaxbourne Boat Harbour ...	Near to station.
Starborough	R. Beamont	2,175	25,284	30,300	20	60	16 miles from Blenheim	,,
Fairfield Downs	Mrs. Stephens	...	5,522					
,, ,, ...	C. Fell	...	4,600					
Burtergill	W. Atkinson	...	3,099	1,073	10	8	15 ,, ,, ...	About 1 mile.
Dumgree	Renwick's Trustees ...	3,036	19,120	11,366	14	25	14 ,, ,, ...	About 2 miles.
Vernon	W. Clifford	...	18,501	14,480	...	...	7 ,, ,, ...	About 1 mile.
Richmond Brook	Major Richmond ...	6,180	23,733	13,908	17	19	17 ,, ,, ...	About 6 or 7 miles.
Blairich	P. R. McRae	21,280	8,488	9,500	50	15	17 ,, ,, ...	About 12 miles.
Weld's Hill	,, ...	16,665	22,042	19,000	40	31	25 ,, ,, ...	About 20 miles.
Altimarlock	M. Mowat	...	683	1,100	30	10	22 ,, ,, ...	About 17 miles.
Upton Downs	J. D. Busby	26,935	22,935	20,232	...	29	22 ,, ,, ...	,,
Gladstone	J. Tinline	10,500	11,640	7,000	...	11	40 ,, ,, ...	About 35 miles.
Kaikoura	Sundry farmers ...	...	4,000	7,600	867	301	1 or 2 miles from Kaikoura Boat Harbour ...	Average 1 or 2 miles.
Motunau	,, ...	...	500	...	170	113	Chiefly 1 mile from Motunau Boat Harbour ...	Motunau Flat; about 8 miles from railway-line.
Totals	...	395,575	577,424	526,557	2,253	1,226		

COMPARATIVE SUMMARY of LANDS and STOCK on the Two Proposed LINES of RAILWAY betwixt WAIPARA and PICTON.—September, 1882.

—	East Coast Railway.	Central Railway.
	Acres.	Acres.
Land held in occupation—freehold	577,424	795,621
Crown lands held under lease	395,575	1,385,139
Crown lands not yet taken up, estimated at ...	Nil	899,240
	972,999	3,080,000
Sheep	526,557	928,843
Cattle	2,253	6,964
Horses	1,226	2,084

COMPARATIVE RETURN of the POPULATION affected beneficially by Each of the Proposed LINES of RAILWAY betwixt WAIPARA and COOK STRAIT. Taken from the Census of 1881.—September, 1882.

Boroughs and Counties.	East Coast Railway. Total Persons.	Central Railway. Total Persons.
Ashley County, Part of	82	619
Cheviot County	102	Nil
Kaikoura County	1,105	Nil
Amuri County	Nil	513
Marlborough County: Awatere Riding	323	56
,, Wairau Riding	Nil	735
,, Spring Creek Riding ...	666	666
,, Omaka Riding	805	785
,, Picton Riding	798	798
Waimea County	Nil	7,535
Collingwood County	Nil	1,643
Blenheim Borough	2,107	2,107
Picton Borough	834	834
Nelson Borough	Nil	6,764
	6,822	23,055
Westland, Grey, Inangahua, and Buller (the railways of which districts would join the central line)	Nil	24,214
	6,822	47,269

No. 2.

REPORT by Mr. W. GARDNER as to the ADA PASS ROUTE.

Reefton Railway League,
Broadway, Reefton, 30th November, 1882.

GENTLEMEN,—

By direction of the Reefton Railway League, I have the honour to submit the enclosed circular for your favourable consideration, and, in respect thereto, to urge the practicability of travelling over the proposed Ada Pass railway route; and, further, respectfully submit that but a short time—"unattended with danger"—would be required to compass the journey.

I have further the honour to draw your attention to the situation of the Ada Pass on the map, as being the most central—"as indicated by the term"—of the several proposed railway routes going northwards, and from which a branch line of twenty-nine miles in length would connect the West Coast, by which all interests would be served.

I have, &c.,
HENRY GEO. HANKIN,
Secretary.

To the Honourable Members of the Royal Railway Commission.

Enclosure.

Reefton Railway League.

GENTLEMEN,—

At your request I have the honour to report that, during the time that I acted in the capacity of Engineer to the Inangahua County Council, I had occasion to make several trips through the Cannibal Gorge Pass, for the purpose of prospecting for a road-line to connect Reefton with the cattle-runs upon the Canterbury side of the Spencer Range.

During these journeys I discovered that the maps of that portion of the country were in error, as they each and all show the head waters of the Maruia River running north along the western base of the Spencer Range. I also discovered that the same error existed upon the Canterbury side of the range with respect to the head of the Ada River (a tributary of the Waiau-ua). As the maps show that, the Spencer Range acts as the divide between the heads of the Maruia and Ada Rivers.

The divide between the Maruia and Ada Rivers is a very low saddle; and the Maruia River, instead of going north on the western base of the Spencer Range, has cut its way through the heart of the Spencer Range to the Ada Saddle, which is the true divide between the head waters of the Maruia and Ada Rivers. This statement can be corroborated by Mr. George Walker, station proprietor, Maruia Plains, and Mr. W. L. Fowler, stationmaster, Lake Guyon. Moreover, and as a proof that the above statement is correct, on March 4th, 1880, at a quarter to 7 a.m., I left Fowler's station, on Lake Guyon, in company with Mr. George Walker, and on horseback made the passage of the Gorge and arrived in Reefton at 2 a.m. on the 5th, doing the journey in nineteen hours, including a rest of an hour on the Maruia Plains.

To travel across the Spencer Mountains would be a feat impossible on horseback; also, it must be taken into consideration that we had five and a half hours' travelling after nightfall. Moreover, it rained during the whole journey, insomuch that the Maruia River rose rapidly during the time we were passing through the gorge.

I have, &c.,
WILLIAM GARDNER,
Late Engineer, Inangahua County Council.

To the Members.

No. 3.

REPORT by Mr. J. G. BLACKETT on Mr. ROCHFORT'S PLANS, &c.

Memorandum for the Hon. Dr. Pollen, Chairman, Railway Extension Commission.

Public Works Office, Nelson, 9th December, 1882.

As requested by you, I have examined Mr. Rochfort's plans and section of the two routes, and find some few discrepancies and errors on both routes.

Central Route.—On plan he gives height of saddle as 3,070 feet above the sea, and on section 3,230 feet. The first height agrees very nearly with my own at head of Alma; the other may be at head of Travellers' Valley. I cannot make the difference between Travellers' Valley route and that down Alma more than 3½ miles, whereas Mr. Rochfort makes it 5 miles.

The Hossack Saddle is incorrectly called Hoosack by Mr. Rochfort. My heights agree so nearly with Mr. Rochfort's on this route that I do not think it necessary to give them.

East Coast Route.—The grades between 57½ miles and 62 miles on section Waipara to Blenheim are, if I remember Mr. Dobson's plan, incorrect, as I think he makes 1 in 50 throughout. This point could be settled by reference to Engineer in Charge, Middle Island. The grades between Ure River and Blenheim are all limited to 1 in 50, although shown steeper by Mr. Rochfort.

On Greenhills route, by Mr. Foy, Mr. Rochfort shows a 1-in-7 grade from Whale's Back to Conway and Charwell Saddle: this should be 1 in 7 Whale's Back to Conway River (see pencil line).

I enclose a skeleton tracing showing approximate position of East Coast, Central, and Maruia routes, which may be of service to you.

J. GEO. BLACKETT,
Engineer in Charge.

No. 4.

CORRESPONDENCE with Dr. HECTOR on WEST COAST PASSES, FORMATION, &c.

Middle Island Railway Extension Commission,
Wellington, 13th December, 1882.

SIR,—

It has been suggested to the Commissioners appointed to inquire and report upon the question of Middle Island railway extension that certain advantages might be obtained by a deflection of the main line westwards through a pass at or near the Cannibal Gorge, in order to give access to a district on the west side of the main range said to be rich in minerals, and to contain a considerable quantity of land suitable for agriculture. I have therefore to request that you will be good enough to inform me whether any geological survey has been made of the district lying between the Maruia River, the upper portion of the Buller River, and the main range as far southwards as the Cannibal Gorge; and what has been the result of that survey, if made.

I have, &c.,
DANIEL POLLEN,
Chairman, Middle Island Railway Extension Commission.

No. 5.

Colonial Museum of New Zealand, Wellington, 23rd January, 1883.

SIR,—

In reply to your letter of 13th December last, asking to be informed if any geological survey has been made of the district lying between Maruia River and the upper parts of the Buller River, and the main range as far west as Cannibal Gorge, I have the honour to state that a partial examination of the district in question was made by myself in 1868, and again in 1872, but that the district along the west flank of the Spencer Range is still unexplored.

My observations led me to believe that a very considerable area of the district, commencing from the west side of Rotorua Lake, is occupied by the same "coal formation" that contains valuable seams at Greymouth and Westport, and that the coal formation forms a succession of scarps facing the

Spencer Range, and resting at a considerable elevation on a series of highly mineralized rocks, comprising granite, diorite, and serpentine, cutting through Upper Silurian and Devonian rocks, which conditions are throughout New Zealand the most favourable for the development of mineral lodes.

Along the base of the scarps, and between them and the west base of the Spencer (or main) Range, it appeared to me, from distant views, as if there existed a succession of low saddles, and that probably an easy line of access might be obtained that would form part of an arterial line through the Island. The great advantage that will follow the opening-up of coal and other mineral deposits at the summit-level of such a line is very obvious, as the heavy freights would be down-hill in all directions, whether to Canterbury, Cook Strait, or the West Coast.

As soon as was possible after the receipt of your letter I despatched Mr. Cox, Assistant Geologist, to make a special examination of the district in question, and have instructed him as to the above points, fully explaining to him my previous observations. I expect to receive his report about the end of February, and will at once communicate the result to you. I may state that he started on the 4th instant; and, in a note dated the 18th instant, he informed me that "I find the coal formation is continuous from the Hope to Hampden, and, from its strike, would appear to flank Mount Murchison. It appears again close to Rotorua, as you told me, but I did not see the seam you mentioned. I hear that coal occurs up the Matakitaki for some distance, so I think you will be thoroughly borne out in your surmise as regards its extension, and so far the boundaries you sketched in on the map are very close to the truth. Granite and syenite form the whole block between the Rotorua and Rotoiti Lakes and the Buller, between the Devil's Grip and Owen River, at least close down to the latter place; and from there to Hampden the measures are standing at angles of 50° to 70°, striking N. to N. 40° W., and dipping easterly."

In another letter he states that "A quite low saddle—really no rise at all to speak of—occurs between the head of the Howard and the Rotorua Lake; and I am informed that the saddle between the Howard and Rotoiti is quite low, but it is quite impossible to travel it now owing to the quantity of fallen timber."

I have, &c.,
JAMES HECTOR,
Director.

The Hon. Dr. Pollen, Chairman, Middle Island Railway Extension Commission.

No. 6.

SIR,— Colonial Museum of New Zealand, Wellington, 21st March, 1883.

With reference to my letter of the 7th ultimo, and to former correspondence on the subject, I have now the honour to enclose a report by Mr. S. H. Cox, giving further information respecting the coal-area west of the Spencer Mountains.

I have, &c.,
JAMES HECTOR.

The Chairman of the Railway Commission,
Care of the Hon. the Minister for Public Works, Wellington.

REPORT on the DISTRICT between the MARUIA and BULLER RIVERS, by S. H. Cox, Assistant-Geologist.—26th February, 1883.

Instructions by Dr. Hector.

Wellington, 3rd January, 1883.

DURING the remainder of this season I wish you to devote your attention to the structure of the block of country extending from the source of the Buller River at Tophouse to the source of the Ahaura, and as far to the westward as the Maruia River.

The chief object will be to define the extent and value of the coal-formation which occupies a large portion of this district as defined, and to ascertain the best lines of access to any workable seams that may be found. So far as yet known the seams in that district all belong to the upper coal, at the base of the Island sandstone; but the existence of great plateaux of quartz-conglomerate towards the source of the Maruia renders it probable that the lower coal will also be found under conditions similar to those on the Mount Rochfort plateau.

You will find the following to be useful sections as a preliminary to the study of the district:—

1. Section of Hope Gorge, on the Buller.
2. Section across Lake Hill.
3. Section along Mount Roberts to main range (Mount Travers), and from source of Howard to upper end of Rotorua.

Narrative.

Wellington, 26th February, 1883.

I HAVE the honour to inform you that, in accordance with your instructions, herewith appended, I left Wellington, per s.s. "Taiaroa," on the 4th January, arriving in Nelson the following day, where I was delayed till the 9th, when I left for Tophouse. From the 12th till the 17th January I was engaged in examination of the country between Tophouse and the Rotorua Lake, and from there went by way of the Devil's Grip and Buller River to Hampden, where I arrived on the 18th. To the 27th I spent the time examining the coal-measures between Hampden and the Tutaki River, going by way of the Mangles and Tutaki and returning by the Matakitaki River; and on the 29th I left for the Maruia Plains by way of the Warbeck and Warwick Rivers. From the 31st January to the 3rd February I was engaged on an examination of the country between the Warwick and Sheriff Rivers, and down the Maruia; and from the 4th to the 8th February I examined the rocks in the vicinity of the Alfred River, and in the direction of the Cannibal Gorge, reaching Reefton by Walker's Track on the 9th February.

Report.

The country which I have examined in the course of my work lies to the westward of the Spencer Mountains, and is bounded by the Maruia and Buller Rivers. I was unable, in consequence of the Cannibal Gorge being blocked by driftwood, to return *viâ* the Rainbow, as you proposed; so went to Reefton by Walker's Track down the right-hand branch of the Inangahua River, and officially inspected the West Coast mines on my way back to Wellington.

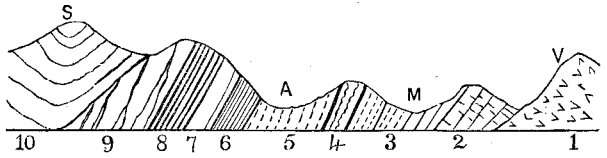
The result of my observations is to divide the formations represented in the district as follows:—

1. *Metamorphic crystalline rock.*
2. *Lower Devonian, or Upper Silurian.*—Crystalline limestone with carbon-schist and black calcareous slates, passing up into foliated quartzose schist, talc- and chlorite-schist, and fine-grained mica-schist. Garnets are common in the wash, but I did not see any *in situ*.
3. *Upper Devonian.* Te Anau series.
4. *Serpentines.*
5. *Lower Carboniferous.* Maitai series.
6. *Lower Greensand.* Lower coal-measures.
7. *Cretaceo-tertiary.* { *a.* Upper coal-measures. *b.* Clay-marls. *c.* Limestone.
8. *Lower Miocene.* Moutere gravels.
9. *Pliocene.* Moraines.
10. *Pleistocene.* River-plains, &c.

1. *Metamorphic Crystalline Rocks.*—The rocks of this formation are somewhat various in character, ranging as they do from a true granite to an almost pure hornblende rock, and passing at places into hypersthenite and gabbro, but whether as veins through the granitic beds or as local variations of the rock I have been unable to determine, owing to the fact that nearly all the country is covered with bush, thus making it a matter of impossibility without a great deal of work to do more than determine the boundaries of the wide formation. Rocks of this description were first met with as a small patch just below the Rotoiti Lake, and were traced through from there to the Howard, and thence over Lake Hill to Lake Rotorua; they are again met with down the Devil's Grip to the Hope River, and thence along the Buller until nearly reaching the Owen. From this point they rise to form Mount Murchison, and are again met with to the eastward of the track from Lake Rotorua to the Mangles; again in the Tiraumea River; and where the Tutaki forks between McGregor's and O'Loughlen's the right-hand branch is the line of division between them and the coal-measures. They are found in the Matakitaki River, between Hunter's station and Glenroy River, at which point this block of these rocks ends, but they are again met with as an isolated mass of granite in the hills to the westward of the Warbeck Creek, and forming the saddle between the Warbeck and Warwick Creeks. Another isolated patch of granite occurs on the western side of the lake which is at the head of the right-hand branch of the Sheriff River, but drains into the Alfred River; and the Victoria Mountains on the western side of the Maruia River are chiefly composed of them. A certain amount of interest attaches to these rocks, since they have lately been prospected for stanniferous deposits, and I brought several specimens for analysis, which were supposed by the prospectors to contain tin. I regret to state that in no instance was any trace of this metal found to be present, nor are the rocks which were forwarded such as would lead one to anticipate its association, being composed chiefly of hornblende and hypersthene.

2. *Lower Devonian, or Upper Silurian.*—A most interesting section of these rocks is met with at the head of the Maruia Plains and up the Alfred River, the lowest beds exposed being a white crystalline limestone which forms an isolated hill in the Maruia Plains, opposite the Alfred River, and is continued in the hill which lies between the Alfred and Sheriff Rivers, but is not well exposed there owing to the heavy bush which covers it. The presence of this limestone is, however, vouched for by the occurrence of some remarkable calcareous sinter-terraces immediately below the junction of the right- and left-hand branches of the Alfred River, which are about 400 feet in height in the aggregate, and have been deposited by calcareous waters. These terraces have been chiefly built up by a form of moss which grows luxuriantly on the calcareous deposits, layer upon layer becoming petrified in time, and a fresh growth being formed—the general effect is very beautiful.

Overlying this deposit of limestone, or marble as it may more properly be termed, we find certain black calcareous slates, and carbon slates and schists which bear a marked resemblance to some of the Devonian rocks of Reefton; they are striking N.–S., and dipping E. at an angle of 80°. These pass up into a very easily decomposed mica-schist, which, with alternations of chlorite and talc-schist, are continuous until we pass into hard, well-defined foliated quartzose schists, which represent the typical foliated schists of Otago. These foliated schists may be traced continuously through the ranges to Na-do Creek, on the Matakitaki River, and thence into the Mole River, where they wedge out between the metamorphic crystalline rocks and the Maitai slates of the Spencer Mountains, and are not traced farther in a northerly direction. The section is as follows:—



1. Metamorphic crystalline rocks. 2. Crystalline limestone (marble). 3. Calcareous slates, 4. Carbon slates and schists. 5. Fine-grained mica-schists. 6. Chlorite schists. 7. Mica-schists. 8. Talc-schists. 9. Foliated quartzose schists. 10. Maitai slates and sandstones. V. Victoria Mountains. M. Maruia River. A. Alfred River. S. Spencer Mountains.

These rocks deserve special mention for two reasons. Firstly. There is a large deposit of marble in the hill which occupies the head of the Maruia Plain, which, as far as can be judged from hand

specimens, is of a superior quality, being pure-white and of moderately fine grain. It is in a position which must be considered as easily accessible, since it is situated alongside one of the lines of railway which have been surveyed by Mr. Foy. Of course, until some work has been expended upon it, no one can say whether it will prove free from flaws and procurable in large blocks. Secondly. It is in all probability in the upper part of this formation that the reefs exist from which the alluvial gold of the Alfred River and Upper Matakitaki has been derived, and it is therefore probable that prospecting in the area of country occupied by this formation will eventually be attended with success; but I would specially direct the attention of explorers to the eastern side of the area along the western flanks of the Spencer Mountains.

3. *Upper Devonian* (Te Anau Series).—All the typical rocks of this series, the aphanite sandstones, the red and green breccias, and slates, are represented in this district, but occupy only a small surface-area. They are found on the western side of the beds last described, occurring as a narrow strip from the Matakitaki, at the lower part of Hunter's Plain, to the upper part of the Glenroy River. I have not paid any special attention to these beds, beyond locating them on the map.

4. *Serpentine.*—A belt of serpentine occurs, associated with the upper part of the last-mentioned series, forming a high bare hill which can be seen from Hunter's on the Matakitaki; and it is continuous to the Glenroy. There are reports that copper has been found in small quantities associated with these rocks, but I did not see any specimens of that metal.

5. *Lower Carboniferous* (Maitai Series).—These beds, which consist of the typical slates and sandstones of the Maitai series, form the great mass of the Spencer Mountains, and rest unconformably upon the crystalline metamorphic rocks in the vicinity of Lake Rotorua and Lake Rotoiti, and from there until nearly reaching the Matakitaki River, after which they are found to be lying on the foliated schists previously described. They are all lying at high angles with an easterly dip on the western side of the range; and in the neighbourhood of Cannibal Gorge they retreat towards the centre of the range, the foliated schists, &c., expanding in that direction. They have been prospected for reefs from time to time, but from what I can learn the creeks and rivers which drain through them have never carried sufficient alluvial gold to make them worth working, and no auriferous reefs have as yet been found.

6. *Lower Greensand.* Lower coal-measures.

7. *Cretaceo-tertiary.*
   - *a.* Upper coal-measures.
   - *b.* Clay-marls.
   - *c.* Limestone.

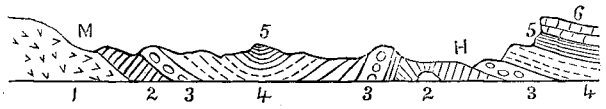
Although these beds are subdivided in the table and on the map, they will be most conveniently described together, since they are all part of one sequence. The formation extends from the Owen River to the Maruia River, and up the latter as far as the Sheriff River, being bounded in an easterly direction by the carbon-schists at the head of the Sheriff, the Te Anau beds and serpentines in the Glenroy, and the metamorphic crystalline rocks between the Matakitaki River and Mount Murchison. Another outcrop of granite is found on the western side of the Warbeck River, and extending towards the Maruia River, which the coal-measures envelop. The general arrangement of these beds is thus represented, roughly speaking, by two synclines with axes striking about N.E.; but these have also been plicated along their course, and thus we find the strike and dip of the rocks varying a good deal at different points, making the connection sometimes rather difficult to follow out. The beds throughout are standing at high angles, the dip generally being from 45° to 50°, and the only parts of the field where this is less is in the Matakitaki River, where the marls are seen between Glenroy and Hampden, and again in the Upper Maruia Plains, at which point the coal is probably at no great depth.

The division between the upper and lower coal-measures is marked by a belt of conglomerate of great thickness, which may be traced throughout the district, always occupying the same position in the sequence. An outcrop of this conglomerate occurs at the crossing of the Owen River, striking N. 40° W., and dipping S.W. at an angle of 50°; and this may be traced up on to the flanks of Mount Murchison on the side of Murchison Creek; and, following down the Buller, we find, at the junction of the Mangles River, that these beds are striking N.–S., and dipping E. at an angle of 70°, so that a syncline occurs between the Owen River and that point. The occurrence of this syncline is borne out by the fact that about a mile below the Owen River an inferior seam of coal, about 1 foot thick, belonging to the upper coal-measures, has been found; and, when we reach Hampden, two good seams of coal, 3 feet and 4 feet thick respectively, are seen on the banks of the Buller River, striking N. 40° W., and dipping N.E. at an angle of 45°. These coals are of good quality, as will be seen by the following analysis:—

	3-ft. Seam.	4-ft. Seam.
Fixed carbon	56·60	56·20
Hydro-carbon	38·79	38·82
Water	1·20	1·19
Ash	3·41	3·79
	100·00	100·00

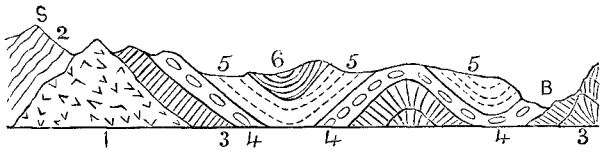
The ash is red, and the powder black; and they both cake strongly, the coke not puffing to any notable extent. Evaporative power: 3-feet seam, 7·3 lb.; 4-feet seam, 7·3 lb.

The strike of these seams of coal would carry them into the hill on which the trig. station has been placed to the eastward of the Town of Hampden, and Mr. Stewart informs me that he has found a seam at a point which would be absolutely on the line of strike, and that it was nearly 6 feet thick. I did not see this seam, nor hear of it until after I had left the district. After crossing the Matakitaki River the beds assume a S.W. dip; and near the junction of the Maruia another outcrop of coal has been found. The section from the Maruia to the Owen River is as follows:—



1. Granite. 2. Lower coal-measures. 3. Conglomerate. 4. Upper coal-measures. 5. Clay-marls (*P. pleuronectes*). 6. Limestone. H. Hampden. M. Mount Murchison.

In passing up the Mangles River the conglomerate is found for some distance with sandstones, as an anticline and subsequent syncline are passed, exposing them for some distance on the surface; but the conglomerate is not met with above the Blackwater Creek, the upper coal-measures coming in, consisting of sandstones and shales interstratified in thin bands, and with numerous thin and inferior seams of coal. Above this a belt of marls, with *Pecten pleuronectes*, &c., occurs, occupying the valley of the Mangles in the direction of the Rotorua Lake, and stretching by way of the head of Blackwater Creek to the Matakitaki River, as shown on the plan. Another belt of the conglomerate is seen in the Tiraumea River, striking N. 40° E., and dipping N.W. at an angle of 45°, and the lower coal-measures here rest on the metamorphic crystalline rocks. The following section from the Tiraumea to the mouth of the Mangles will show the mode of occurrence of the various beds:—



1. Granite. 2. Maitai slates and sandstone. 3. Lower coal-measures, with coal-seams. 4. Conglomerate. 5. Upper coal-measures. 6. Clay-marls (*P. pleuronectes*). S. Spencer Mountains. B. Buller River.

This belt of conglomerate may be traced into the Tutaki River, and follows the right-hand branch where the river forks, being found again in the Matakitaki River, which it crosses, and, flanking the boss of granite near the Warbeck, is seen on the Maruia side of the range striking N. 40° W., and dipping S.W. at an angle of 45°. An anticline is seen on the Maruia Plain between Moonlight's store and Walker's station, the conglomerate on the eastern side striking N. 40° W., and dipping N.E. at an angle of 30°; and in the Sheriff River, a syncline having been passed, the dip is again to the S.W.

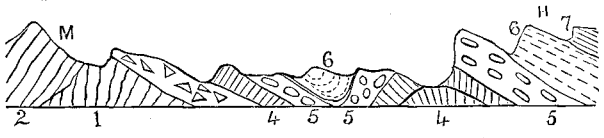
This syncline runs through to the mouth of the Glenroy River, at which point a seam of coal has been struck, 2 feet thick, striking N.–S., and dipping E. at an angle of 70°, the following analysis of which shows that it is of very good quality:—

Analysis of Glenroy Coal.

Fixed carbon	61·68
Hydro-carbon	32·07
Water	3·96
Ash	1·99
	100·00

The ash is red, and powder black; and the coal cakes without puffing to any notable extent. Evaporative power, 8·0 lb.

A section of these beds taken from the head-waters of the Matakitaki to Hampden is as follows:—



1. Foliated schists. 2. Maitai slates and sandstones. 3. Te Anau series. 4. Lower coal-measures. 5. Conglomerates. 6. Upper coal-measures. 7. Clay-marls. M. Spencer Mountains. H. Hampden.

and a section from the Maruia to Sheriff River further illustrates the position of the beds, and includes a steep syncline near the mouth of the Warwick River, where the upper coal-measures, with about dozen thin seams of coal, are exposed.

It will be seen from the foregoing report, and by a reference to the map, that the lower coal-measures, which are those only which need engage our attention from an economic point of view, flank the older rocks—

1. Down the Buller River between the Owen River and Hampden, seams of coal having been found at the latter locality.

2. From the Tiraumea through the Matakitaki and thence to the Maruia, where they surround a granite boss, and from a syncline on the Maruia Plains, which extend to Glenroy River; and a seam of coal has been found in these beds at Glenroy.

3. That a syncline of coal-measures exists in the lower Matakitaki River; but, as a large development of the marls and upper coal-measures is exposed at the surface, the coal must be at considerable depth, while, the syncline in the Maruia Plains being in the conglomerates and lower coal-measures, the coal-seams in this locality may be expected at such a depth as would permit of their being worked, and the angle of dip at this point is much less than in most other localities.

With regard to the lines of access to these coals, I may point out that Mr. T. M. Foy has reported on a line of railway which was proposed to be taken down the Maruia Plains, thence by way of the Warwick and Warbeck Rivers to the Matakitaki River, then to follow down the Matakitaki River to Hampden, and thence by the Buller River to Lake Rotoiti, and by the Black Valley to Tophouse. In this report he points out that, in crossing the saddle of the Warwick and Warbeck Rivers, the following grades would be obtained:—1 in 9, 60 chains; 1 in 11, 25 chains; 1 in 15, 15 chains; 1 in 20,

Geological Survey of New Zealand.

JAMES HECTOR, C.M.G., F.R.S., DIRECTOR.

REFERENCE.

1.	Granite and crystalline rocks.	
2.	Crystalline limestone (marble).	
3.	Carbon-slates, and blue calcareous slates.	
4.	Foliated schists, with talc and chlorite schists.	
5.	Serpentine.	
6.	Te Anau series (Upper Devonian).	
7.	Maitai series (Lower Carboniferous).	
8.	Lower coal-measures (Lower Greensand).	
9.	Conglomerates.	Cretaceous.
10.	Upper coal-measures.	
	Clay-marls (*P. pleuronectes*, &c.).	
12.	Limestone.	
13.	Moutere gravels (Miocene).	
14.	Old moraines.	
15.	Recent deposits.	
++++	Proposed alternative route for railway.	

GEOLOGICAL SKETCH MAP

OF THE

EASTERN SIDE OF THE UPPER BULLER

Scale. 8 Miles to an Inch

NOTE.

Bridle Tracks -------

Dray Roads ~~~~~

Railway Lines explored —·—·—

" " *surveyed* ======

To illustrate report by S. Herbert Cox, Assistant Geologist.

Lithographed at the General Survey Office, Wellington, N.Z. May, 1883.

65 chains; and at the saddle to Tophouse a grade of 1 in 20 for 100 chains. He says, "These grades over the worst part of the line, I consider, are sufficient to condemn this route, especially as I fear the grade of 1 in 9, the steepest, cannot be improved."

An improvement in this line could be effected between the Matakitaki at the junction of the Warbeck and the Rotoiti Lake if, instead of going down the river to the Buller, the line were taken up the Matakitaki Plains to Hunter's station, thence over the moraine which forms the head of the Tutaki, and by O'Loughlen's and McGregor's to the Mangles, thence by the Mangles to Lake Rotorua, and, passing up the eastern side of this lake, cross by an almost imperceptible saddle to the Howard River, then down the Howard and up the Buller to connect with the surveyed line again. By this route, a fall of 500 feet between the Warbeck River and Hampden would be saved, but at the expense of a rise of about 300 feet between the Warbeck and O'Loughlen's, which could, however, be accomplished by easy grades.

The steep grades mentioned by Mr. Foy would still have to be contended with, and I can see no route through this district which will avoid them.

Either of these routes would pass through belts of the lower coal-measure, as will be seen by the plan, and would doubtless have the effect of opening up a considerable area of valuable coal.

Before leaving these beds I should point out that from time to time parties of diggers have engaged in prospecting for reefs areas of country occupied by these rocks, but without success. They have been led to suppose that reefs existed because in Murchison Creek, the Mangles River, and Glenroy River coarse gold has been found, at times associated with quartz, in the lower parts of their course, whereas the upper parts of these rivers were either barren or only carried fine gold of quite a different character. This distribution of gold was, no doubt, sufficient reason for their expecting reefs in the district; but when we come to examine the distribution of the coal conglomerate, and find that above where the various creeks and rivers cut through this rock the change in the character of the alluvial gold takes place, we are forced to the conclusion that it is probably to the conglomerates the coarse gold must trace its origin, more especially because whenever quartz has been found associated with the gold it is waterworn. Under these circumstances it does not appear likely that prospecting for reefs in this formation will be successful.

8. *Lower Miocene* (Moutere Gravels).—These beds occupy but an unimportant place in the district which I have examined. They occur in the Slips Hill, this wide-spread formation being terminated here in this direction, unless a few outlying patches of gravel, of no importance, may perhaps belong to them, serving to mark their former extension.

9. *Pliocene* (Moraines).—I have only seen two moraines during my trip: one occupying the Black Valley below Tophouse, marking the course of the Rotoiti glacier; and another, at the head of the Tutaki River, which was deposited by the Matakitaki glacier when the drainage from Mount Una followed the course of the Tutaki River. In speaking of these deposits, it is important to note that at the time of the extension of the glaciers, and probably for some time subsequently, the main drainage-channels followed a very different course from what they now possess: thus the Upper Matakitaki drained down the Tutaki River, and thence by that branch of the Mangles which now heads towards Lake Rotorua, and either through the "grassy patch" to Murchison Creek, or more probably through to the Rotorua Lake. The glacier which wore out the Rotorua basin would appear to have passed through what is now quite a low saddle to the Howard River, and may possibly have flowed from there to join the Rotoiti, as I am informed there is a depression along that line, which is, however, impassable at present, owing to the great quantities of fallen timber. The result of this drainage is that all the hills to the westward of the Spencer Mountains stand up as a series of isolated mountain-masses with valleys all round them, and make the travelling of this country, which would otherwise be a work of great difficulty, comparatively simple.

10. *Pleistocene* (River-plains, &c.).—These are of interest as forming the only flat ground which exists in the district, and, although of no great extent, there are still some nice little patches. The most important of these is the Maruia Plain, which is about twenty miles long and from one mile to two miles wide. Much of the land is very inferior, but some parts appear to be of very good quality. Another small plain is situated on the Matakitaki River, above the gorge near the Glenroy, and is occupied by Mr. Hunter; while in the lower part of the Matakitaki River, and on the Four-Mile Plain at Hampden, there is a fair extent of open country. Again, between O'Loughlen's and McGregor's there are a few thousand acres of good open pastoral land, which, judging from the amount of feed to be seen, should be of good quality; and some more patches occur towards the Rotorua Lake. In the Howard Valley, and again at the head of the Buller River, near Lake Rotoiti, there are considerable flats, but, although there is a small extent of fair quality, they are generally very poor.

I have, &c.,
S. Herbert Cox,
Assistant Geologist.

No. 7.

RETURN AS TO VALUE OF LAND ALONG THE CENTRAL AND THE EAST COAST ROUTE.

(Prepared under the direction of the Property-Tax Commissioner, but not completed until after the presentation of the Report.)

APPROXIMATE VALUE of FREEHOLD, CROWN, and NATIVE LANDS included within the Twelve-Mile Limit of the CENTRAL ROUTE.

Name of Road District or County.	Freehold.	Crown.	Native.
	£	£	£
Amuri Road District	411,539	233,375	*Nil*
Cheviot Road District	216,997	1,240	*Nil*
Picton Road District	12,301	5,342	310
Pelorus Road District	20,566	16,909	475
Awatere Road District	22,829	15,510	*Nil*
Wairau Road District	262,912	38,897	*Nil*
Spring Creek Road District	107,000	*Nil*	*Nil*
Upper Motueka Road District	2,330	4,000	*Nil*
Motupiko Outlying District	*Nil*	3,200	*Nil*
Wai-iti Outlying District	*Nil*	6,172	*Nil*
Inangahua County	3,236	23,995	*Nil*
Omaka Road District (Renwick Subdivision)	96,600	*Nil*	*Nil*
Kaikoura County	2,442	857	*Nil*
	1,158,752	349,497	785

APPROXIMATE VALUE of FREEHOLD, CROWN, and NATIVE LANDS included within the Twelve-Mile Limit of the COAST ROUTE.

Name of Road District or County.	Freehold.	Crown.	Native.
	£	£	£
Awatere Road District	382,702	24,736	*Nil*
Amuri Road District	80,979	9,123	*Nil*
Cheviot Road District	371,934	2,897	*Nil*
Kaikoura County	184,744	70,291	1,594
Omaka Road District (Opawa Subdivision)	127,467	*Nil*	*Nil*
	1,147,826	107,047	1,594

NOTE.—That portion of the Borough of Blenheim coming within the twelve-mile limit of this route is not included in either of the above valuations.

23rd February, 1883.

J. SPERREY,
Property Tax Commissioner.

By Authority: GEORGE DIDSBURY, Government Printer, Wellington.—1883.